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MCAS EL TORO
SSIC NO. 5090.3

TRANSMITTAL

Date: 12 November 2002

From: Lynn Marie Hornecker

LMH

To: **John Broderick**
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, California 92501-3339

Subj: Supplementary Information
Oil/Water Separator (OWS) Site 672A
Former Marine Corps Air Station, El Toro

This transmittal includes a response to the Regional Water Quality Control Board (RWQCB) comments on the Site Assessment Report for OWS Site 672A at the former Marine Corps Air Station, El Toro. The RWQCB comments state that limited sampling has been conducted at OWS Site 672A and that the petroleum release has not been sufficiently characterized.

Transmitted as the attachments are a copy of the Regional Water Quality Control Board comments dated 28 September 2000 and an information package for OWS Site 672A at the former Marine Corps Air Station, El Toro. OWS Site 672A is located within a fenced compound formerly used as an aircraft refueling vehicle wash facility. Two former Underground Storage Tank (UST) Sites – UST Sites 672 and 672B – are located within the compound, approximately 250 feet east of OWS Site 672A, and the UST sites were closed by the RWQCB in 1999 (RWQCB Case Number 083003209T).

OWS Site 672A is located within the boundary of Installation Restoration Program (IRP) Site 24 - the Volatile Organic Compound (VOC) Source Area. OWS Site 672A is located within the southern section of the trichloroethylene (TCE) plume in the vadose zone of IRP Site 24. OWS Site 672A also overlies the Operable Unit 1 VOC groundwater plume. An interim Record of Decision (ROD) for the vadose zone of IRP Site 24 was signed in 1997, and the ROD for Operable Unit 1 was signed in 2002.

We discussed the RWQCB comments and some of the planned Navy responses with you during our recent site visit on 31 October 2002. During the site visit, we observed the location of a nearby vapor extraction well, 24SVE141A, that was used during the verification and remediation activities for the vadose zone of IRP Site 24 - the Volatile Organic Compound (VOC) Source Area. OWS Site 672A is located within the radius of influence for vapor extraction well 24SVE141A. The attached Information Package includes an exhibit showing the locations of several nearby IRP Site 24 sample points and a photograph showing the proximity of vapor extraction well 24SVE141A to OWS Site 672A.

We believe that the information collected adjacent to OWS 672A during the Resource Conservation and Recovery Act Facility Assessment (RFA) in 1992, during the verification sampling in 1999, and during the verification and remediation activities at IRP Site 24 show that the petroleum release from OWS 672A is limited to an area approximately 50 feet long by 30 feet wide, and that the greatest petroleum hydrocarbon concentrations are found near the intermediate vadose zone of the IRP Site 24 TCE release. Information from the RFA, the OWS 672A verification sampling, and the IRP Site 24 sampling activities is presented in the Summary Table in this transmittal. The attached Information Package includes excerpted material from the source documents for historical field sampling activities that are summarized in the Summary Table.

The following paragraphs summarize information from historical sampling activities at or near OWS Site 672A.

Resource Conservation and Recovery Act Facility Assessment (RFA) and RFA Target Clean-up Levels.

Several sites were evaluated within the Refueling Vehicle Compound during the RFA. During the 1992 RFA Sampling Visit, the highest Total Recoverable Petroleum Hydrocarbon (TRPH) concentration of 11,008 mg/kg was measured in the 25-foot sample from boring 173B1 adjacent to the east side of OWS 672A. TRPH was measured by Method 418.1. Benzene was detected as an estimated concentration of 37 "J" micrograms per kilogram in the 25-foot sample, and benzene was not detected in the other samples collected at depths of 5 feet, 10 feet, 15 feet, and 20 feet.

The RFA Report recommended further evaluation for OWS 672A and sites with similar TRPH concentrations. The target clean-up levels for TRPH that were established for petroleum releases during the RFA were considered along with Orange County Health Care Agency (OCHCA) guidelines and site-specific criteria recommended by the RWQCB for tank sites with releases of petroleum hydrocarbons. Usually, the results from Method 8015-modified for TPH-diesel, TPH-motor oil, and TPH-gasoline are considered during the evaluations of releases at petroleum sites. The Navy has not observed a consistent correlation between high TRPH concentrations identified during the RFA and high TPH-diesel, TPH-motor oil, or TPH-gasoline concentrations measured in subsequent site verification activities.

Verification Activities of 1999.

The Marine Corps Air Station, El Toro closed on 2 July 1999. The aircraft refueling vehicle wash rack that discharged wash water to OWS 672A was taken out of service prior to 2 July 1999. During the sampling activities of 1999, the highest TPH-diesel concentration of 1,200 mg/kg was detected in the 50.5-foot sample from boring SB-02. The highest TPH-gasoline concentration of 20 mg/kg was detected in the 50-foot sample. The TPH-motor oil was not detected at or above the reporting limit of 110 mg/kg in the 50.5-foot sample. TPH-diesel was not detected at or above reporting limits in the 21-foot sample from SB-02, and TPH-diesel was detected at 76 mg/kg in the 30.5-foot sample from SB-02.

Leachate concentrations of TPH-diesel, TPH-gasoline, and TPH-motor oil were measured by the Synthetic Precipitation Leaching Procedure (SPLP) in accordance with the recommendation for similar sites in the RWQCB letter dated 13 August 1996. A copy of the 13 August 1996 letter is included in the Information Package for a petroleum site with a similar vadose zone release (UST Site 272). The SPLP information for UST Site 272 indicates a low leaching potential due to low concentrations of TPH in the leachate samples, and the RWQCB closed UST Site 272 after evaluating the SPLP data. The RWQCB also considered the SPLP data for the near UST Sites 672 and 672B (Case 083003209T).

The leachate concentration for OWS Site 672A was 1.7 mg/L for diesel range petroleum hydrocarbons which is significantly lower than the concentration of 1,200 mg/kg in the corresponding soil sample. The low leaching potential of the residual petroleum hydrocarbons indicates a low risk to groundwater quality.

Installation Restoration Program (IRP) Site 24 Data.

A soil gas survey was conducted during the Remedial Investigation (RI) of IRP Site 24 during the summer of 1994. The 1994 survey identified potential sources of VOCs at OWS 672A and at UST Sites 672 and 672B. A release of petroleum hydrocarbons at the former UST Sites 672 and 672B, located east of OWS 672A, however, no releases were identified at OWS Site 672A. In 1994, samples were collected from two soil gas sample points in the vicinity of OWS 672A: 24_SG264 was located adjacent to the south side of OWS 672A and 24_SG262 was located approximately 100 feet west of OWS 672A. A sample was collected at a depth of 15 feet below ground surface (bgs) at the nearest sample point, 24_SG264, and no volatile petroleum hydrocarbons or volatile organic compounds were detected at or above reporting limits. Also, no volatile petroleum hydrocarbons and no volatile organic compounds were detected at or above reporting limits (with the exception of CIS 1,2-DCE at 1.1 micrograms per liter in the 20-foot sample) in the two samples (collected at 12 and 20 feet bgs) from 24_SG262.

Soil gas samples were collected during 1999 in order to verify conditions and to optimize the design of the vapor extraction well field for the vadose zone remediation of IRP Site 24. Three soil gas samples were collected approximately 100 feet northwest of the site in February 1999 at sample point 24SG137 at depths of 48, 76, and 97 feet below ground surface, and TCE was not detected at or above laboratory reporting limits. Freon 113 was detected at 474 micrograms per liter in the 76-foot sample. No other VOCs were detected at 1 microgram per liter in vapor samples from 24SG137.

Vapor extraction wells were constructed in the vicinity of OWS Site 672A during the verification and remediation activities at IRP Site 24. Two wells are located along "R" Street in the vicinity of OWS Site 672A.

Vapor samples were collected from well 24SVE141A that is located less than 100 feet south of OWS Site 672A. The well is screened from 50 to 80 feet bgs, and the baseline TCE concentration (in January 2000) was 2.4 micrograms per liter. BTEX compounds were not detected at or above 1 microgram per liter.

Vapor samples were collected from well 24SVE138A that is located within approximately 200 feet west-southwest of OWS Site 672A. The well is screened from 44 to 70 feet below ground surface, and the baseline TCE concentration (in June 1999) was 139.8 micrograms per liter. No BTEX compounds were detected at or above 1 microgram per liter.

Information from two nearby groundwater monitoring wells was considered during the evaluation of OWS Site 672A. Petroleum hydrocarbons have not been detected in water samples from the two nearby wells.

The residual petroleum hydrocarbons at OWS Site 672A are not anticipated to pose a significant threat to groundwater due to the low leaching potential as demonstrated by the SPLP test result, the low concentration of benzene (37 micrograms per liter "J") in the 25-foot sample that was collected in 1992, and the low vapor concentrations of VOCs that were measured during the verification and remediation activities at IRP Site 24 vadose zone. As of November 2002, the California Department of Toxic Substances Control and the United States Environmental Protection Agency have submitted written concurrence of the closure of the vadose zone of IRP Site 24.

We continue to recommend no further action status for OWS 672A based upon the information presented in the Site Assessment Report dated 1999 and the clarifications provided in this transmittal.

Please do not hesitate to call me at (619) 532-0783 if you have questions pertaining to this transmittal.

Attachments:

RWQCB comments dated 28 September 2000
Information Package, OWS Site 672A (SWDIV 12 November 2002)

CF w/attachments:

Dean Gould (BRAC Environmental Coordinator, MCAS El Toro)
CSO/El Toro
Administrative Record File
Project File (MCAS El Toro)

Summary Table of Sampling Activities at or near OWS Site 672A Former Marine Corps Air Station, El Toro

Sample Location Identifier	Sample Results	Comments and/or Sources of Information																					
<i>Resource Conservation and Recovery Act Facility Assessment Sampling Visit of 1992</i>		Sampling visit data was published in the "Installation Restoration Program, Final Resource Conservation and Recovery Act Facility Assessment Report for Marine Corps Air Station, El Toro" (Jacobs Engineering Group 1993).																					
173B1 25-foot deep vertical boring adjacent to east side of OWS 672A with samples collected at 5, 10, 15, 20, and 25 feet below ground surface (bgs)	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Depth</th> <th style="text-align: center;">Total Recoverable Petroleum Hydrocarbons (TRPH)</th> <th style="text-align: left;">Other</th> </tr> </thead> <tbody> <tr> <td>5-foot:</td> <td style="text-align: center;">ND</td> <td></td> </tr> <tr> <td>10-foot</td> <td style="text-align: center;">496 mg/kg</td> <td></td> </tr> <tr> <td>15-foot</td> <td style="text-align: center;">8,341 mg/kg</td> <td></td> </tr> <tr> <td>15-foot duplicate</td> <td style="text-align: center;">2,153 mg/kg</td> <td></td> </tr> <tr> <td>20-foot</td> <td style="text-align: center;">1,606 mg/kg</td> <td></td> </tr> <tr> <td>25-foot</td> <td style="text-align: center;">11,008 mg/kg</td> <td style="text-align: left;">Benzene 37 ug/kg "J"</td> </tr> </tbody> </table>	Depth	Total Recoverable Petroleum Hydrocarbons (TRPH)	Other	5-foot:	ND		10-foot	496 mg/kg		15-foot	8,341 mg/kg		15-foot duplicate	2,153 mg/kg		20-foot	1,606 mg/kg		25-foot	11,008 mg/kg	Benzene 37 ug/kg "J"	<p>OWS 672A was designated Solid Waste Management Unit (SWMU) 173 during the RFA. Boring 173B1 was located within 10 feet of OWS Site 672A.</p> <p>The TRPH concentrations of 8,341 mg/kg and 11,008 mg/kg exceed thresholds that were considered during the RFA, however, the Orange County Health Care Agency and/or the RWQCB have not relied upon RFA data alone in the evaluation or closure of petroleum storage tank sites.</p>
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5-foot:	ND																						
10-foot	496 mg/kg																						
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15-foot duplicate	2,153 mg/kg																						
20-foot	1,606 mg/kg																						
25-foot	11,008 mg/kg	Benzene 37 ug/kg "J"																					
<i>OWS Site 672A Verification Activities of 1999</i>		Results are published in the "Site Assessment Report, Oil/Water Separator Site 672A, Marine Corps Air Station, El Toro, California" (OHM Remediation Services Corp. 1999) and Figure 4-1 of the report summarizes the analytical results.																					
SB-01 30.5-foot boring with samples collected at 9.5, 20.5, 21, and 30.5 feet bgs	The maximum total petroleum hydrocarbon (TPH) concentration was measured as TPH-gasoline at 0.2 mg/kg "J" in the 30.5-foot sample. Petroleum hydrocarbons as diesel or motor oil were not detected at or above reporting limits in the samples from SB-01.	<p>SB-01 is adjacent to the north side of OWS 672A and within 10 feet of OWS Site 672A. SB-01 is located within approximately 15 feet of RFA boring 173B1.</p> <p>Benzene and MTBE were not detected at or above reporting limits.</p>																					
SB-02 50.5 foot boring with samples collected at 21, 30.5, and 50.5 feet bgs	The maximum total petroleum hydrocarbon (TPH) concentration was measured as TPH-diesel at 1,200 mg/kg in the 50.5-foot sample; the corresponding TPH-diesel leachate concentration by the Synthetic Precipitation Leaching Procedure (SPLP) was 1.7 mg/liter.	<p>SB-02 is adjacent to the west side of OWS 672A and within 10 feet of OWS Site 672A. SB-02 is located within approximately 30 feet of RFA boring 173B1.</p> <p>Benzene and MTBE were not detected at or above reporting limits.</p> <p>SPLP analyses have been routinely conducted at various petroleum sites. The RWQCB letter dated 13 August 1996 recommended the use of SPLP at several tank sites to evaluate the potential risk to groundwater quality due to the presence of residual petroleum hydrocarbons in the vadose zone. An example, is former UST Site 272, and the UST Site 272 closure letter is included in the Information Package.</p>																					

Summary Table of Sampling Activities at or near OWS Site 672A (Continued)

Sample Location Identifier	Sample Results	Comments and/or Sources of Information
<i>IRP Site 24 Soil Gas Survey of Summer 1994</i>		Results of survey are published in "Marine Corps Air Station, El Toro, California, Installation Restoration Program, Remedial Investigation/Feasibility Study, Final Soil Gas Survey, Technical Memorandum, Sites 24 and 25" (Jacobs Engineering Group 1994).
24_SG264 (also known as 264) with sample collected at 15 feet below ground surface (bgs)	Total Petroleum Hydrocarbons (TPH), benzene, toluene, ethylbenzene, and xylenes (BTEX compounds), and other volatile organic compounds (VOCs) were not detected at or above reporting limits.	Soil gas point 264 is located adjacent to the south side of OWS Site 672A. Point 264 is located within approximately 20 feet of OWS Site 672A.
24_SG262 (also known as 262) with samples collected at 12 and 20 feet bgs	Total Petroleum Hydrocarbons (TPH), benzene, toluene, ethylbenzene, and xylenes (BTEX compounds), and other volatile organic compounds (VOCs) were not detected at or above reporting limits with the exception of CIS 1,2-DCE at 1.1 microgram per liter in the 20-foot sample.	Soil gas point 262 is located approximately 100 feet west of OWS Site 672A.
<i>Phase II RI at IRP Site 24 (Summer 1995)</i>		Results are published in the "Draft Final Phase II Remedial Investigation Report, Operable Unit 2A – Site 24, Marine Corps Air Station, El Toro, California" (Bechtel 1996).
24_SG8 (near soil gas point 24SG137) with soil gas samples collected at 42, 74, and 92 feet bgs	Freon 113 was detected in all samples with the maximum concentration of 2,150 micrograms per liter in the 74-foot sample. BTEX compounds were not detected at or above reporting limits.	Soil gas point 24_SG8 is located approximately 100 feet northwest of OWS Site 672A in the vicinity of 24SG137.
Soil Gas Sample Points near Former UST Sites 672 and 672B	BTEX compounds and total volatile hydrocarbons were detected in 1994 near the location of former UST Sites 672 and 672B.	USTs 672 and 672A are located approximately 250 feet east of OWS Site 672A. USTs 672 and 672B have been removed and the tank sites have been closed by the RWQCB.
<i>Verification and Remediation Activities, Vadose Zone of IRP Site 24 (1998-2000)</i>		Data was taken from the following reports: "Draft System Evaluation and Optimization Report, IRP Site 24, Vadose Zone Remediation, Marine Corps Air Station, El Toro, California" (EarthTech May 1999); "Draft Final Site Closure Report, Vadose Zone Remediation, IRP Site 24, Volatile Organic Compounds Source Area, Former Marine Corps Air Station, El Toro, California" (EarthTech June 2002).
24SG137 (near 24_SG8) with soil gas samples collected at 48, 76, and 97 feet bgs during February 1999	TCE was not detected at or above the laboratory reporting limit, and BTEX compounds were not detected at or above a concentration of 1 microgram per liter. Freon 113 was detected at 474 micrograms per liter in the 76-foot sample.	Soil gas point 24SG137 is located approximately 100 feet northwest of OWS Site 672A.
24SVE141A (screened interval: 50 – 80 feet bgs); Flow: 170 standard cubic feet per minute (scfm)	TCE was detected at 2.4 micrograms per liter and Freon 113 was detected at 33 micrograms per liter in January 2000. Other VOCs were not detected at or above reporting limits.	Vapor extraction well 24SVE141A was constructed in January 2000. 24SVE141A is located south of and less than 100 feet of OWS Site 672A. Groundwater was encountered at approximately 85 feet bgs during construction of 24SVE141A. The radius of influence of 24SVE141A is 190 feet.

**Summary Table of Sampling Activities at or near OWS Site 672A
 (Continued)**

Sample Location Identifier	Sample Results	Comments and/or Sources of Information
<p align="center">24SVE138A (screened interval: 44 - 70 feet bgs) Flow: 70 scfm</p>	<p>TCE was detected at 139.8 micrograms per liter in June 1999. Other VOCs were detected.</p>	<p>Vapor extraction well 24SVE138A is located approximately 200 feet southwest of OWS Site 672A.</p>
<p align="center"><i>Phase I Remedial Investigation (RI) Groundwater Monitoring Wells</i></p>		<p>Data was taken from "Marine Corps Air Station, El Toro, California, Installation Restoration Program, Remedial Investigation/Feasibility Study, Groundwater Quality Data Report" (Jacobs Engineering Group 1994).</p>
<p align="center">18_PS8 08_UGMW29</p>	<p>Total Recoverable Petroleum Hydrocarbons (TRPH), Total Petroleum Hydrocarbons as Volatiles, and Total Petroleum Hydrocarbons as Diesel were not detected in water samples from wells 18_PS8 and 08_UGMW29 during the Phase I RI in 1992 and 1993.</p>	<p>Well 18_PS8 is located several hundred feet downgradient from OWS Site 672A. TCE, PCE, carbon tetrachloride have been detected in water samples collected from 18_PS8.</p> <p>Well 08_UGMW29 is located approximately 150 feet southwest of OWS Site 672A, and TCE has been detected in water samples from well 08_UGMW29.</p>



California Regional Water Quality Control Board

Santa Ana Region



Winston H. Hickox
Secretary for
Environmental
Protection

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Gray Davis
Governor

September 28, 2000

Mr. Dean Gould
BRAC Environmental Coordinator
MCAS El Toro
P O Box 51718
Irvine, CA 92619 -1718

COMMENTS ON SITE ASSESSMENT REPORT, OIL/WATER SEPARATOR SITE 672A, MARINE CORPS AIR STATION, EL TORO

Dear Mr. Gould:

We have completed our review of the above-referenced document, dated September 16, 1999, which we received on September 27, 1999. We do not concur with the recommendation for no further action based on the following comment:

The boring taken in 1991 as part of the RCRA Facility Assessment reported 11,006 mg/kg TPH at 25 feet bgs, 1,606 mg/kg TPH at 20 feet bgs, and 2,153 and 8,341 mg/kg TPH at 15 feet bgs. After closing the OWS in place during March 1999, two confirmation soil borings were advanced. Samples from boring 672A SB02 were collected at 20, 30, and 50.5 feet bgs. The sample from 50.5 feet bgs reported 1,200 mg/kg TPH-diesel. The values from the RFA and site verification activities are above the target clean-up level for the Station. Based on this limited sampling, and the analytical results above the target clean-up level, the soil characterization at the OWS site is insufficient to warrant closure.

For any questions on this review or related matters, please call me at (909) 782-4494.

Sincerely,


John Broderick
SLIC/DoD/AGT Section

cc: Ms. Triss Chesney, Department of Toxic Substances Control, OMF
Mr. Gregory F. Hurley, El Toro RAB Co-Chair
Ms. Lynn Hornecker, Naval Facility Engineering Command, SWDIV
Mr. Glenn Kistner, U.S. EPA, Region IX

California Environmental Protection Agency

Information Package

Oil/Water Separator Site 672A
Solid Waste Management Unit (SWMU) 173
Former Marine Corps Air Station, El Toro, California

12 November 2002

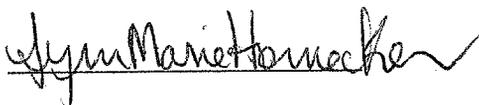
Prepared by:
Southwest Division, Naval Facilities Engineering Command
BRAC Programs Office
San Diego, CA 92101-2404

Information Package

Oil/Water Separator Site 672A
Solid Waste Management Unit (SWMU) 173
Former Marine Corps Air Station, El Toro, California

12 November 2002

Prepared by:



Lynn Marie Hornecker
Project Manager

Southwest Division, Naval Facilities Engineering Command
BRAC Programs Office
San Diego, CA 92101-2404

INFORMATION PACKAGE

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- FIGURE 1. OWS 672A
 - EXHIBIT. OWS SITE 672A AND NEARBY IRP SITE 24 VADOSE ZONE
SAMPLE LOCATIONS
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- PHOTOGRAPHS
 - EXCERPT FROM SITE ASSESSMENT REPORT
 - DOCUMENTATION FOR VADOSE ZONE VERIFICATION AND
REMEDATION
 - DOCUMENTATION FOR FORMER UST SITE 272

DRAWING NUMBER 818655331

APPROVED BY

CHECKED BY

DRAWN BY MY 11-5-02

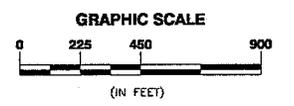
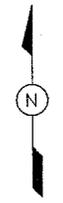
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PRIMARY SOURCE OF MAP INFORMATION: FIGURE 3-2 OF THE DRAFT FINAL SITE CLOSURE REPORT, FORMER MARINE CORPS AIR STATION, EL TORO, CALIFORNIA (EARTH TECH 2002).

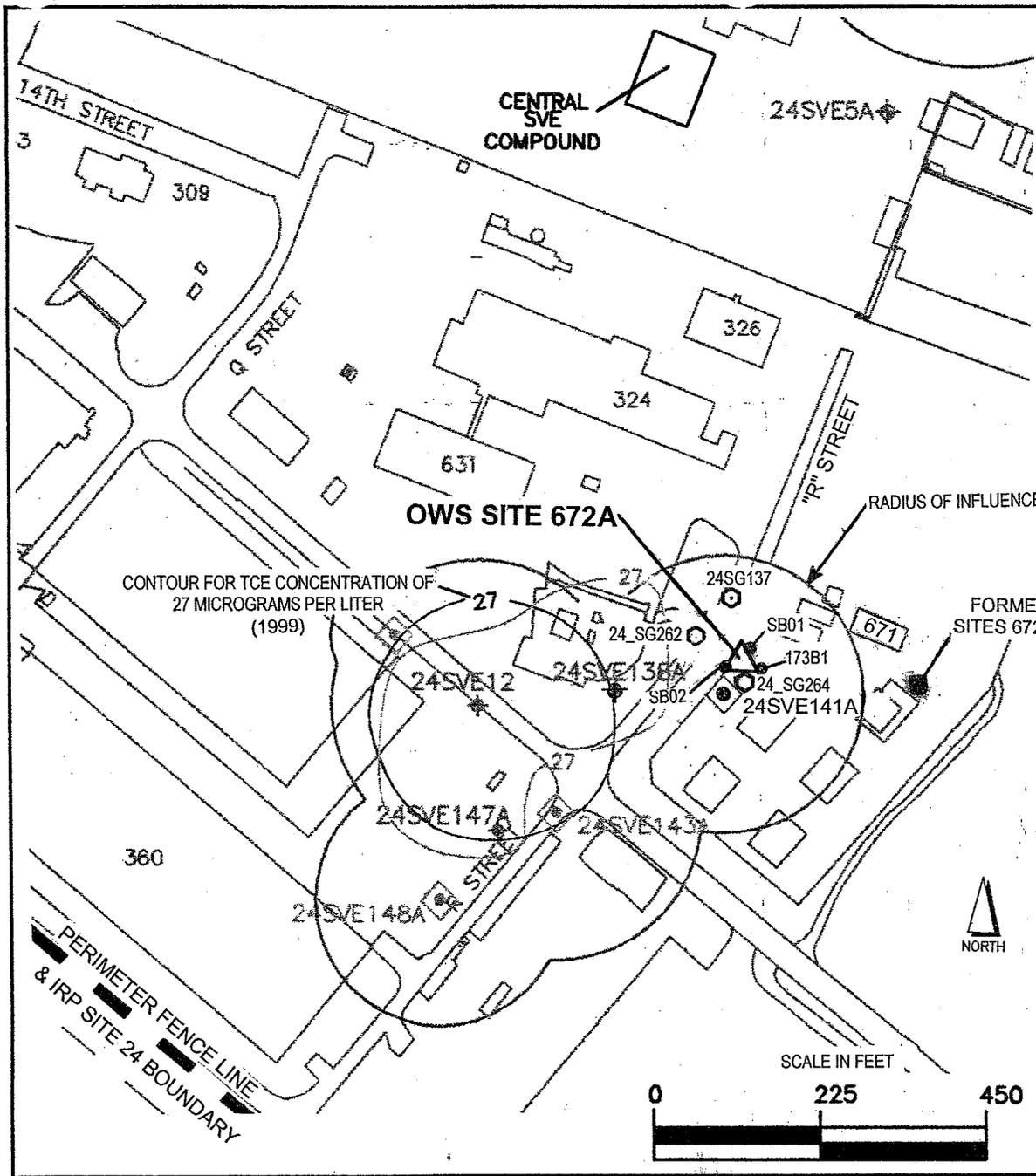


- LEGEND:**
- OWS 672A OIL WATER SEPARATOR
 - 24SVE7A SOIL VAPOR EXTRACTION WELL
 - 24SVE21A ADDITIONAL SOIL VAPOR EXTRACTION WELL INSTALLED DURING DECEMBER 1999 AND JANUARY 2000
 - 27 CONTOUR LINE OF TRICHLOROETHENE (TCE) SOIL GAS CONCENTRATION IN µg/L (SOURCE: BCR MAY 1998)
 - 27 CONTOUR LINE OF BASELINE TRICHLOROETHENE (TCE) SOIL GAS CONCENTRATION IN µg/L
 - EFFECTIVE RADIUS OF INFLUENCE (ERO) BOUNDARY
 - SITE 24 BOUNDARY



EFA WEST
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CONTRACT NO. N62474-98-D2076

FIGURE 1
OWS 672A AND INTERMEDIATE ZONE
BASELINE TCE CONCENTRATIONS VS. ERO!
AND SURVEYED WELL LOCATIONS
MARINE CORPS AIR STATION
EL TORO, CALIFORNIA



LEGEND

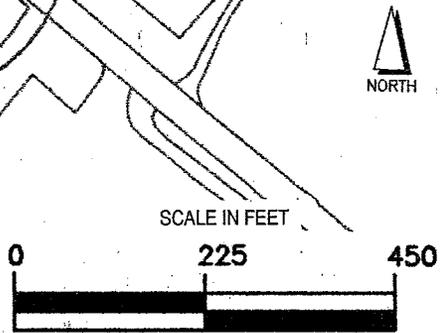
- △ OWS SITE 672A
- SOIL BORING AT OWS 672A (SWMU 173)
- SOIL GAS SAMPLE POINT
- ◆ VAPOR EXTRACTION WELLS

NOTE: PRIMARY SOURCES OF MAP INFORMATION FOR NEARBY IRP SITE 24 VAPOR EXTRACTION WELL AND SOIL GAS SAMPLE LOCATIONS INCLUDE THE DRAFT SYSTEM EVALUATION AND OPTIMIZATION REPORT (EARTH TECH 1999), THE DRAFT FINAL SITE CLOSURE REPORT (EARTH TECH 2002), AND THE FINAL SOIL GAS SURVEY TECHNICAL MEMORANDUM, SITES 24 AND 25 (JEG 1994).

EXHIBIT

OWS SITE 672A AND NEARBY IRP SITE 24 VADOSE ZONE SAMPLE LOCATIONS

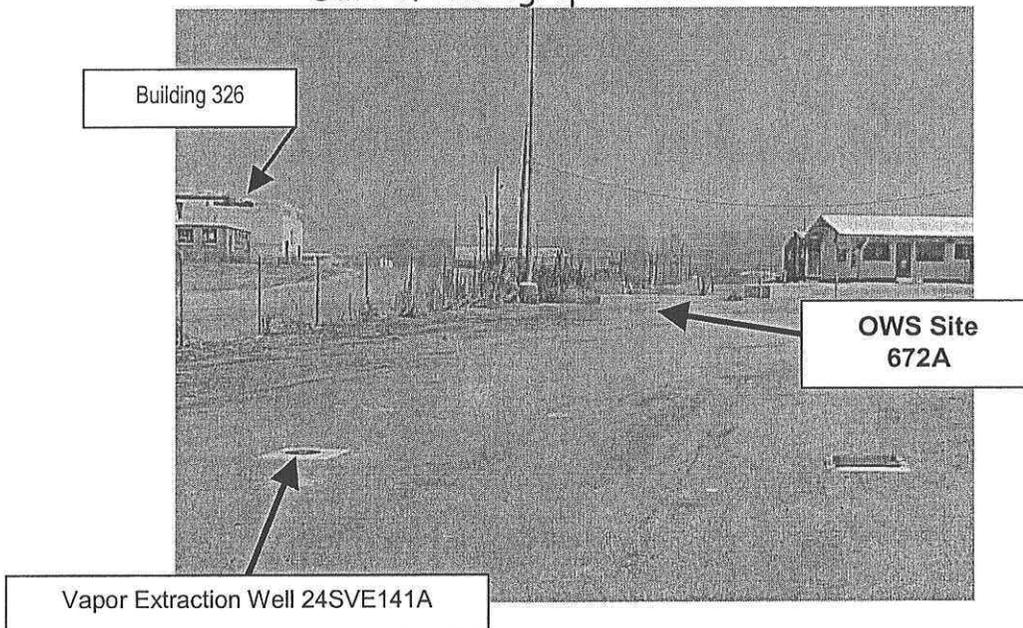
FORMER MARINE CORPS AIR STATION, EL TORO



Photograph 1. Oil/Water Separator (OWS) Site 672A.
Former Marine Corps Air Station, El Toro
Date of Photograph: Summer 2001



Photograph 2. OWS Site 672A.
Former Marine Corps Air Station, El Toro
Date of Photograph: Summer 2001



Photograph 3. OWS Site 672A Vicinity.
Former Marine Corps Air Station, El Toro
Date of Aerial Photograph: 1994

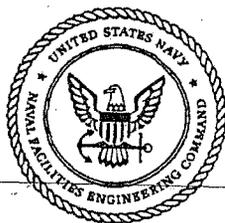


VICINITY OF
OWS SITE 672A

EXCERPTS FROM SITE ASSESSMENT REPORT, OWS SITE 672A
(OHM Remediation Services Corp. September 1999)

EXCERPT

Note: Annotations made by the
writer of the Information Package
are identified with a star symbol or
an arrow.



Oil/Water Separator Site 672A

Marine Corps Air Station

El Toro, California

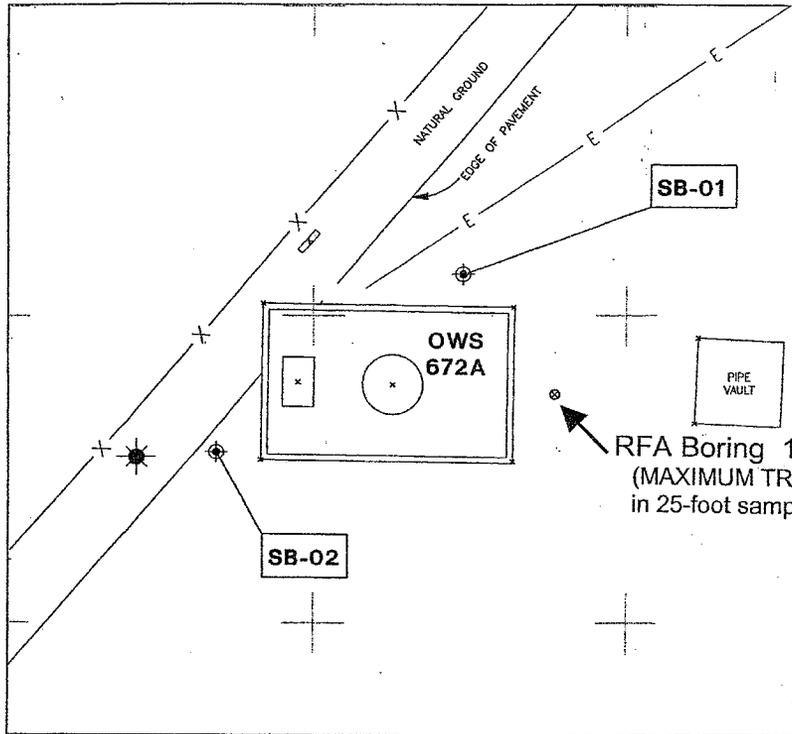
SWDIV Contract No. N68711-93-D-1459 — Delivery Order No. 0070 — Revision 0

OHM Project No. 18609 — Document Control No. SW6814 — September 16, 1999

Site Assessment Report

Appendix A - Tentative Reuse Parcel Location of OWS Site 672A; Appendix B - JEG RFA Information;
Appendix C - TCE in Groundwater; Appendix D - Remedial Activities, Selected Soil Vapor Analytical Data;
Appendix E - Excerpts from Law/Crandall Report for OWS Site 672A; Appendix F - Station Drawing;
Appendix G - Site Photographs; Appendix H - Site Inspection Log; Appendix I - Geophysical Survey Data;
Appendix J - Laboratory Analytical Reports; Appendix K - Field Soil Boring Logs; Appendix L - Land Survey Data;
Appendix M - OWS Contents Waste Manifest

Sept. 14, 1999 - 15:47:43 I:\OHM CORP\PROJECTS\18609\18609247.dwg



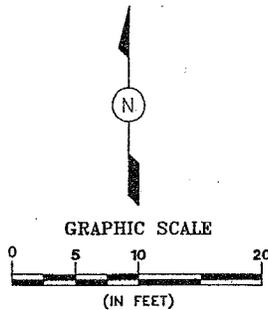
Sample Location and Data Summary

Boring Number	Location Northing (NAD 83)	Easting (NAD 83)	Elevation (ft amsl)	Sample Number	Depth (ft bgs)	CA LUFT 8015M TPH:		EPA 1312/CA LUFT 8015M TPH:			EPA 8260A VOCs:					
						as Diesel mg/kg	as Gasoline mg/kg	Motor Oil mg/kg	as Diesel mg/L	as Gasoline mg/L	Motor Oil mg/L	Benzene µg/kg	Ethylbenzene µg/kg	Methyl tert-butyl ether µg/kg	Toluene µg/kg	Xylenes (total) µg/kg
OWS-672-SB01	2187428.38	6110211.85	276.96	18609-2161	9.5	11 U	1.1 U	11 U	NA	NA	NA	5.7 U	5.7 U	11 U	5.7 U	5.7 U
					20.5	12 U	1.2 U	12 U	NA	NA	NA	5.9 U	5.9 U	12 U	5.9 U	5.9 U
					21.0	11 U	0.07 J	11 U	NA	NA	NA	5.5 U	5.5 U	11 U	5.5 U	5.5 U
					30.5	12 U	0.2 J	12 U	NA	NA	NA	6.1 U	6.1 U	12 U	6.1 U	6.1 U
OWS-672-SB02	2187414.03	6110192.16	276.07	18609-2166	21.0	1 J	0.1 J	11 U	NA	NA	NA	5.4 U	5.4 U	11 U	5.4 U	5.4 U
					30.5	76	7	12 U	NA	NA	NA	6.2 U	2 J	12 U	6.2 U	6.2 U
					50.5	1200	20	110 U	1.7	NA	0.5	56 U	260	110 U	56 U	56 U

Datum, 1983.
 ft amsl - feet above mean sea level datum.
 ft bgs - Feet below ground surface.
 CA LUFT - California leaking underground fuel tank.
 EPA - US Environmental Protection Agency.
 J - Estimated value.
 mg/kg - Milligrams per kilogram.
 NA - Not analyzed.
 TPH - Total petroleum hydrocarbons.
 U - Not detected at or above the stated reporting limit.
 µg/kg - Micrograms per kilogram.

EXPLANATION:

- SAMPLE POINTS
- CHAIN LINK FENCE
- UNDERGROUND ELECTRIC UTILITIES
- CONTROL PANEL
- VALVE
- LIGHT STANDARD



DATE OF SURVEY: 4-14-99
 8-20-99

REVISIONS			
REV. No.	DESCRIPTION	DATE	APPROVED
01	97102-126A.DWG BY CALVADA SURVEYING, INC.	4/14/99	
		8/20/99	

CONTRACT NAME SWDIV		OHM Remediation Services Corp. A Subsidiary of OHM Corporation IRVINE, CA	
DRAWN BY R. PIRMORADIAN	DATE 09/14/99	SITE PLAN OWS 672A	
CHECKED BY DR	DATE 9/16/99		
APPROVED BY	DATE		
PROJECT MANAGER W. Schell		DATE 9/16/99	
AUTOCAD FILE No. 18609247.DWG		MARINE CORPS AIR STATION EL TORO, CALIFORNIA	
SCALE 1"=10'	SHEET 1	OF 1	DOCUMENT CONTROL No. SW6814
OHM PROJECT No. 18609		DRAWING No. FIG 4-1	

DOCUMENTATION FOR VADOSE ZONE VERIFICATION
AND REMEDIATION

INSTALLATION RESTORATION PROGRAM (IRP) SITE 24
VOLATILE ORGANIC COMPOUND SOURCE AREA

MARINE CORPS AIR STATION EL TORO
EL TORO, CALIFORNIA
INSTALLATION RESTORATION PROGRAM
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
FINAL SOIL GAS SURVEY
TECHNICAL MEMORANDUM
SITES 24 AND 25

Revision 0

EXCERPTS

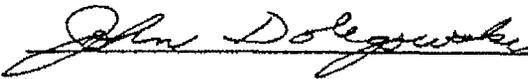
Note: Annotations made by the
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are identified with a star symbol or
an arrow.

PREPARED BY:
Southwest Division, Naval Facilities
Engineering Command
1220 Pacific Highway
San Diego, California 92132-5190

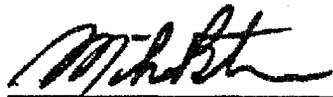
THROUGH:
CONTRACT #N68711-89-D-9296
CTO #145
DOCUMENT CONTROL NO:
CLE-C01-01F145-S2-0004

WITH:
Jacobs Engineering Group Inc.
3655 Nobel Drive, Suite 200
San Diego, California 92122

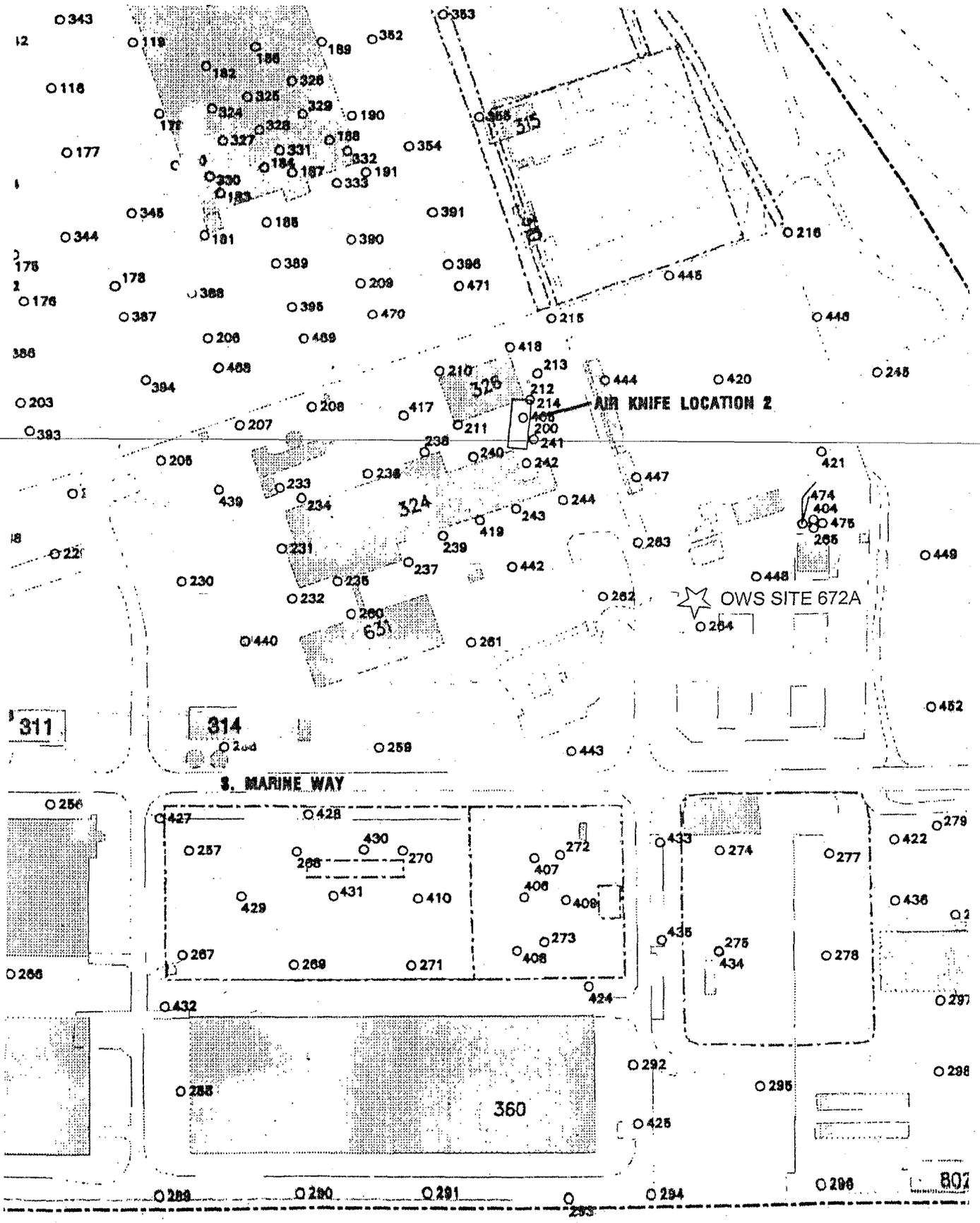
In association with:
International Technology Corporation
CH2M HILL

 28 Oct 94
Date

John Dolegowski
CLEAN Project Manager
CH2M HILL, Inc.

 27 OCT 94
Date

Michael Bitner, R.G.
CLEAN Technical Reviewer
CH2M HILL, Inc.



**Table 3-4
Possible Source Areas at Sites 24 and 25
MCAS El Toro Soil Gas Survey Technical Memorandum**

Page 4 of 7

Possible Source Area	Source Area Description (a)	Soil Gas Sampling Description
RFA SWMU/AOC 98 (Vehicle Wash Rack)	Located on southeast side of Bldg. 359.	Collected soil gas samples within wash rack boundaries.
RFA SWMU/AOC 99 (Drum Storage Area [DSA])	Former DSA located south of Bldg. 359.	Collected soil gas samples within estimated DSA boundaries.
RFA SWMU/AOC 100 (TCE Degreaser)	Former TCE degreaser located in south corner of Bldg. 359 (inside structure)	Collected soil gas samples adjacent to south wall of Bldg. 359.
RFA SWMU/AOC 101 (OWS)	OWS located near south side of Bldg. 359.	Addressed with soil gas investigation for SWMU/AOC 100.
RFA SWMU/AOC 303 Underground Storage Tank (UST)	UST located beneath concrete floor in Bldg. 359.	Collected soil gas samples immediately outside Bldg. 359 adjacent to UST.
RFA SWMU/AOC 110 (Vehicle Wash Rack)	Inactive 3,200-square foot concrete wash rack located at the northwest side of Bldg. 386. Drain leads to OWS 386-B.	Collected soil gas samples within wash rack area.
RFA SWMU/AOC 145 (UST)	Waste oil tank (Tank 529) located at northeast side of Bldg. 529. Installed 25,000-gallon concrete UST in 1944; currently active.	Collected soil gas samples adjacent to UST.
RFA SWMU/AOC 173 (OWS)	OWS located north of Site 8 and abandoned Well 29.	Collected soil gas samples adjacent to OWS.
RFA SWMU/AOCs 175, 176	USTs north of Building 672/OWS	Collected a soil and soil gas samples adjacent to UST and OWS.
RFA SWMU/AOC 188 (UST)	UST located along south reach of Agua Chinon Wash. UST collects waste oil from OWS associated with skimmer at wash.	Collected soil gas samples adjacent to UST.

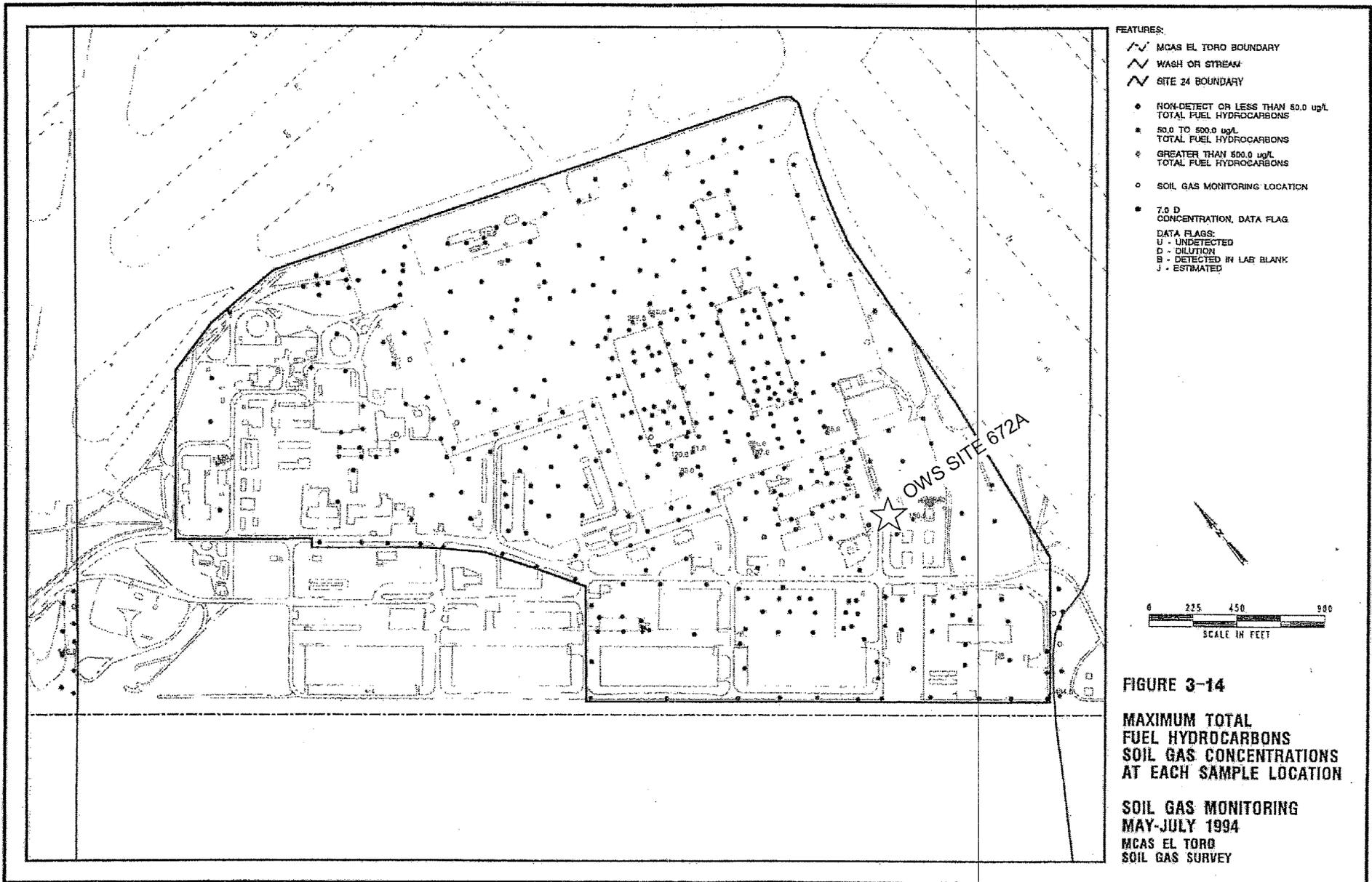


Table C-1
Concentrations in Soil Gas
MCA5 El Toro Soil Gas Survey Technical Memorandum

Concentration in ug/L

(1) Key to Full Parameter names in Legend.

Station ID	Depth	Sample ID	Smp. Date	Smp. Time	PCE (ECD)	PCE (FID)	TCE (ECD)	TCE (FID)	C12DCE	T12DCE	11DCA	11DCE (ECD)	11DGE (FID)	VC	111TCA	112TCA	TC1FA	CT	CHCL3	12DCCP	MeCL2	TPH	Benzene	Toluene	Ethylbenzene	Total Xylenes	
24_SG241	12	S145G2009	8/1/94	17:02	4.8		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	2.6 J	1 U	1 U	1 U	1 U	33	1 U	1 U	1 U	1.1	5
24_SG241	12	S145G2010	8/1/94	20:13	4.8		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	2.6 J	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1.8	1.8
24_SG241	12	S145G2011	8/2/94	14:08	4.1		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1.1 J	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG241	12	S145G2012	8/4/94	12:00	6.5 E	2.1 FI	1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	2.9 J	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG242	15	S145G1242	8/28/94	11:59	1 U		1 U		1 U	1 U	1 U	121 E	1.4 FI	8.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	17	1 U	1 U	1 U	1 U	1 U
24_SG243	12	S145G1243	8/10/94	9:05	3.9 E	2.9 FI	2		1 U	1 U	1 U	1 U		5 U	1 U	1 U	3.9 J	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG243	20	S145G1543	8/10/94	9:10	3.3 E	2.2 FI	2		1 U	1 U	1 U	1 U		5 U	1 U	1 U	2.6 J	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG243	20	S145G3133	8/10/94	9:11	3.5 E	2.4 FI	2.1		1 U	1 U	1 U	1 U		5 U	1 U	1 U	2.8 J	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG244	12	S145G1244	8/9/94	8:19	3.6 E	2.7 FI	1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	2.8 J	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG244	12	S145G3128	8/9/94	8:20	2.1 E	1.3 FI	1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1.4 J	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG244	20	S145G1544	8/9/94	8:25	3.8 E	2.7 FI	1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	3.2 J	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG245	15	S145G1245	8/16/94	8:34	1 U		13.5 E	79.1 FI	1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG248	15	S145G1248	8/15/94	9:50	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG247	15	S145G1247	8/15/94	10:12	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG248	15	S145G1248	8/15/94	14:18	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG249	15	S145G1249	8/15/94	10:45	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG250	15	S145G1250	8/15/94	14:00	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG251	15	S145G1251	8/15/94	11:10	1 U		1.1		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG252	15	S145G1252	8/15/94	11:20	1 U		1		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG253	15	S145G1253	8/15/94	13:25	1 U		1		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG254	15	S145G1254	8/15/94	13:40	1 U		1		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG254	15	S145G3150	8/15/94	13:41	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG255	15	S145G1255	8/15/94	10:47	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG258	15	S145G1256	8/15/94	11:07	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG257	12	S145G1257	8/10/94	8:09	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG257	20	S145G1557	8/10/94	9:18	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG258	15	S145G1258	8/15/94	13:48	1 U		1 U		1 U	1 U	1 U	45		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG259	15	S145G1259	8/15/94	14:11	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG260	12	S145G1260	8/10/94	11:15	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 J	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG260	20	S145G1560	8/10/94	11:20	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG281	15	S145G1261	7/1/94	10:50	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG282	12	S145G1262	8/9/94	9:40	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG282	20	S145G1562	8/9/94	9:48	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG283	12	S145G1263	8/9/94	8:55	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG283	20	S145G1563	8/9/94	9:14	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG284	15	S145G1264	8/15/94	14:39	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG265	15	S145G1265	8/15/94	15:18	1 U		1 U		1 U	1 U	1 U	10		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10000	121	80	180	446	375
24_SG265	15	S145G3084	8/15/94	15:18	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	8900	112	71	157	375	1 U
24_SG266	15	S145G1266	8/16/94	11:35	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG267	12	S145G1267	8/10/94	8:41	1 U		1 U		1 U	1 U	1 U	28.5 E	1.9 FI	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG267	20	S145G1567	8/10/94	8:49	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG268	12	S145G1268	8/10/94	9:39	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG268	20	S145G1568	8/10/94	9:47	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1.1	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
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24_SG270	20	S145G3089	8/10/94	10:46	1 U		1.4		1 U	1 U	1 U	200 E	1.1 FI	5 U	1 U	1 U	1 U	4.8	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG271	12	S145G1271	8/10/94	11:06	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	2.5	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG271	20	S145G1571	8/10/94	11:16	1 U		1 U		1 U	1 U	1	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG272	12	S145G1272	8/10/94	12:59	1 U		4.8		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG272	20	S145G1572	8/10/94	13:06	1 U		3.8		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG273	12	S145G1273	8/10/94	13:27	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG273	20	S145G1573	8/10/94	13:36	1		11.4 E	9.5 FI	1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	4.7	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	1 U
24_SG274	15	S145G1274	8/16/94	14:23	1 U		1 U		1 U	1 U	1 U	1 U		5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	10 U	1 U	1 U	1 U	1 U	4.2
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Comprehensive Long-Term Environmental Action Navy (CLEAN) II
Contract No. N62742-94-D-0048
Contract Task Order No. 0068

EXCERPTS

Draft Final Site Closure Report

**Vadose Zone Remediation
IRP Site 24,
Volatile Organic Compounds
Source Area**

Former Marine Corps Air Station, El Toro, California

Prepared for

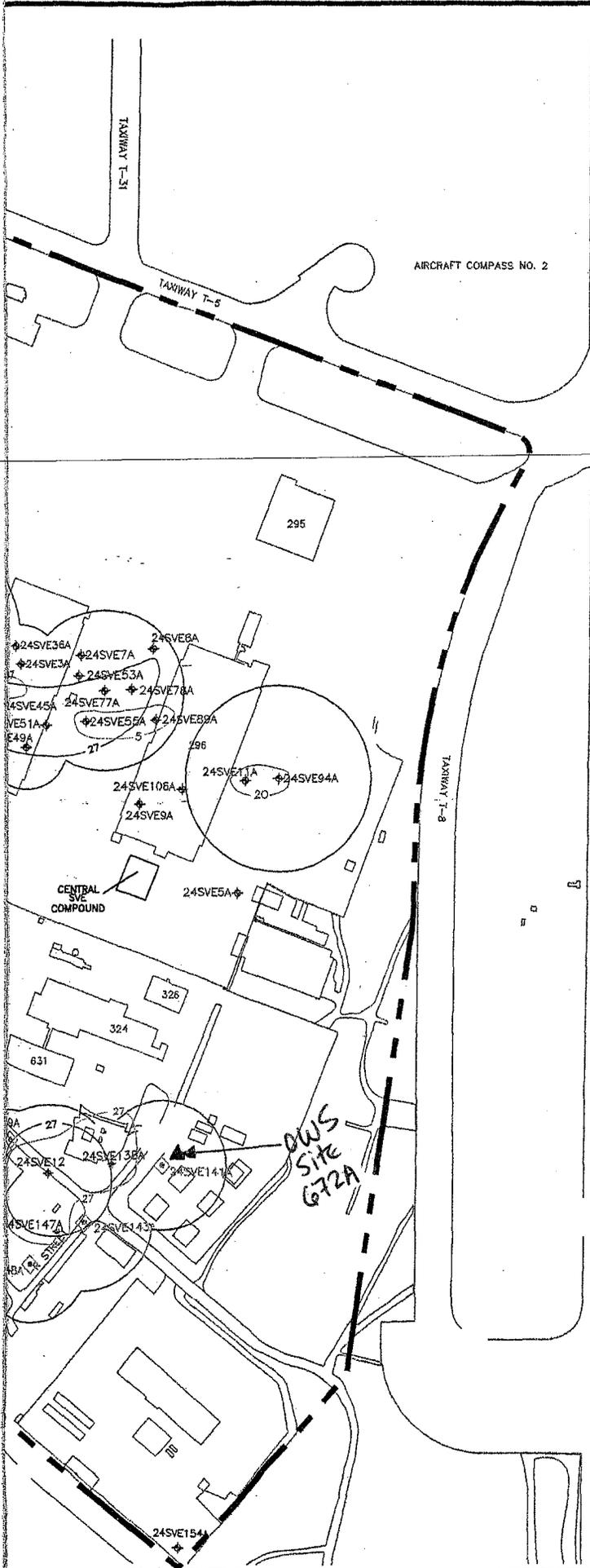
Department of the Navy
Pacific Division
Naval Facilities Engineering Command
258 Makalapa Drive, Suite 100
Pearl Harbor, Hawaii 96860-3134

Prepared by

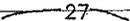
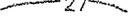
Earth Tech, Inc.
841 Bishop Street, Suite 500
Honolulu, Hawaii 96813-3920

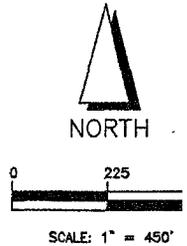
Note: Annotations made by the
writer of the Information Package
are identified with a star symbol or
an arrow.

June 2002



EXPLANATION

- 24SVE7A  SOIL VAPOR EXTRAC
- 24SVE21A  ADDITIONAL SOIL VAP INSTALLED DURING D JANUARY 2000
-  27 CONTOUR LINE OF TR SOIL GAS CONCENTR. (SOURCE: SEOR MAY
-  27 CONTOUR LINE OF BA TRICHLOROETHENE (SOIL GAS CONCENTR
-  EFFECTIVE RADIUS OF (EROI) BOUNDARY
-  SITE 24 BOUNDARY



Site Closure Report	
Intermediate Zone Baseline TCE Co. EROI and Surveyed Well Lo	
Vadose Zone Remediation IRP Site 24, VOC S	
Date 06-02	Former MCAS EI Toro
Project No. 29307	EARTH  TE <small>A tyco INTERNATIONAL LTD. COMPAN</small>

only. The laboratory results were then used as a basis for optimizing the mass of VOCs extracted from all active wells. In general, extraction from wells with baseline concentrations less than 10 µg/L was discontinued following receipt of the preliminary baseline analytical data. A TCE level of 10 µg/L was selected for operational purposes to allow for adequate airflow through CTS without using ambient air. Summaries of the extraction well sampling and monitoring data collected are presented in Appendix E, and plots of extracted vapor concentrations versus time are presented in Appendix F.

→ Table 2 -1: Summary of Baseline Concentrations

Well No.	Sample Date	Applied Vac inches Water	Flow scfm	TCE	PCE	CFC 113	1,1,DCE	CCL4
24SVE1	8/12/99	30	308	18	0.24 U	5.9	2.1 J	0.22 U
24SVE2*	4/22/99	-	-	171	4.4	10.9	29.3	2.2 U
24SVE2A*	8/12/99	34	25	11	0.36	0.68	0.56 J	0.13 U
24SVE3	8/12/99	25	30	26	0.38	0.38 U	0.34 J	0.32 U
24SVE3A	8/12/99	25	0	0.18	0.014 U	0.015 U	0.008 U	0.013 U
24SVE4	8/12/99	27	60	21.0	0.37	1.9	1.3J	0.26 U
24SVE5	5/25/99	95	25	30.0	4	35	1.6	1.5
24SVE5A	5/25/99	65	120	2.7	0.31	1.9	0.09	0.079
24SVE6	8/12/99	30	290	14.0	0.17 U	0.96	0.83 J	0.16 U
24SVE7	9/23/99	29	0	21.0	1.0	1.0	1.0	1.0
24SVE7A	9/23/99	29	25	1.0	1.0	1.0	1.0	1.0
24SVE8	9/21/99	22	0	1.0	1.0	1.0	1.0	1.0
24SVE8A	9/21/99	22	35	1.0	1.0	1.0	1.0	1.0
24SVE9	5/28/99	90	16	53	0.7 U	170	0.44 J	0.65 U
24SVE9A	5/25/99	90	50	5.2	0.07 U	11	0.04 U	0.065 U
24SVE10	5/25/99	25	175	41	0.7 U	31	0.42	0.65 U
24SVE11	5/25/99	80	25	89	0.94 U	27	0.53 U	0.87 U
24SVE11A	5/18/01	99	-	23	0.46 U	14	0.26 U	0.43 U
24SVE14	8/12/99	25	5	48	1	2.4	1.3	0.65 U
24SVE21	1/14/00	45	105	26	0.79	3.6	3.8	0.32 U
24SVE21A	1/14/00	50	105	0.74	0.07	0.08	0.05	0.013 U
24SVE24	1/14/00	55	63	4.2	0.14	2.5	1.2	0.052 U
24SVE32	8/12/99	30	72	19	0.27	0.54	0.86J	0.2 U
24SVE32B	8/12/99	30	224	0.33	0.29	0.15 U	0.008 UJ	0.013 U
24SVE35	6/24/99	85	75	150	5.5	10	3.3	2.2 U
24SVE35A	6/29/99	85	60	39.2	1.45	2.06	6.18	0.65 U
24SVE35B	6/29/99	85	100	11.8	0.82	0.66	0.789	0.2 U
24SVE36	8/12/99	26	45	18.0	0.41	0.26 U	0.48 J	0.22 U
24SVE36A	8/12/99	26	0	1.7	0.16	0.018 U	0.01 UJ	0.01 U
24SVE36B	8/12/99	25	55	0.76	0.11	0.015 U	0.008	0.013 U
24SVE41	8/12/99	25	55	19.0	0.34	0.87	0.64	0.16
24SVE41A	8/12/99	25	12	0.31	0.014 U	0.015 U	0.008 U	0.013 U

Table 2 -1: Summary of Baseline Concentrations (continued)

Well No.	Sample Date	Applied Vac in. H ₂ O	Flow scfm	TCE	PCE	CFC	1,1,DCE	CCL ₄
24SVE41B	8/12/99	25	224	4.4	0.29	0.06 U	0.032 U	0.052 U
24SVE45	8/12/99	25	35	110	1.5	1.5 U	1.9	1.3 U
24SVE45A	8/12/99	25	25	3.4	0.099	0.038 U	0.02U	0.32 U
24SVE45B	8/12/99	25	85	0.5	0.043	0.015 U	0.0079 U	0.013 U
24SVE49	8/12/99	25	50	120	3.4	25	1.6	1.3 U
24SVE49A	8/12/99	25	12	2.5	0.12	0.047	0.016 U	0.026 U
24SVE49B	8/12/99	25	330	2.1	0.19	0.03 U	0.016 U	0.026 U
24SVE50	1/14/00	65	165	8.1	0.14 U	19.0	0.34	0.13 U
24SVE51	8/25/99	35	14	58	1.20	33.0	0.55	0.65 U
24SVE51A	8/12/99	30	12	0.34	0.024	0.02 U	0.01 UJ	0.01 U
24SVE51B	8/12/99	30	90	0.13	0.014 U	0.015 U	0.008 UJ	0.013 U
24SVE53	9/8/99	35	55	23	0.28 U	0.30 U	0.16 UJ	0.26 U
24SVE53A	8/26/99	20	-	0.72	0.90	0.02 U	0.01 U	0.01 U
24SVE53B	8/26/99	20	-	0.21	0.93	0.12	0.008 U	0.013 U
24SVE54	8/12/99	30	35	44.0	0.91	1.40	0.49 J	0.65 U
24SVE55	8/26/99	25	45	69.0	2.70	57.0	0.81	0.93
24SVE55A	8/26/99	25	10	8.5	0.43	6.0	0.053 U	0.087 U
24SVE55B	8/26/99	20	90	2.0	0.25	2.7	0.02 U	0.032 U
24SVE62	8/26/99	19	25	18	0.24	10.20 U	0.41 -	0.20 U
24SVE62B	8/26/99	19	5	1.0	0.023	0.02 U	0.01 U	0.01 U
24SVE67	8/26/99	20	12.5	84	1.40 U	1.50 U	1.20	1.30
24SVE67B	8/26/99	20	30	2.1	0.067	0.062	0.016 U	0.026 U
24SVE77	8/25/99	30	80	37.0	0.87	7.0	0.32 -	0.43 U
24SVE77A	8/25/99	35	5	0.23	0.83	0.08 U	0.04 U	0.07 U
24SVE77B	8/25/99	25	>125	0.68	0.14	0.46	0.01 U	0.01 U
24SVE78	7/21/99	40	75	37	0.59 U	4.8	0.76 J	0.55U
24SVE78A	7/21/99	42	25	1.2	0.062	0.09	0.02 U	0.03 U
24SVE78B	7/21/99	40	125	1.1	0.32	0.04	0.008 UJ	0.013 U
24SVE89	6/23/99	35	25	130J	1.4 UJ	24 J	2.7 J	1.3 UJ
24SVE89A	6/23/99	32	>45	8.9 J	0.094 UJ	1.2	0.15 J	0.087 UJ
24SVE89B	6/23/99	30	>45	0.07 J	0.014 UJ	0.048 J	0.008 UJ	0.013 UJ
24SVE92	1/14/00	45	125	3.1	ND U	0.54	0.03	0.05
24SVE94	7/7/99	55	30	56	0.7 U	18	0.5 J	0.83
24SVE94A	6/23/99	28	>45	24	0.28 U	15	0.26 J	0.44
24SVE94B	6/23/99	25	>45	3.9 J	0.056 UJ	3.5 J	0.052 J	0.14 J
24SVE104B	5/25/99	16	300	3.1	0.046 U	1.3	0.026 U	0.043 U
24SVE106	6/23/99	50	9	15.0 J	0.28 UJ	0.77 J	0.16 UJ	0.26 UJ
24SVE106A	6/23/99	50	15	0.046 J	0.014 UJ	0.0015 UJ	0.08 UJ	0.013 UJ

Table 2 -1: Summary of Baseline Concentrations (continued)

Well No.	Sample Date	Applied Vac in. H ₂ O	Flow scfm	TCE	PCE	CFC	1,1,DCE	CCL ₄
24SVE106B	6/23/99	50	>15	0.004 J	0.014 UJ	0.0015 UJ	0.008 UJ	0.013 UJ
24SVE107	5/25/99	90	50	7.1	0.16	120 D	0.2J	0.087 U
24SVE116	5/25/99	90	110	41	1.2	63	1.1 J	0.43 U
24SVE117	5/25/99	90	70	14	4.4	330	0.98 J	0.76
24SVE128B	5/25/99	70	280	50	0.7 U	37	0.4 U	0.65 U
24SVE129	1/14/00	40	112	9.4	0.14	3.3	0.079 U	0.16
24SVE131B	1/14/00	25	135	0.5	0.014 U	0.15	0.0079 U	0.013 U
24SVE161	6/2/99	97	70	46	0.7	13	0.53	0.65
24SVE12	1/27/99	92	128	235.0	5.55	99	2.75	6.85
24SVE13	4/28/99	94	32	2.6	69	1.5	0.4 U	0.65 U
24SVE15	8/27/99	10	75	2.7	0.08	0.31	0.02 U	0.032 U
24SVE15A	8/27/99	10	75	0.01	0.014 U	0.041	0.0079 U	0.013 U
24SVE15B	8/27/99	10	75	0.011 U	0.014 U	0.015 U	0.0079 U	0.013 U
24SVE16	1/4/00	10	78	0.4	25.5	0.28 U	0.16 U	0.26 U
24SVE18	7/20/99	12	80	3.1	43	2.7	0.4 U	0.65 U
24SVE39A	1/13/00	100	50	20	0.42	22	0.6	1.2
24SVE68	1/6/00	8	77	0.6	21	0.55	0.099 UJ	0.16 U
→ 24SVE138A	6/9/99	90	70	139.8	5.24	215.3	0.95 U	5.27
→ 24SVE141A	1/20/00	66	170	2.4	0.28 U	33	0.16 U	0.26 U
24SVE143A	1/11/00	100	100	14.0	0.37	0.3	0.099 U	0.29
24SVE147A	6/15/99	98	60	137.5	3.29	5.88	1.12	2.95
24SVE148A	1/6/00	38	160	9.7	0.5	0.14	0.14	0.43
24SVE154	10/14/99	54	10	3.1	0.18	0.047 U	0.026 U	0.043 U
24SVE154A	10/14/99	54	10	12	0.94	0.21	0.079 U	0.13 U
24SVE154B	10/14/99	54	10	0.02	0.014 U	0.014 U	0.0079 U	0.013 U

Notes:

All concentrations of contaminants are reported in micrograms per liter (µg/L)

U = The compound or analyte was analyzed for but not detected at or above the stated limit.

UJ = The compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value

ND = not detected

scfm = standard cubic feet per minute

On January 14, 2000, 24-hour baseline samples were collected from the eight newly installed SVE wells (24SVE129, 24SVE50, 24SVE92, 24SVE131, 24SVE131B, 24SVE21, 24SVE21A, 24SVE24) near hangars 296 and 297. None of the samples exceeded the soil gas threshold value of 27 µg/L for TCE, and the results were used to confirm the extent of the plume boundary. However, two of the wells (24SVE21 and 24SVE131) exceeded 10 µg/L for TCE at 26 µg/L and 11 µg/L, respectively. Extraction from 24SVE21 and 24SVE131 continued until the TCE concentrations decreased below 10 µg/L.

In January 2000, 24-hour baseline samples were also collected from the six newly installed wells (24SVE141A, 24SVE39A, 24SVE148A, 24SVE16, 24SVE68, and 24SVE143A) not close to hangars 296 and 297. Two portable treatment systems were used. None of the samples exceeded the

Table 3-4: Closure Sampling Analytical Results (continued)

Well ID No.	Screened Interval (feet)	Baseline TCE Concentrations	Sample Date	Pre-Shutdown TCE Concentrations	Sample Date	Closure Sample TCE Concentrations	Sample Date
Portable Treatment System							
24SVE12	34-74	235	1/27/99	0.21	2/14/00	13	9/19/00
24SVE13	79-109	69 (PCE)	4/28/99	30 (PCE)	10/28/99	30 (PCE)	9/21/00
→ 24SVE138A	45-70	140	6/9/99	0.98	2/29/00	0.011 U	9/20/00
→ 24SVE147A	57-77	138	6/15/99	0.08	2/21/00	0.1	9/19/00

Notes:

All concentrations of contaminants are reported in micrograms per liter ($\mu\text{g/L}$)

* Indicates duplicate samples. $\mu\text{g/L}$ = micrograms per liter TCE = trichloroethene

ND = not detected PCE = tetrachloroethene J = Indicates an estimated value.

U = Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

UJ = Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

Table C-4. Summary of EROI Estimates (continued)

Well ID Number	Completion Zone	Screen Interval		Screen Length	Vacuum	Flow	EROI	ROI
		From (feet)	To (feet)	(feet)	(inches of water)	(scfm)	(feet)	(feet)
24SVE161	Deep	70.3	95.3	25	70	57	110	104
24SVE2A	Intermediate	40	70	30	42	56	90	200
24SVE3A	Intermediate	45	60	15	120	55	176	115
24SVE11A	Intermediate	43	73	30	90	27	67	104
24SVE12*	Intermediate	34	74	40	98	100	241	200
24SVE21A	Intermediate	50	75	25	75	160	384	286
24SVE35A	Intermediate	50	75	25	80	70	168	128
24SVE39A	Intermediate	50	75	25	100	45	88	126
24SVE45A	Intermediate	50	70	20	60	56	135	144
24SVE49A	Intermediate	45	65	20	110	50	122	140
24SVE55A	Intermediate	40	70	30	100	0	0	0
24SVE77A	Intermediate	39	54	15	30	100	235	235
24SVE78A	Intermediate	45	60	15	90	49	156	90
24SVE94A	Intermediate	49.5	69.5	20	40	115	274	295
→ 24SVE138A	Intermediate	44	70	26	100	105	201	131
→ 24SVE141A*	Intermediate	50	80	30	63	163	311	190
24SVE143A*	Intermediate	50	75	25	100	103	200	219
24SVE147A	Intermediate	57	77	20	49	61	116	86
24SVE148A*	Intermediate	55	75	20	38	160	302	170
24SVE32B*	Shallow	20	40	20	59	125	241	278
24SVE35B	Shallow	15	35	20	60	175	417	231
24SVE36B*	Shallow	15	40	25	80	125	241	214
24SVE45B	Shallow	20	40	20	35	154	362	171
24SVE62B	Shallow	15	40	25	110	35	0	0
24SVE67B	Shallow	17	32	15	99	133	254	135
24SVE77B	Shallow	18	33	15	30	175	409	181
24SVE94B	Shallow	25	45	20	55	175	335	232
24SVE104B	Shallow	25.3	45.3	20	19	308	701	293
24SVE128B	Shallow	15	40	25	40	170	324	349
24SVE131B*	Shallow	20	40	20	45	175	334	318

Notes:

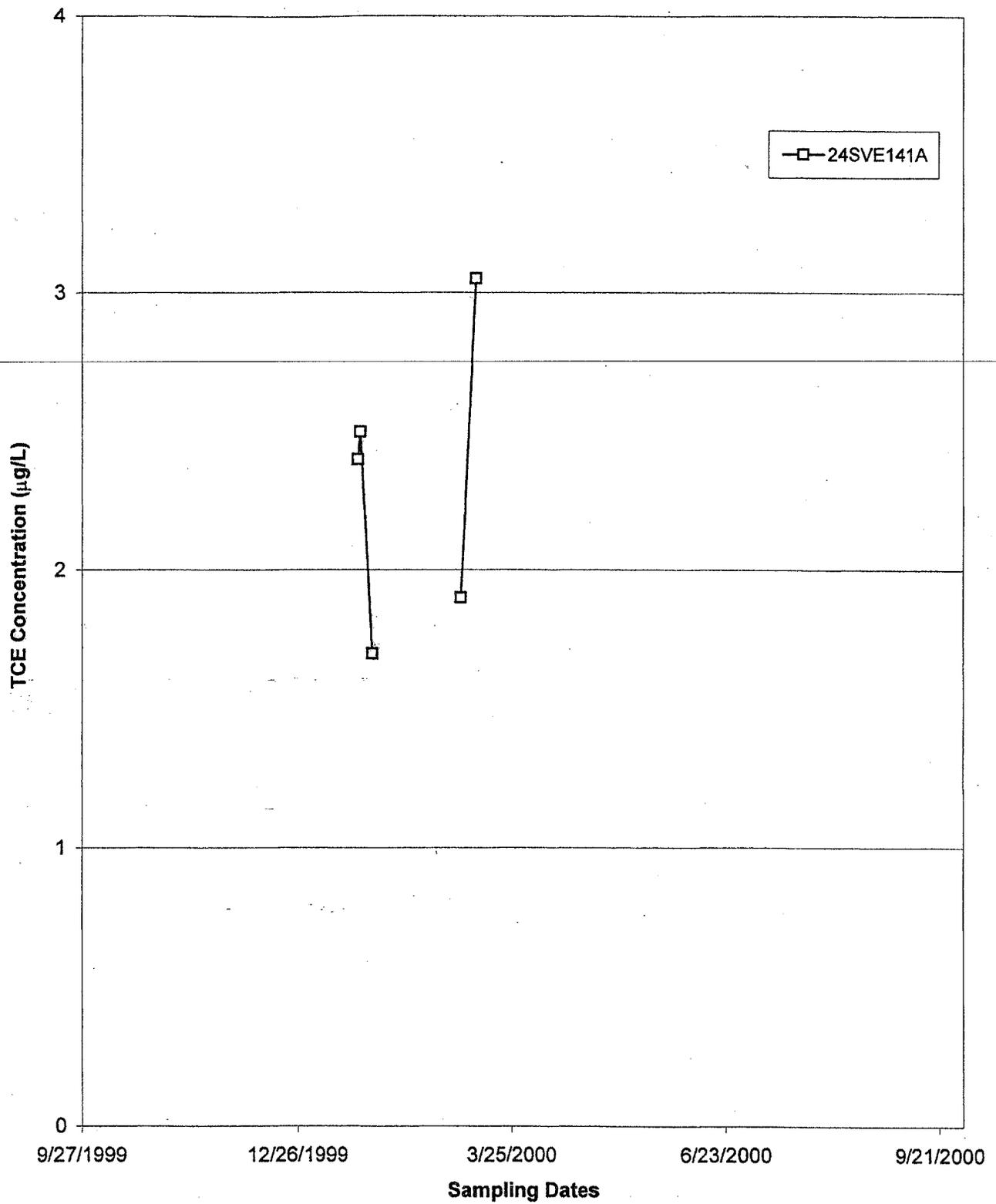
* indicates the well ROI and EROI were evaluated after the fourteen additional wells were installed.

bgs = below ground surface

EROI = effective radius of influence

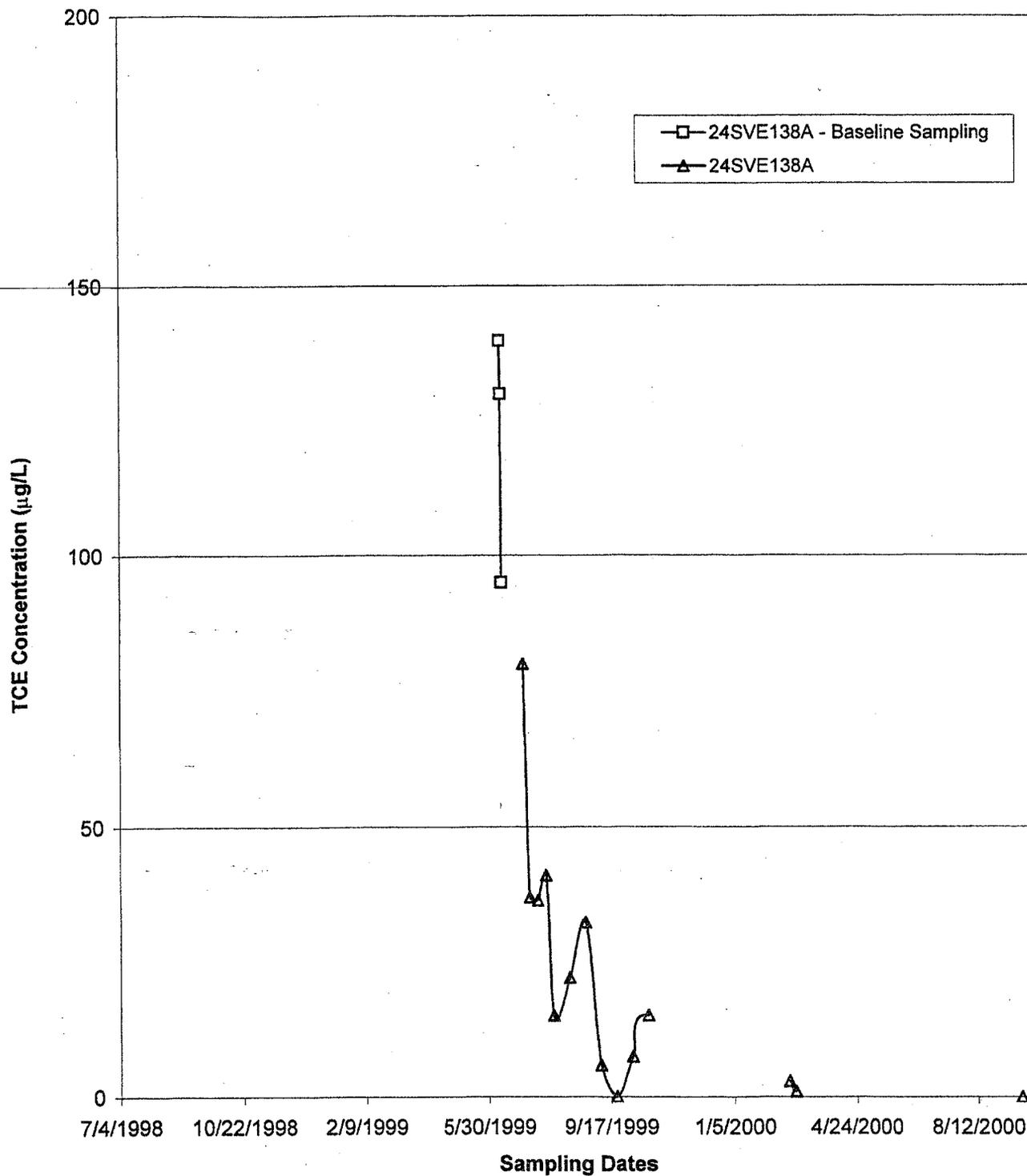
ROI = effective radius of influence

scfm = standard cubic feet per minute



Note:

- 1. Sample collected on 3/3/00 was a restart sample.

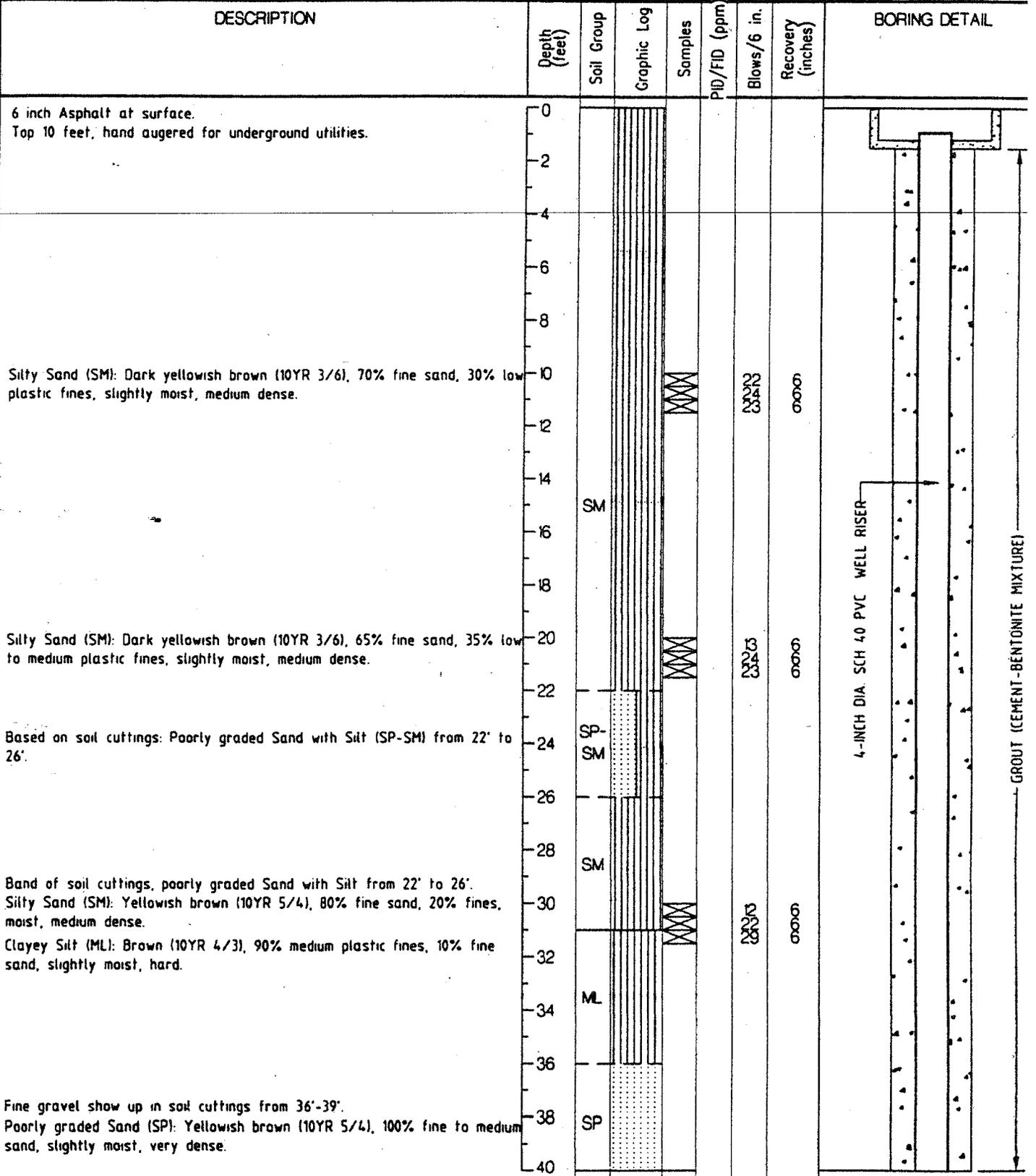


Notes:

1. Sample collected on 2/23/00 was a restart sample.
2. Sample collected on 9/20/00 was a closure verification sample.

Geologic Log of Boring 24-SVE 141A

Project MCAS/EL TORO	Northing 2187376.22	Drilling Company LAYNE CHRISTENSEN
Project Number 918708	Easting 6110205.34	Drill Rtg AP 1000
Client SWDIV	TOC Elevation 275.31	Driller MARTIN
Location SITE 24	TOP OF RIM 275.62	Drill Method DWRCPH
Geologist A. SIDDIQUI	DIAGRAM NOT TO SCALE	
Borehole Diameter 10-INCHES	Total Depth of Borehole 86.5 FEET	Depth to Water 85 FEET



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Geologic Log of Well 24-SVE 141A

Project **MCAS/EL TORO**

Project No. **918708**

DESCRIPTION	Depth (feet)	Soil Group	Graphic Log	Samples	PID/FID (ppm)	Blows/6 in.	Recovery (6 inches)	WELL DETAIL	
Poorly graded Sand (SP): Yellowish brown (10YR 5/4), 100% fine to medium sand, slightly moist, very dense.	40 - 42	SP			13	50/4	200	<p>4-INCH DIA SCH 40 PVC WELL RISER</p> <p>4-INCH DIA SCH 40 PVC WITH 0.020-INCH SLOT SCREEN</p> <p>1/4" BENTONITE PELLETS</p> <p>#3 MONTEREY SAND FILTER PACK</p> <p>FRUIT IFMENT BENTONITE MVTIDEI</p>	
Silty Sand (SM): Light yellowish brown (2.5Y 6/4), 80% fine sand, 20% fines, slightly moist, very dense.	42 - 46				38	50/4	40		
Silty Sand (SM): Dark yellowish brown (10YR 4/6), 80% fine sand, 20% low plastic fines, slightly moist, very dense.	46 - 50	SM			33	50/4	40		
Sandy Silt (ML): Dark yellowish brown (10YR 4/4), 80% medium plastic fines (mostly silt with clay), 20% fines sand, moist, hard.	50 - 56	ML			16	24	33		4000
Silty Sand (SM): Dark yellowish brown (10YR 4/6), 85% fine sand, 15% fines, slightly moist, dense.	56 - 60				14	42	42		0000
Silty Sand (SM): Yellowish brown (10YR 5/4), 65% fine sand, 35% low plastic fines, slightly moist, dense, at places grades into Sandy Silt	60 - 66				13	37	49		0000
Silty Sand (SM): Dark yellowish brown (10YR 4/6), 85% fine sand, 15% fines, slightly moist, dense.	66 - 70	SM			11	32	42		0000
Silty Sand (SM): Yellowish brown 10YR 5/6, 80% fine sand, 20% low plastic fines, moist, very dense.	70 - 76				11	5/5	50		0000
Poorly graded Sand (SP): Light yellowish brown (2.5Y 6/4), 95% fine to medium sand, 5% fine subangular gravel, trace fins, moist, dense, interbedded with thin Sandy Silt/Silty Sand lenses at places.	76 - 80	SP							

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Geologic Log of Well 24-SVE 141A

Project **MCAS/EL TORO**

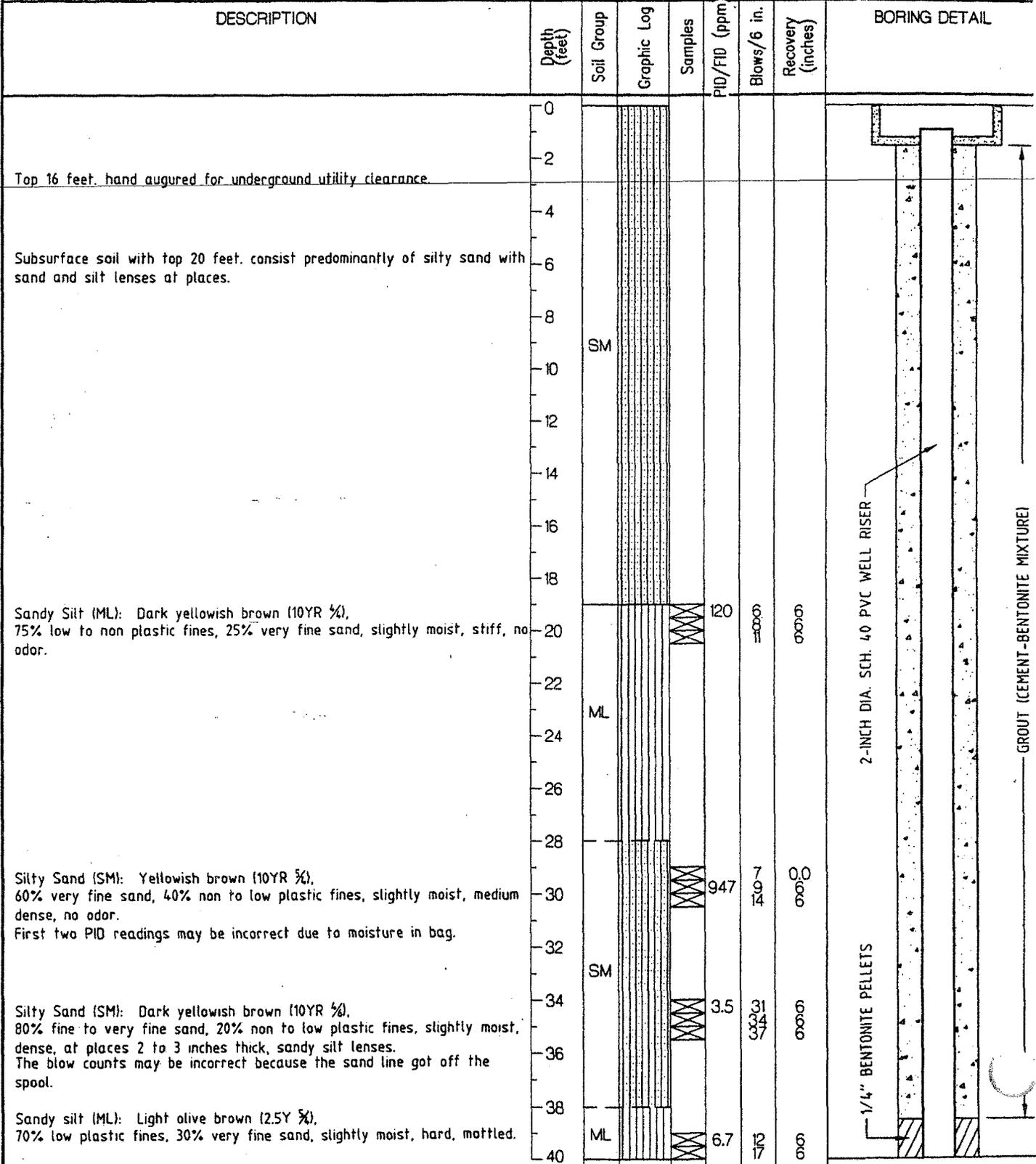
Project No. **918708**

DESCRIPTION	Depth (feet)	Soil Group	Graphic Log	Samples	PID/FID (ppm)	Blows/6 in.	Recovery (6 inches)	WELL DETAIL
Poorly grade Sand (SP): Light yellowish brown (2.5Y 6/4), 95% fine to medium sand, 5% fine subangular gravel, trace fines, moist, dense, interbedded with thin Sandy Silt/Silty Sand lenses at places.	80					8000	00000	<p style="font-size: small;">4-INCH DIA SCH 40 PVC WITH 0.020-INCH SLOT SCREEN</p> <p style="font-size: x-small;">43 MONTEREY SAND</p>
Poorly graded Sand (SP): Light olive brown (2.5Y 5/4), 95% fine to medium sand, 5% fines, wet, dense.	82					8000	00000	
End of boring at 86.5 feet bgs. Groundwater encountered at approximately 85 feet.	84							
	86							
	88							
	90							
	92							
	94							
	96							
	98							
	100							
	102							
	104							
	106							
	108							
	110							
	112							
	114							
	116							
	118							
	120							

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Geologic Log of Boring 24-SVE 138A

Project MCAS/EL TORO	Northing 2187382.44	Drilling Company LAYNE CHRISTENSEN	
Project Number 918708	Easting 6110056.29	Drill Rig CME-95	Begin Drilling 5/8/99
Client SWDIV	TOC Elevation 269.49	Driller JIM KLINE	End Drilling 5/1/99
Location SITE 24	TOP OF RIM 270.36	Drill Method HOLLOW STEM AUGER	Well Completion Date 5/7/99
Geologist A. SIDDIQUI	DIAGRAM NOT TO SCALE		
Borehole Diameter 8-INCHES	Total Depth of Borehole 70.5 FEET	Depth to Water	NOT ENCOUNTERED



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Geologic Log of Well 24-SVE 138A

Project **MCAS/EL TORO**

Project No. **918708**

DESCRIPTION	Depth (feet)	Soil Group	Graphic Log	Samples	PID/FID (ppm)	Blows/6 In.	Recovery (6 inches)	WELL DETAIL
Sandy silt (ML): Light olive brown (2.5Y 5/6), 70% low plastic fines, 30% very fine sand, slightly moist, hard, mottled.	40	ML				26	6	<p style="text-align: center;">2-INCH DIA. SCH 40 PVC WITH 0.020-INCH SLOT SCREEN</p> <p style="text-align: center;">#3 MONTEREY SAND FILTER PACK</p> <p style="text-align: center;">BENTONITE PELLETS</p> <p style="text-align: center;">FLUSH THREADED END CAP</p>
Silty Sand (SM): Light olive brown (2.5Y 5/6), 70% very fine sand, 30% low plastic fines, dense, slightly moist, no odor. Slow drilling, augers are smoking very tight formation.	42							
	44				4.2	17	0000	
	46					34	0000	
	48	SM						
Silty Sand (SM): Light olive brown (2.5Y 5/6), 70% very fine sand, 30% low plastic fines, slightly moist, medium dense.	50				2.1	20	0000	
	52							
Poorly graded Sand with Silt (SP/SM): Light olive brown (2.5Y 5/6), 90% fine grained (predominantly) to medium grained sand, 10% fines, trace fine subrounded gravel (18mm max.), slightly moist, medium dense.	54	SP/SM			1.2	23	0000	
	56					40	0000	
	58	SM						
Silty Sand (SM): Light olive brown (2.5Y 5/6), 70% fine sand, 30% low plastic fines, medium dense, slightly moist, amount of fines in variable 25-40%. In the shoe of the samples is sandy silt.	60				0.0	14	0000	
	62	ML						
Sandy Silt (ML): Lightly olive brown (2.5Y 5/6), 60% non to low plastic fines, 40% very fine sand, slightly moist, very stiff.	64							
	66				1.8	14	0000	
Silty Sand (SM): Dark yellowish brown (10YR 5/6), 85% fine sand, 15% fines, slightly moist, medium dense.	68	SM						
	70							
Silty Sand (SM): Dark yellowish brown (10YR 5/6), 75% very fine sand, 25% low plastic fines, moist, dense.	72							
	74							
	76							
	78							
	80							
Total Depth=70½ feet.						400	0000	

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Comprehensive Long-Term Environmental Action Navy (CLEAN) II
Contract No. N62742-94-D-0048
Contract Task Order No. 0068

EXCERPTS

Draft

System Evaluation and Optimization Report

IRP Site 24, Vadose Zone Remediation
Marine Corps Air Station, El Toro California

Prepared for

Department of the Navy
Commander, Southwest Division
Naval Facilities Engineering Command
San Diego, California 92132-5190

Prepared by

Earth Tech, Inc.
700 Bishop Street, Suite 900
Honolulu, Hawaii 96813

May 1999

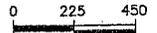
Note: Annotations made by the
writer of the Information Package
are identified with a star symbol or
an arrow.

earthtech
engineering and technology
for the planet.

PRIMARY SOURCE OF MAP INFORMATION
DRAFT FINAL ENGINEERING
DESIGN REPORT (DEC/TEL)

EXPLANATION

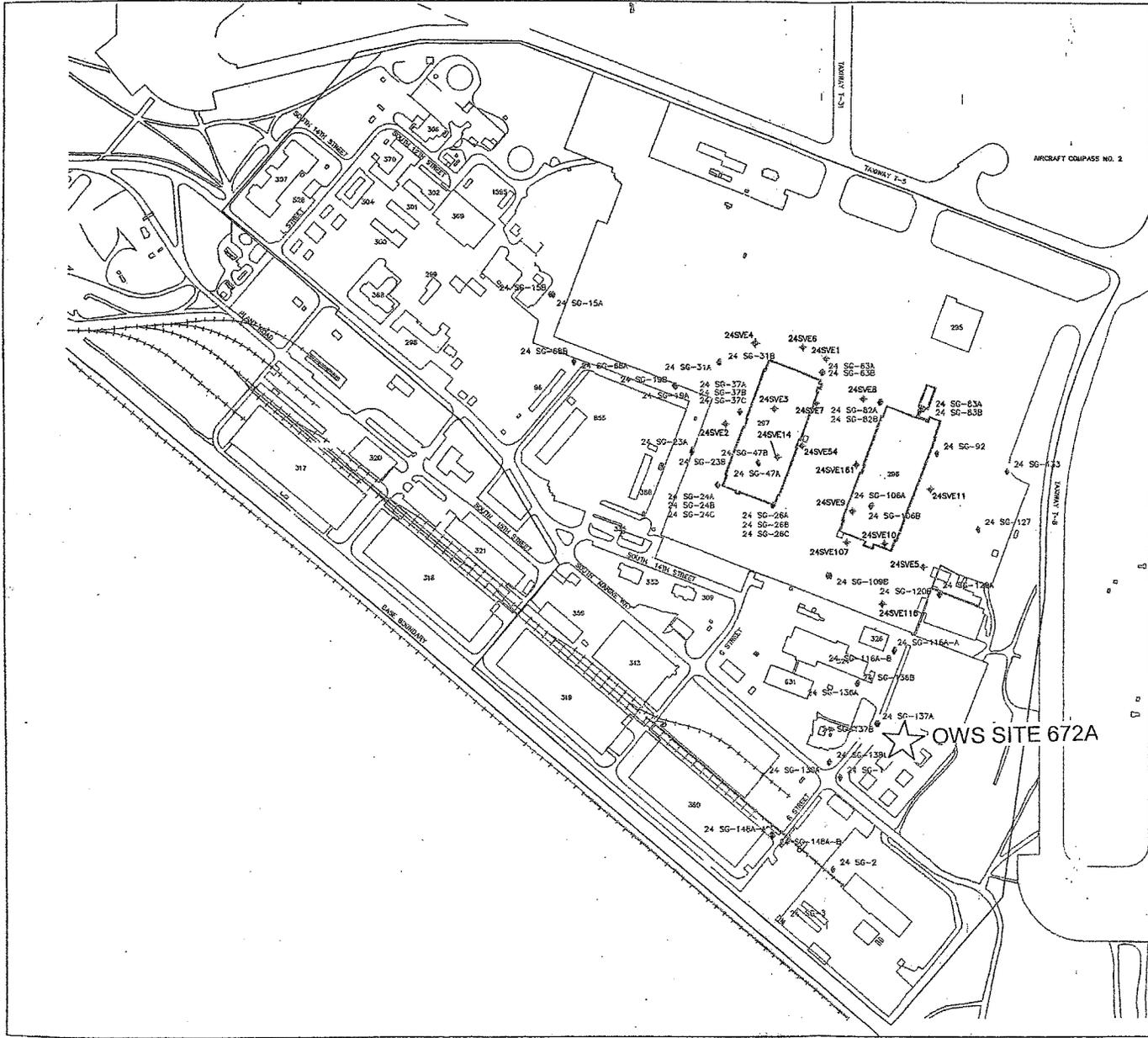
- 24SVE1 EXISTING SOIL VAPOR EXTRACTION WELL
- 24 SG-116A-A SOIL-GAS PROBE LOCATION



SCALE: 1" = 450'

Figure 3-1
Soil and Sample Locations
December 1998 - February 1999
Site 24, MCAS, El Toro

EARTH TECH



Additional soil gas sampling was completed from December 1998 through February 1999. The samples were collected primarily from the intermediate and deep zones, although one sample was collected in the shallow zone.

Figure 3-1 shows the sampling locations. Table 3-1 summarizes the soil gas survey results. In summary, TCE was detected at concentrations exceeding 27 µg/L in only two samples: 24SG47 (34.6 µg/L at depth 94 feet) and 24SG138 (52µg/L at depth 51 feet) (SOUTHWESTNAVFACENCOM 1998-1999).

Table 3-1: Soil Gas Sample Results December 1998-February 1999

Soil Gas Sample Point Identification [nearest reference point]	Sample Identification Number	Date	Sample Depth (Feet Below Ground Surface)	TCE (µg/L)	Other Compounds Detected at or above 1.0 µg/L
24SG1A	18708-481	12/29/98	55	1.3	
[Well 24SVE12]	18708-482	12/29/98	74	320	1,1-DCE: - 2.6 Freon 113: 420 PCE: 4.6 CCL4:- 17
24SG2A	18708-484	12/29/98	51	5.6	Freon 113: 2.3 PCE: 4.6 CCL4:- 17
[West of BLDG 800]	18708-486	12/29/98	72	4.2	Freon 113: 1.6
24SG3A	18708-488	12/29/98	54	3.8	
[South West of BLDG 800]	18708-489	12/29/98	74	7.3	
24SG15	18708-838	2/16/99	51.5	0.26	
[Well 24SVE13]	18708-847	2/16/99	74	ND	
	18708-849	2/16/99	95	0.035	
24SG19	18708-817	2/10/99	50.5	ND	
[South of Well 24SVE4 and West of Building 297]	18708-819	2/10/99	70	4.1	1,1-DCE: 35 Freon 113: 26
	18708-820	2/10/99	92	23	1,1-DCE: 41 Freon 113: 64 C Cl ₄ : 2.2
24SG23	18708-784	2/5/99	48.5	1.6	1,1-DCE: 2.7 Freon 113: 4.6
[West of Building 297]	18708-786	2/5/99	61.5	0.018	
	18708-787	2/5/99	94.5	1.6	1,1-DCE: 10 Freon 113: 11
24SG24	18233-044	2/1/99	53	ND	
[Southwest Corner of Building 297]	18233-045	2/1/99	75	2.35	1,1-DCE: 10.2 Freon 113: 27.9
	18233-046	2/1/99	95	0.14	
	18233-004	1/19/99	95	0.056	

Soil Gas Sample Point Identification [nearest reference point]	Sample Identification Number	Date	Sample Depth (Feet Below Ground Surface)	TCE ($\mu\text{g/L}$)	Other Compounds Detected at or above 1.0 $\mu\text{g/L}$
24SG120 [South of Building 315]	18708-872	2/19/99	51.5	0.34	
	18708-873	2/19/99	74.5	ND	
	18708-876	2/19/99	96	1.1	Freon 113: 12
24SG127 [East of Building 296]	18708-799	2/8/99	50.5	4.8	Freon 113: 56
	18708-800	2/8/99	69	3.7	Freon 113: 55
	18708-801	2/8/99	95	6	Freon 113: 73
24SG133 [East of Building 296]	18708-794	2/8/99	50	2.1	Freon 113: 38
	18708-795	2/8/99	72.5	2.5	Freon 113: 63
	18708-797	2/8/99	89.5	2.8	Freon 113: 85
24SG136 [Near Building 324]	18233-049	2/1/99	46.5	ND	Freon 113: 951
→ 24SG137 [South of Building 324]	18708-852	2/17/99	48	ND	
	18708-853	2/17/99	76	ND	Freon 113: 474
	18708-855	2/17/99	97	ND	
24SG138 [Near Well 24SVE12]	18233-030	1/28/99	51	52	Freon 113: 300
	18233-032	1/28/99	81	1.4	
24SG148A [South of Well 24SVE12]	18708-829	2/12/99	44	0.87	
	18708-831	2/12/99	71	4	Chloroform: 4.3

Blank cell = not applicable

ND = not detected at or above the laboratory reporting limit

EXCERPTS

Note: Annotations made by the
writer of the Information Package
are identified with a star symbol or
an arrow.

**DRAFT FINAL
INTERIM RECORD OF DECISION
OPERABLE UNIT 2A
SITE 24 – VOC SOURCE AREA
VADOSE ZONE
MARINE CORPS AIR STATION
EL TORO, CALIFORNIA**

SEPTEMBER 1997



→ NOTE: THE APPROXIMATE LOCATION OF OWS SITE 672A IS IDENTIFIED WITH A STAR SYMBOL.

LEGEND

- BUILDING OR PAD
- - - - - STREAMS OR WASH
- ==== IMPROVED ROADS
- ==== RAILROAD
- - - - - PHASE II UNIT BOUNDARY
- - - - - FENCE
- - - - - BASE BOUNDARY

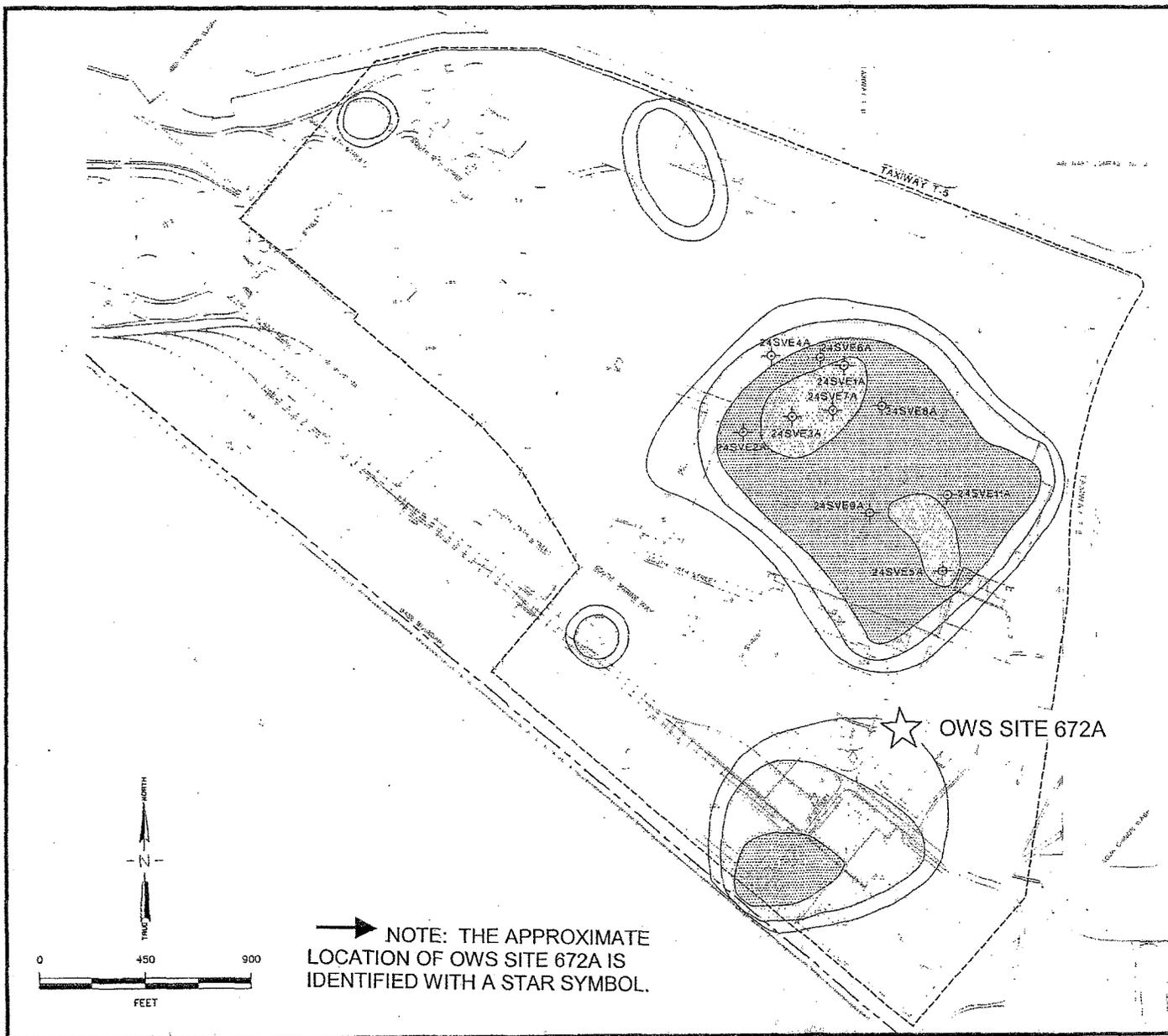
APPROXIMATE SAMPLING LOCATIONS

- 24SVE12 PHASE II SOIL VAPOR EXTRACTION WELL
- PROPOSED SOIL VAPOR EXTRACTION WELLS
- FOR REMEDIATION OF SECONDARY, PCE VAPOR PLUME

TCE SOIL GAS CONCENTRATION

- 10 TO 50.0 µg/L
- 50.0 TO 500.0 µg/L
- 500.0 TO 5000.0 µg/L
- GREATER THAN 5000.0 µg/L

<p>Record of Decision Figure 7-2 SVE Well Locations Shallow Soil Gas Horizon (10-40 Feet Deep)</p>	
<p>MCAS, El Toro, California</p>	
	<p>Bechtel National, Inc. CLEAN II Program</p>
<p>Date: 5/27/97 File No: 135L2385 Job No: 22214-135 Rev No: A</p>	



LEGEND

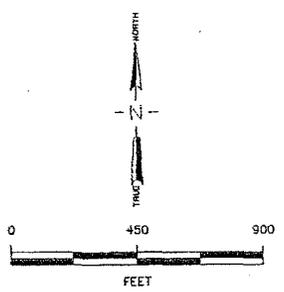
- BUILDING OR PAD
- STREAMS OR WASH
- IMPROVED ROADS
- RAILROAD
- PHASE II UNIT BOUNDARY
- FENCE
- BASE BOUNDARY

APPROXIMATE SAMPLING LOCATIONS

- 24SVE1A
- PHASE II SOIL VAPOR EXTRACTION WELL
- PROPOSED SOIL VAPOR EXTRACTION WELLS

ICE SOIL GAS CONCENTRATIONS

- 1.0 TO 5.0 µg/L
- ▨ 5.0 TO 50.0 µg/L
- ▩ 50.0 TO 500.0 µg/L
- ▧ GREATER THAN 500.0 µg/L



→ NOTE: THE APPROXIMATE LOCATION OF OWS SITE 672A IS IDENTIFIED WITH A STAR SYMBOL.

<p>Record of Decision Figure 7-3 Soil Vapor Extraction Well Locations Intermediate Soil Gas Horizon (40-70 Feet Deep)</p>	
<p>MCAS, El Toro, California</p>	
	<p>Bechtel National, Inc. CLEAN II Program</p>
<p>Date: 5/27/97 File No: 135L2386 Job No: 22214-135 Rev No: A</p>	



MCAS EL TORO Phase 1 RI Technical Memorandum

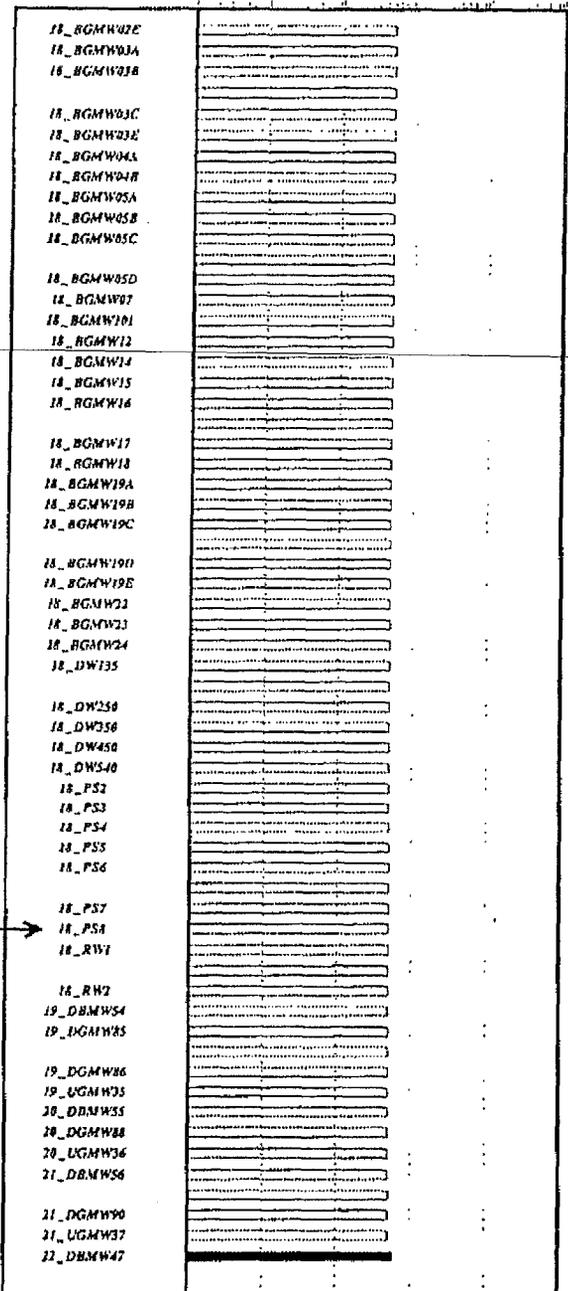
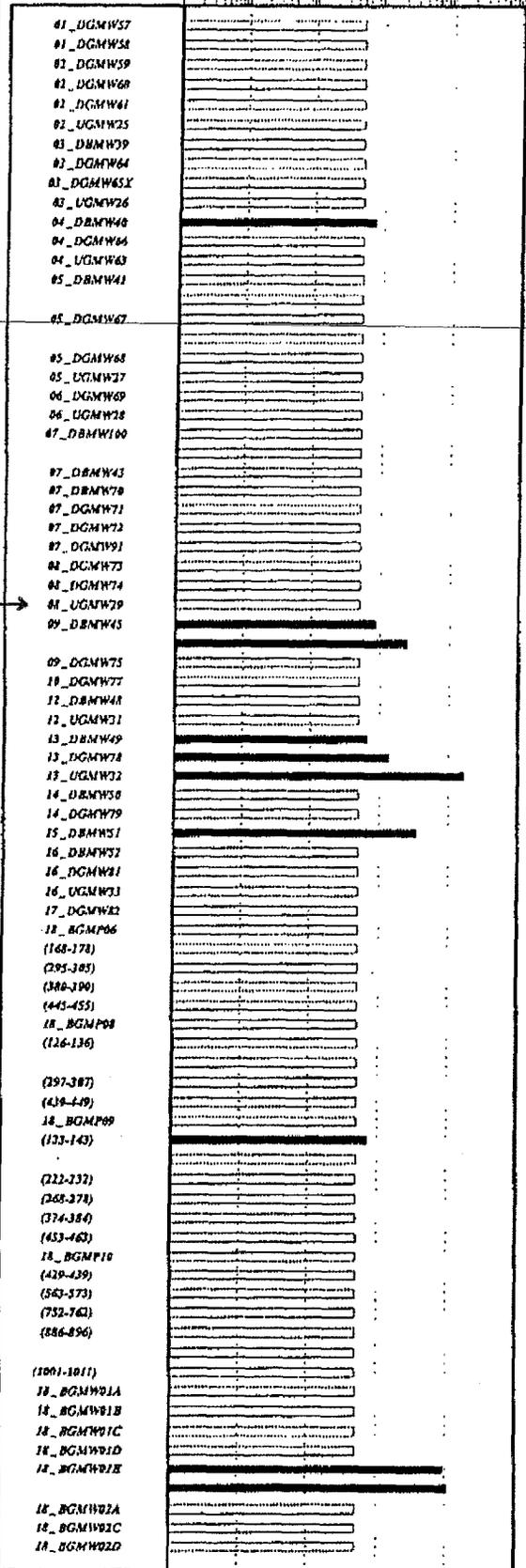
TPHVOA Concentration in Ground Water-Sampling Duration (09/21/92-02/08/93)

CONC.(UG/L)

CONC.(UG/L)

0.1 1 10 100 1000 10000

0.1 1 10 100 1000 10000



LEGEND

- UNDETECTED
- DETECTED
- XXXXXX ESTIMATED
- 10⁰ H D D DILUTED SAMPLE ANALYSIS
- DATA BELOW PLOT LIMIT

10/24/93 2:15:01 PM

MCAS EL TORO Phase 1 RI Technical Memorandum

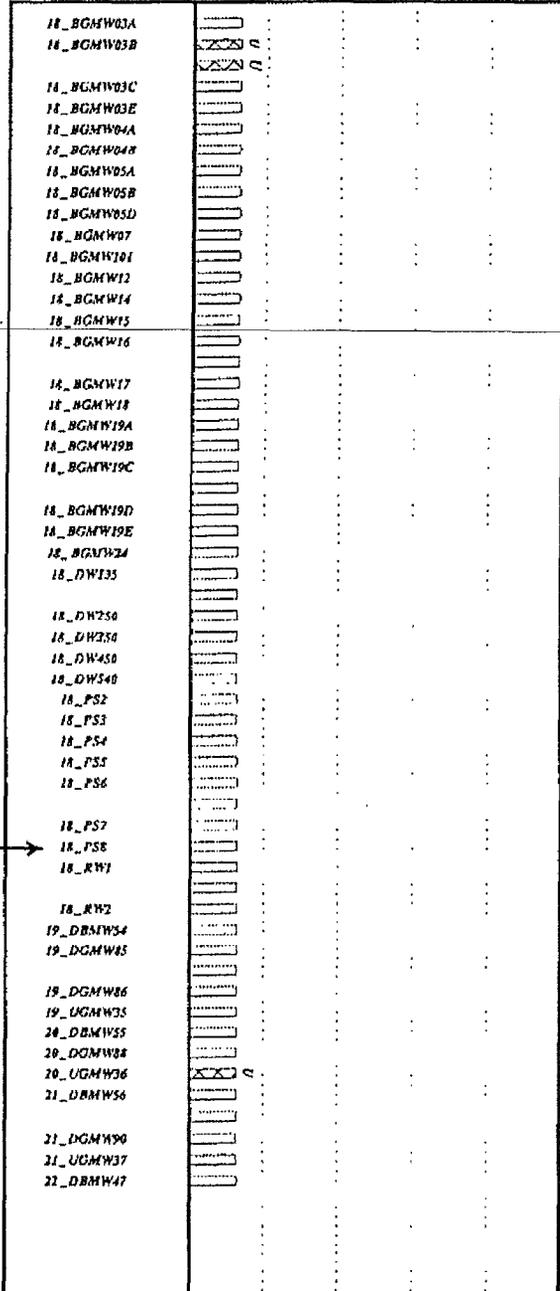
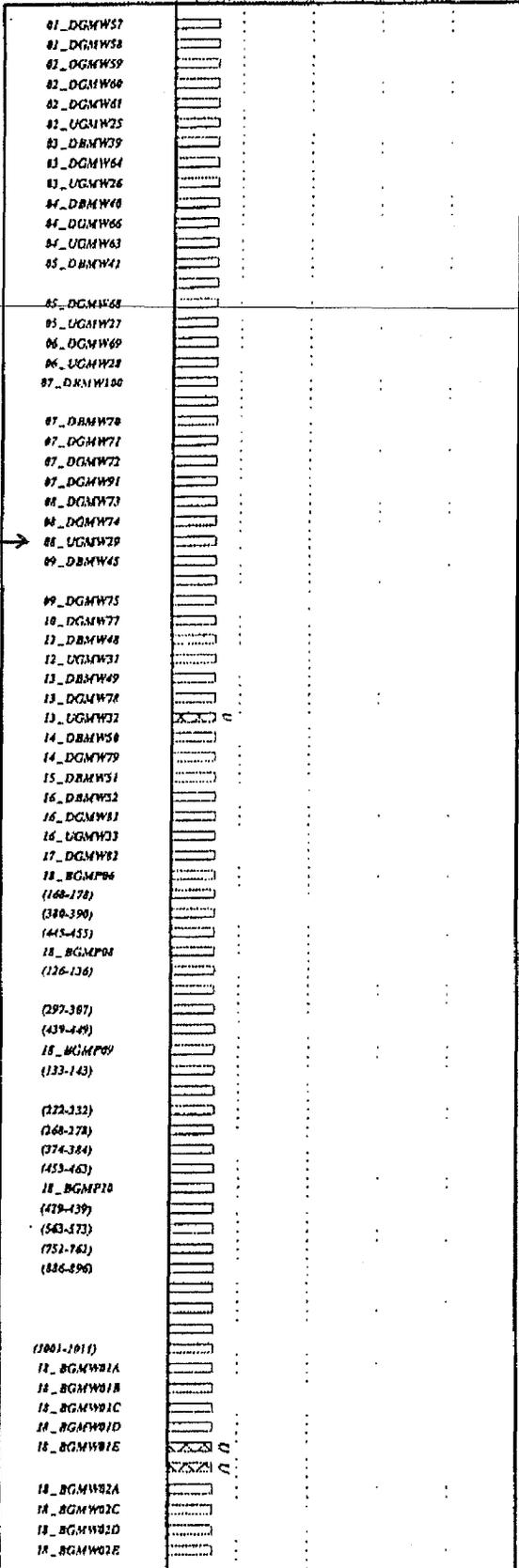
TOTAL RECOVERABLE PETROLEUM HYDROCARBON Concentration in Ground Water - Sample

CONC.(MG/L)

CONC.(MG/L)

10000
1000
100
10
1
0.1

10000
1000
100
10
1
0.1



LEGEND

- UNDETECTED
- DETECTED
- ESTIMATED
- DILUTED SAMPLE ANALYSIS
- DATA BELOW PLOT LIMIT

10/27/93 10:27:33 1993

DOCUMENTATION
FOR FORMER UST SITE 272

LEACHABILITY ANALYSIS BY USEPA METHOD 1312 (SPLP)

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SANTA ANA REGION

3737 MAIN STREET, SUITE 500

FRESNO, CA 92501-3339

TELEPHONE: (909) 782-4130

FAX: (909) 781-6288



May 14, 1997

Mr. Wayne D. Lee
Assistant Chief of Staff
Environment and Safety
Marine Corps Air Station El Toro
P.O. Box 95001
Santa Ana, CA 92709-5001

SUBJECT: CASE CLOSURE, FORMER UNDERGROUND STORAGE TANK SITE 272,
MARINE CORPS AIR STATION EL TORO

Dear Mr. Lee:

This letter confirms the completion of site investigations and remedial actions for the subject underground storage tank site. Based on the information provided in the Addendum Site Assessment Report Underground Storage Tank Site 272 dated 4/24/97 and with the provision that the information provided to this agency was accurate and representative of site conditions, no further action related to the underground storage tank release is required.

This notice is issued pursuant to a regulation contained in Title 23, Division 3, Chapter 16, Section 2721(e) of the California Code of Regulations.

If you have any questions regarding this matter, please contact Lawrence Vitale at (909) 782-4998.

Sincerely,

A handwritten signature in black ink, appearing to read "Gerard J. Thibeault", is written over a horizontal line.

Gerard J. Thibeault
Executive Officer

cc: LT. Hope Katcharian, Marine Corps Air Station El Toro
Mr. Bill Diekman, Orange County Health Care Agency
Mr. John Adams Jr., State Water Resources Control Board, Division of Clean
Water Programs

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SANTA ANA REGION

7 MAIN STREET, SUITE 500
SANTA ANA, CA 92701-3339
PHONE: (909) 782-4130
FAX: (909) 781-6288



August 13, 1996

Mr. Wayne D. Lee
Headquarters
Marine Corps Air Station El Toro
Environmental and Safety
P.O. Box 95001
Santa Ana, CA 92709-5001

SUBJECT: CASE CLOSURES, FORMER UNDERGROUND STORAGE TANKS AT
SITES 14, 54A, 263, 272, and 374B

Dear Mr. Lee:

This is in response to the subject underground storage tanks (USTs) closure reports dated from 2/20/96 to 3/8/96 received by us July 5, 1996. Due to the high concentrations (12,000 to > 25,000) reported for Total Petroleum Hydrocarbons (TPH), we cannot approve closure of these sites. Contaminated UST sites with elevated levels of TPH require additional investigation to determine migration potential. It has been our experience that very high levels of TPH may contain soluble levels of contaminants, volatile or semi-volatile components, that may migrate over wide areas and potentially contaminate water resources. We recommend analysis of leaching potential using Method 1312, Synthetic Precipitation Leaching Procedure for volatile analytes. Method 1312 is designed to determine the mobility of both organic and inorganic analytes present in samples of soils and wastes. The additional data may be reported, for our review, in the form of an addendum to the case closure reports already submitted. Remediation or closure will be determined based on the results of the leaching procedure test.

If you have any questions regarding this matter, please contact me at (909) 782-4998.

Sincerely,

Lawrence Vitale
Lawrence Vitale
DoD Section

cc: LT Hope Katcharian, Marine Corps Air Station El Toro
Mr. Bill Diekman, Orange County Health Care Agency
Mr. John Adams Jr., State Water Resources Control Board, Division of Clean
Water Programs

EXCERPTS

ADDENDUM

Site Assessment Report, Former Underground Storage Tank Site 272
Marine Corps Air Station (MCAS), El Toro, California

24 April 1997

Prepared by Southwest Division, Naval Facilities Engineering Command
BRAC Operations Office
San Diego, California

Section 1

Introduction

The purpose of this addendum is to provide additional information for the Site Assessment Report, Former Underground Storage Tank Site 272, MCAS El Toro, California (Bechtel, February 1996). The Site Assessment Report presents information pertaining to the environmental setting, the tank removal activities, and previous site investigation activities.

Underground Storage Tank (UST) Site 272 is located west of Building 272 in the northwestern quadrant of MCAS El Toro. UST 272 was a 1,500-gallon fuel oil storage tank. A site assessment that included the collection of soil samples from one boring was completed in early 1996. The site assessment indicated that residual levels of petroleum hydrocarbons exceeded or were equal to 10,000 milligrams/kilogram at depths of 11 to 32 feet below ground surface at UST Site 272. The depth to ground water at UST Site 272 is approximately 150 feet below ground surface (bgs) based upon 1996 water level measurements at well 18_BGMW12, located approximately 1,500 feet southwest of the site.

Following the review of the Site Assessment Report (Bechtel, February 1996), the Regional Water Quality Control Board, Santa Ana Region recommended that soil samples be collected for analysis by Method 1312- the Synthetic Precipitation Leaching Procedure (SPLP). This addendum presents the results of the SPLP analyses for soils collected from UST Site 272.

Section 2

Investigation Activities

Field activities were conducted in September 1996 by OHM Remediation Services under Southwest Division, Naval Facilities Engineering Command Contract N68711-93-D-1459, Delivery Order #24. The field work was conducted in accordance with the procedures described in the Draft Work Plan, Remediation of Various Underground Storage Tanks at the Marine Corps Air Station, El Toro (OHM, 1995). Utility clearance and geophysical surveys were conducted prior to drilling. One boring, SB01A, was drilled at the former UST Site 272, and soil samples were collected for analyses by Methods 8015 Modified and 1312. The analyses identified Total Petroleum Hydrocarbon (TPH) leachate concentrations of 0 and 3,300 micrograms per liter (ug/l) at depths of 20 and 25 feet bgs, respectively; the corresponding TPH concentrations in soil samples were 24,000 and 56,000 milligrams per kilogram, respectively. The results of the laboratory analyses are presented in Table 1. The site, sample locations, and subsurface information from the 1995 and 1996 field data collection activities are shown on Figures 1, 2, and 3.

Section 3

Conclusions and Recommendations

The potential for remaining petroleum hydrocarbons at the former UST Site 272 to impact ground water has been evaluated using the results of the leachability analyses and the California Leaking Underground Fuel Tank (LUFT) Field Manual Risk Appraisal Method. The following conclusions are based upon existing information from tank removal activities and subsequent field sampling activities:

- UST 272 and fuel-impacted soils were removed from the site in 1993.
- The depth to ground water is approximately 150 feet bgs.
- Soil samples have been collected from two borings from depths of 6.5 to 65 feet bgs. The results of the analyses of soil samples indicate that petroleum hydrocarbon concentrations exceed or equal 10,000 milligrams/kilogram between depths of 11 and 32 feet bgs. The results of the analyses also indicate that Benzene, Toluene, Ethylbenzene, and Xylenes were not detected.
- Leachability analyses indicate a low potential for leaching of petroleum hydrocarbons to ground water. Leachate concentrations of petroleum hydrocarbons from 0 to 3,300 micrograms per liter were measured. Additionally, the residual fuel oil has limited mobility and poses minimal risk to ground water quality.

Based upon the low concentrations of petroleum hydrocarbons in the leachate and the depth to ground water at UST Site 272, it is recommended that this unauthorized release case be closed.

Section 4

References

Bechtel, 1996. Site Assessment Report, Former Underground Storage Tank Site 272, MCAS El Toro, California.

CDM Federal Programs Corporation, 1996. Final Groundwater Monitoring Report, January-February 1996 Sampling Round, Volume I, Groundwater Monitoring Program, Marine Corps Air Station, El Toro.

OHM, 1995. Draft Work Plan, Remediation of Various Underground Storage Tanks at the Marine Corps Air Station, El Toro.

OHM, 1996. Information Package for UST Site 272.

Regional Water Quality Control Board, Santa Ana Region, 1996. Letter to MCAS El Toro dated August 13, 1996 (Subject: Case Closures, Former USTs at Sites 14, 54A, 263, 272, and 374B).

**TABLE 1. Summary of Leachability Test Data
 (EPA Method 1312-Synthetic Precipitation Leaching Procedure (SPLP))**

Former Underground Storage Tank (UST) Site 272
 Marine Corps Air Station, El Toro

Soil Boring Number/Date ¹	Sample Depth (Feet Below Ground Surface)	Northing (feet) [North American Datum (NAD 83)]	Easting (feet) [North American Datum (NAD 83)]	TPH Motor Oil (mg/kg)	TPH (mg/kg) [Method 8015 Mod]	TPH Leachability by SPLP (ug/l) [Method 1312]
SB01A/1996	20	2195740	6109948		24000	ND
SB01A/1996	25	"	"		56000	3300
SB01A/1996	29.5	"	"		15000	NA
SB01A/1996	60	"	"		6.8J	NA
SB01A/1996	65	"	"		4.8J	NA
272-SB1/1995	6.5	2195741	6109945	150	150Y ² (TPH-D)	
272-SB1/1995	11.5	"	"	ND	25000 (TPH-D)	
272-SB1/1995	16.5	"	"	ND	19000 (TPH-D)	
272-SB1/1995	21.5	"	"	ND	16000 (TPH-D)	
272-SB1/1995	26.5	"	"	ND	6000 (TPH-D)	
272-SB1/1995	31.5	"	"	ND	10000 (TPH-D)	
272-SB1/1995	36.5	"	"	ND	ND	
272-SB1/1995	41.5	"	"	ND	ND	
272-SB1/1995	46.5	"	"	ND	ND	
272-SB1/1995	51.5	"	"	ND	ND	
272-SB1/1995	56.5	"	"	ND	ND	
272-SB1/1995	61.5	"	"	9 (ZJ) ³	ND	

Explanation

NA Not analyzed
 ND Not detected above method detection limit

- Notes: 1 1995 data is reported in Table 4-1 and Appendix E of the Site Assessment Report, Former Underground Storage Tank Site 272, MCAS El Toro (Bechtel, February 1996); 1996 data was collected by OHM under RAC I Delivery Order #24.
- 2 "Y" qualifier: A fuel mixture pattern was detected but does not fall 90 percent within calibration standard range, or exhibit a reasonable pattern match to any of the calibrated fuels.
- 3 "ZJ" qualifier: Internal standard failed; estimated value.

TRANSMITTAL

Date: 13 Jan 2003

From: Lynn Marie Hornecker
MCAS El Toro

To: Diane Silva
Code ~~01LS.DS~~ 05G.DS

Subj: CERCLA Administrative Record Materials
Marine Corps Air Station, El Toro

Installation: Marine Corps Air Station, El Toro

UIC Number: M60050

Document Title (or subject): OWS Site 672A

Author: John Broderick RWQCB

Recipient:

Record Date: 10 Jan 2003

Approximate Number of Pages: 1

EPA Category: 01.1

Sites: OWS 672A

Key Words:

Contract: N/A

CTO Number: N/A

Note: OWS 672A is located within the boundary of IRP Site 2A.