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MCAS EL TORO
SSIC #5090.3

Technical Memorandum

Progress Report
Phase I Vadose Zone Remediation Activities
Installation Restoration Program Site 24
Volatile Organic Compound (VOC) Source Area
Marine Corps Air Station, El Toro

12 February 1999

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

OHM Remediation Services Corp.
A Member of The IT Group

February 12, 1999

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Southwest Division
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Attention: Ms. Lynn Hornecker, 5BME.LMH

Subject: Transmittal of February 1999 Progress Report, Phase I Vadose Zone Remediation, IRP Site 24, MCAS El Toro
Contract N68711-93-D-1459, Delivery Order 065,
Removal and Remedial Actions at IRP Sites, MCAS El Toro, California

Dear Ms. Hornecker:

Attached are 8 copies of the January 1999 Progress Report for IRP Site 24, as requested in your Memorandum of February 10, 1999. These copies are intended for internal distribution to the Navy and Marine Corps, (RPMs-3, RTM-1, MCAS El Toro-2, ROICC-1, spare-1). Additional copies have been forwarded, with the cover Transmittal from Dave DeMars, directly to the following persons:

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If you have any questions or need additional copies of the document, please let me know.

Sincerely,

William Sedlak
Sr. Project Manager

cc: Lucreatria Holloway, SWDIV, COTR (1C/1E)
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Edwin G. Bond, Contracts Manager

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4 Selected SVE Test Data
5 Photograph of Central System
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Section 1
Introduction

The purpose of this technical memorandum is to provide an update on the Phase I field activities associated with the remediation of the vadose zone at Installation Restoration Program (IRP) Site 24 - the Volatile Organic Compound (VOC) Source Area - at the Marine Corps Air Station, El Toro. This technical memorandum describes start-up and testing activities that were conducted during the period from late December 1998 through late January 1999.

Section 2
Field Activities

Soil Vapor Extraction (SVE) Testing Activities
Soil vapor extraction tests, utilizing portable SVE treatment units, were conducted at several of the twenty-six (26) existing vapor extraction wells during the December 1998 through January 1999 time period. Influent trichloroethylene (TCE) vapor concentrations and selected flow information are presented in Table 1.

TCE levels in the deep vadose zone wells are shown on Exhibit 1, and TCE levels in the intermediate and shallow vadose zone wells are shown on Exhibit 2. Vapor samples were collected from several piezometers that were constructed during the Remedial Investigation. Influent TCE vapor concentrations are equal to or less than the target threshold concentration of 27 micrograms per liter (ug/L) at several of the deep, intermediate, and shallow wells.

Ground water was observed in several of the vapor extraction wells during the period from December 1998 through January 1999. The locations of vapor extraction wells and ground water monitoring, extraction, injection, and observation wells are shown on Exhibit 3.

Influent TCE vapor concentrations at Wells 24SVE4, 24SVE6, 24SVE54, 24SVE14, and 24SVE54 are presented graphically as Exhibit 4.

Soil Gas Sampling
Soil gas sampling was conducted in the vicinity of Buildings 296 and 297 during January 1999 in order to optimize the locations of new vapor extraction wells. Analytical results are in the process of being evaluated.

Central System Start-up Activities
The Central Soil Vapor Extraction (SVE) Treatment System (Central System) was successfully operated for a twenty-four (24) hour low flow test on 27 and 28 January 1999. The estimated air flow was approximately 700 standard cubic feet per minute (scfm). Vapor extraction wells 24SVE10, 24SVE104B, 24SVE107, 24SVE116, 24SVE5, 24SVE5A, 24SVE9, and 24SVE9A were connected to the Central System for the low flow test. Adjustments are being implemented in order to measure air flows more accurately. A photograph of the Central System is provided in Exhibit 5.

Tentative Schedule for Central System and Other Activities

Activity	**Tentative Completion Date**
Start-up Activities	
Central SVE Treatment System Assembly (Central System)	December 1998 (actual)
Publish Public Notice	16 January 1999 (actual)
Public Presentation (Briefing)	27 January 1999 (actual)
First Central System Low Flow Test	28 January 1999 (actual)
Central System Start-up and Testing	March 1999
Central System Optimization for Low Air Flows (includes construction of Selected Phase I Wells)	April 1999
Rebound Testing at Existing Wells	April 1999
Soil Gas Sampling	July 1999

Section 3
References and/or Sources of Information

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For discussion only

Table 1. History and Status of Soil Vapor Extraction (SVE) Testing Operations at IRP Site 24, MCAS El Toro (Updated 4 February 1999)

Vapor Extraction Well ID	Screened Interval (Feet BGS)	Approximate Date(s) of SVE Operations	TCE Vapor Influent Concentrations (ug/L) unless otherwise noted	Date(s) of TCE Vapor Analyses	Comments	Average Flows (from various tests or from the EDR)	TCE Soil Gas Removal Estimates
24SVE1	91 to 109	Note: Soil gas sample via 24CPT31 at 105 feet had 6,120 ug/L of TCE on 29 August 1995. Well 24SVE1 was constructed in 1995. 19 days (10 Jun - 8 Jul 1996) 1 day or 4 hours (23 Oct 96) 84 days or 1,981.5 hours (18 Dec 96 - 12 Mar 97) 1 day or 4 hours (14 Mar 97) 1 day or 4 hours (12 May 97) 5 days approximately (1 - 5 Jun 98) 54 days (7 Oct – 30 Nov 98) ***TOTAL: 164 days approximately***	**910** **120** **73** **89** **37** **8.7**	23 Oct 96 12 May 97 5 Jun 98 9 Oct 98 5 Nov 98 30 Nov 98	Travel time: 1.4 days per pore volume (EDR). Approx. 114 pore volumes removed during tests (as of November 1998).	225 cfm at 42" (1996)	1.15 pound (1996) **435 pounds (through 1997)** Calculations in progress for 1998 tests
24SVE2	80 to 105	**Note:** Soil gas sample via 24CPT27 at 92 feet had 615 ug/L of TCE on 1 September 1995. **Well 24SVE2 was constructed in 1995.** **1 day** or 4 hours (11 Nov 96) 4 days (7 - 11 Jan 99)	**160** **230** **240** **320**	11 Nov 96 7 Jan 99 8 Jan 99 11 Jan 99	100 IWG applied at 24SVE2 resulted in 0.5 IWG at 24SVE7 (396 feet away) during 1996 pilot test	131 at 100" (1996)	0.31 pound (1996)
24SVE2A	40 to 70	**Note:** Soil gas sample via 24CPT27 at 69 feet had 390 ug/L of TCE on 1 September 1995. **Well 24SVE2A was constructed in 1995.** **1 day** or 4 hours (13 Nov 96) 2 days (11 – 13 Jan 99)	**150** **57** **75**	13 Nov 96 11 Jan 99 13 Jan 99		44 cfm at 80" (1996)	0.08 pound (1996)
24SVP2 Piezometer	27.25-27.75 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing completed January 1999.	32	7 Jan 99		Not measured	
24SVE3	80 to 105	Note: Soil gas sample via 24CPT81 at 90 feet had 1,007 ug/L of TCE on 29 November 1995. Well 24SVE3 was constructed in 1995. **1 day** or 4 hours (4 Nov 96) **65 days** or 1,536 hours (21 July - 24 September 1997) **6 days (22 – 28 Dec 98)** ***TOTAL: 72 days approximately***	**1100** **980** **160** **140** **110**	4 Nov 96 21 Jul 97 24 Sep 97 23 Dec 98 28 Dec 98		22 cfm at 100" (1996)	0.36 pound (1996) **59 pounds (through 1997)**
24SVE3A	45 to 60	**Note:** Soil gas sample via 24CPT81 at 58 feet had 3 ug/L of TCE on 29 November 1995**Well 24SVE3A was constructed in 1995.** **1 day** or 4 hours (5 Nov 96) 7 days (28 Dec 98 – 4 Jan 99) ***TOTAL: 7 days approximately***	**130** **1.2** **7.5**	5 Nov 96 28 Dec 98 4 Jan 99		27 cfm at 120" (1996)	0.04 pound (1996)

Table 1. (continued)

Vapor Extraction Well ID	Screened Interval (Feet BGS)	Approximate Date(s) of SVE Operations	TCE Vapor Influent Concentrations (ug/L) unless otherwise noted	Date(s) of TCE Vapor Analyses	Comments	Average Flows (from various tests or from the EDR)	TCE Soil Gas Removal Estimates
24SVE4	85 to 105	**Note:** Soil gas sample via 24CPT37 at 96 feet had 47 ug/L of TCE on 11 September 1995. **Well 24SVE4 was constructed in 1995.** **1 day** or 4 hours (14 Nov 96) 3 days (7 Jan – 13 Jan (water in well caused system shut-down during test (9-11 Jan 99)) ***TOTAL: 3 days approximately***	**280** **60** **56** **28**	14 Nov 96 7 Jan 99 8 Jan 99 11 Jan 99	GW in well	>131 at 55" (1996)	0.55 pound (1996)
24SVE5	68 to 88	Note: Soil gas sample via 24CPT13 at 98 feet had 2,310 ug/L of TCE on 14 September 1995. Well 24SVE5 was constructed in 1995. **1 day** or 4 hours (18 Nov 96) **20 days** (10 Mar-30 Mar 98) ***TOTAL: 21 days approximately***	**220** **20** **7.7**	18 Nov 96 24 Mar 98 30 Mar 98		27 cfm at 110" (1996)	0.09 pound (1996) Calculations in progress for 1998 tests
24SVE5A	41.5 to 56.5	**Note:** Soil gas sample via 24CPT13 at 54 feet had 785 ug/L of TCE on 14 September 1995. **Well 24SVE5A was constructed in 1995.** **1 day** or 4 hours (20 Nov 96)	**360**	20 Nov 96		65 cfm at 100" (1996)	0.35 pound (1996)
24SVE6	89 to 109.5	**Note:** Soil gas sample via 24CPT61 at 105 feet had 1,780 ug/L of TCE on 29 August 1995. **Well 24SVE6 was constructed in 1995.** **1 day** or 4 hours (8 Nov 96) 6 days (28 Dec 98- 4 Jan 99) ***TOTAL: 7 days approximately***	**440** **6.3** **24** **23 (21** duplicate)	8 Nov 96 28 Dec 98 29 Dec 98 4 Jan 99		>131 at 30" (1996)	0.86 pound (1996)
24SVP6 Piezometer	50 to 50.5 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing completed January 1999.	0.14	11 Jan 99		Not measured	
24SVP6A Piezometer	67 to 67.5 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing completed January 1999.	0.17	11 Jan 99		Not measured	
24SVE7	80 to 110	Note: Soil gas sample via 24CPT69 at 110 feet had 2,630 ug/L of TCE on 31 August 1995. Well 24SVE7 was constructed in 1995. **1 day** or 4 hours (31 Oct 96) **2 days** (13 – 15 January 1999)	**54** **140** **170 (130** duplicate) **180**	31 Oct 96 13 Jan 99 14 Jan 99 15 Jan 99	GW in well	180 cfm at 135" (1996) ~ 5 cfm at 120" (Jan 99)	0.15 pound (1996)
24SVE7A	63 to 74	**Note:** Soil gas sample via 24CPT69 at 54 feet had 741 ug/L of TCE on 31 August 1995. **Well 24SVE7A was constructed in 1995.** **1 day** or 4 hours (1 Nov 96) 3 days (15 – 18 January 1999)	**30** **16**	1 Nov 96 18 Jan 99		28 cfm at 110" (1996)	0.01 pound (1996)
24SVP7 Piezometer	54.5 to 55 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing completed January 1999.	6.4	11 Jan 99		Not measured	

Table 1. (continued)

Vapor Extraction Well ID	Screened Interval (Feet BGS)	Approximate Date(s) of SVE Operations	TCE Vapor Influent Concentrations (ug/L) unless otherwise noted	Date(s) of TCE Vapor Analyses	Comments	Average Flows (from various tests or from the EDR)	TCE Soil Gas Removal Estimates
24SVE8	83 to 113	**Note:** Soil gas sample via 24CPT58 at 96 feet had 1,270 ug/L of TCE on 15 September 1995. **Well 24SVE8 was constructed in 1995.** **1 day** or 4 hours (25 Oct 96) 2 days (4 – 6 Jan 99)	**100** **17** **19**	25 Oct 96 4 Jan 99 6 Jan 99		30 cfm at 105" (1996)	0.04 pound (1996)
24SVE8A	50 to 78	**Note:** Soil gas sample via 24CPT58 at 53 feet had 190 ug/L of TCE on 15 September 1995. **Well 24SVE8A was constructed in 1995.** **1 day** or 4 hours (24 Oct 96) 2 days approximately (19 - 21 Jan 99)	**45** **4.6** **18 (2.9** duplicate)	24 Oct 96 19 Jan 99 22 Jan 99		70 cfm at 100" (1996)	0.05 pound (1996)
24SVP8 Piezometer	30.5 to 31 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing was completed in January 1999.	1.5	19 Jan 99		Not measured	
24SVE9	81 to 111	Note: Soil gas sample via 24CPT17 at 105 feet had 1,060 ug/L of TCE on 31 August 1995. Well 24SVE9 was constructed in 1995. **1 day** or 4 hours (21 Nov 96) **62 days** or 1,450.8 hours (15 May –16 Jul 97) **4 days** (8 – 12 Jun 98) ***TOTAL: 67 days***	**550** **170** **58**	21 Nov 96 16 Jul 97 12 Jun 98	Travel time: 0.77 days per pore volume (EDR). Approx. 80 pore volumes removed during tests.	60 cfm at 95" (1996)	**19 pounds (through 1997)** Calculations in progress for 1998 tests
24SVE9A	55 to 85	**Note:** Soil gas sample via 24CPT17 at 82 feet had 439 ug/L of TCE on 31 August 1995**Well 24SVE9A was constructed in 1995.** **1 day** or 4 hours (22 Nov 96)	**36**	22 Nov 96		20 cfm at 100" (1996)	0.01 pound (1996)
24SVP9 Piezometer	35.5 to 36 (approximately)	Note: Piezometer was constructed in 1995. Evaluation of condition of piezometer is in progress.	Not measured			Not measured	
24SVE10	79 to 109	**Note: Well 24SVE10 was constructed in 1995.** **1 day** or 4 hours (15 Nov 96) **44 days** or 1,005.9 hours (24 Mar – 7 May 97) **26 days** (25 Sep 97 – 20 Oct 97) 1 day (10-11 December 1998) ***TOTAL: 72 days approximately***	**1400** **230** **140** **26** **30 (33** duplicate)	15 Nov 96 7 May 97 2 Oct 97 10 Dec 98 11 Dec 98	Travel time: 2.17 days per pore volume (EDR). Approx. 31 pore volumes removed during tests. GW at 104' [GW in well (Dec 98)]	250 cfm at 55" (1996)	5.24 pounds (1996) **308 pounds (through May 1997)** Calculations in progress for late 1997 and 1998 tests
24SVP10 Piezometer	55.5 to 56 (approximately)	Note: Piezometer was constructed in 1995. Evaluation of condition of piezometer is in progress.	Not measured			Not measured	
24SVP10A Piezometer	38 to 38.5 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing was completed in December 1998.	0.15	10 Dec 98		Not measured	

Table 1. (continued)

Vapor Extraction Well ID	Screened Interval (Feet BGS)	Approximate Date(s) of SVE Operations	TCE Vapor Influent Concentrations (ug/L) unless otherwise noted	Date(s) of TCE Vapor Analyses	Comments	Average Flows (from various tests or from the EDR)	TCE Soil Gas Removal Estimates
24SVE11	79 to 109	Note: Soil gas sample via 24CPT59 at 100 feet had 200 ug/L of TCE on 18 September 1995. Well 24SVE11 was constructed in 1995. **1 day** or 4 hours (25 Nov 96) **24 days** (28 Apr - 21 May 98) 2 days (13 – 15 January 1999) ***TOTAL: 26 days approximately***	**300** **23** **160** **120** **96**	25 Nov 96 29 Apr 98 8 May 98 21 May 98 14 Jan 99	GW in well	60 cfm at 100" (1996)	0.27 pound Calculations in progress for 1998 tests
24SVE11A	43 to 73	**Note:** Soil gas sample via 24CPT59 at 52 feet had 461 ug/L of TCE on 18 September 1995**Well 24SVE11A was constructed in 1995.** **1 day** or 4 hours (26 Nov 96) 3 days (15 – 18 January 1999)	**0.14** **38**	26 Nov 96 18 Jan 99		27 cfm at 115" (1996)	
24SVP11 Piezometer	23.5 to 24 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing completed January 1999.	6.6	11 Jan 99		Not measured	
24SVE12	34 to 74	**Note: Well 24SVE12 was constructed in 1995.** **1 day** or 4 hours (30 Dec 97) 6 days (26 January – 1 February 1999)	**330**	30 Dec 97			Calculations in progress
24SVE13	79 to 109	**Note: Well 24SVE13 was constructed in 1995.** Soil gas sample via 24CPT41 at 92 feet had 192 ug/L of PCE on 1 September 1995. **1 day** or 4 hours (27 Nov 96) **28 days** (12 Nov – 17 Dec 98) ***TOTAL: 29 days approximately***	**4.1 (TCE)** **120 (PCE)** **92 (PCE)** **42 (PCE)** **4.1 (TCE)**	27 Nov 96 27 Nov 96 18 Nov 98 17 Dec 98 17 Dec 98		40 cfm at 110" (1996)	Calculations in progress (PCE mass)
24SVP13 Piezometer	71.5 to 72 (approximately)	Note: Piezometer was constructed in 1995. Evaluation of condition of piezometer is in progress.	Not measured			Not measured	
24SVE14	78 to 108	**Note: Well 24SVE14 was constructed in 1995.** **1 day** or 4 hours (7 Nov 96) 6 days (21 Dec – 28 Dec 98) __ days (19 Jan - ___) Test in progress	**110** **760** **940** **780** **420**	7 Nov 96 21 Dec 98 22 Dec 98 28 Dec 98 20 Jan 99	124 IWG applied at 24SVE14 resulted in 0.7 IWG at 24SVE8 (450 feet away) during 1996 pilot test	120 cfm at 120" (1996)	0.2 pound (1996)
24SVP14 Piezometer	49.5 to 50 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing completed January 1999.	27	11 Jan 99			
24SVP14A Piezometer	29.5 to 30 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing completed January 1999.	33	11 Jan 99			

Table 1. (continued)

Vapor Extraction Well ID	Screened Interval (Feet BGS)	Approximate Date(s) of SVE Operations	TCE Vapor Influent Concentrations (ug/L) unless otherwise noted	Date(s) of TCE Vapor Analyses	Comments	Average Flows (from various tests or from the EDR)	TCE Soil Gas Removal Estimates
24SVE104B	25 to 45	Note: Well 24SVE104B was constructed 16 Nov 1998. 2 days (30 Nov 98 – 2 Dec 98)	1.3 (1.3 duplicate) 1.8	1 Dec 98 2 Dec 98	Located within 500 ug/L TCE vapor concentration contour for shallow zone established in 1995	~200 cfm at ~20" (22 cfm at 92 IWG per EDR)	
24SVE107	70 to 95	Note: Well 24SVE107 was constructed 17 Nov 1998. 5 days (2 Dec – 7 Dec 98)	14 4.4	3 Dec 98 7 Dec 98		~40 cfm at ~100" (22 cfm at 92 IWG per EDR)	
24SVE161	70 to 95	Note: Well 24SVE161 was constructed 19 Nov 1998. 3 days (7 Dec 98 – 10 Dec 98)	82 61	7 Dec 98 9 Dec 98	GW in well (Dec 98) Located within 500 ug/L TCE vapor concentration contour for deep zone established in 1995	~50 cfm at ~95" (228 cfm at 47 IWG per EDR)	
24SVE116	75 to 95	Note: Well 24SVE116 was constructed 16 Dec 1998. 4 days (17-21 Dec 98) approximately	130 82	17 Dec 98 21 Dec 98		~75 cfm at ~80" (22 cfm at 92 IWG per EDR)	
24SVE54	75 to 95	Note: Well 24SVE54 was constructed 17 Dec 1998. 2 days (5 – 7 Jan 1999) __ days (2 February - _____) Test in progress	26 460 430	5 Jan 99 6 Jan 99 7 Jan 99		~20 cfm at 100" (22 cfm at 92 IWG per EDR)	
Central System Low-Flow Test		Wells 24SVE5, 24SVE5A, 24SVE9, 24SVE9A, 24SVE10, 24SVE104B, 24SVE107, & 24SVE116 were connected to the Central System on 27 and 28 January 1999 to test the Central System for low-flow operations (~24-hour test duration).	Data evaluation in progress				

Table 1. (continued)

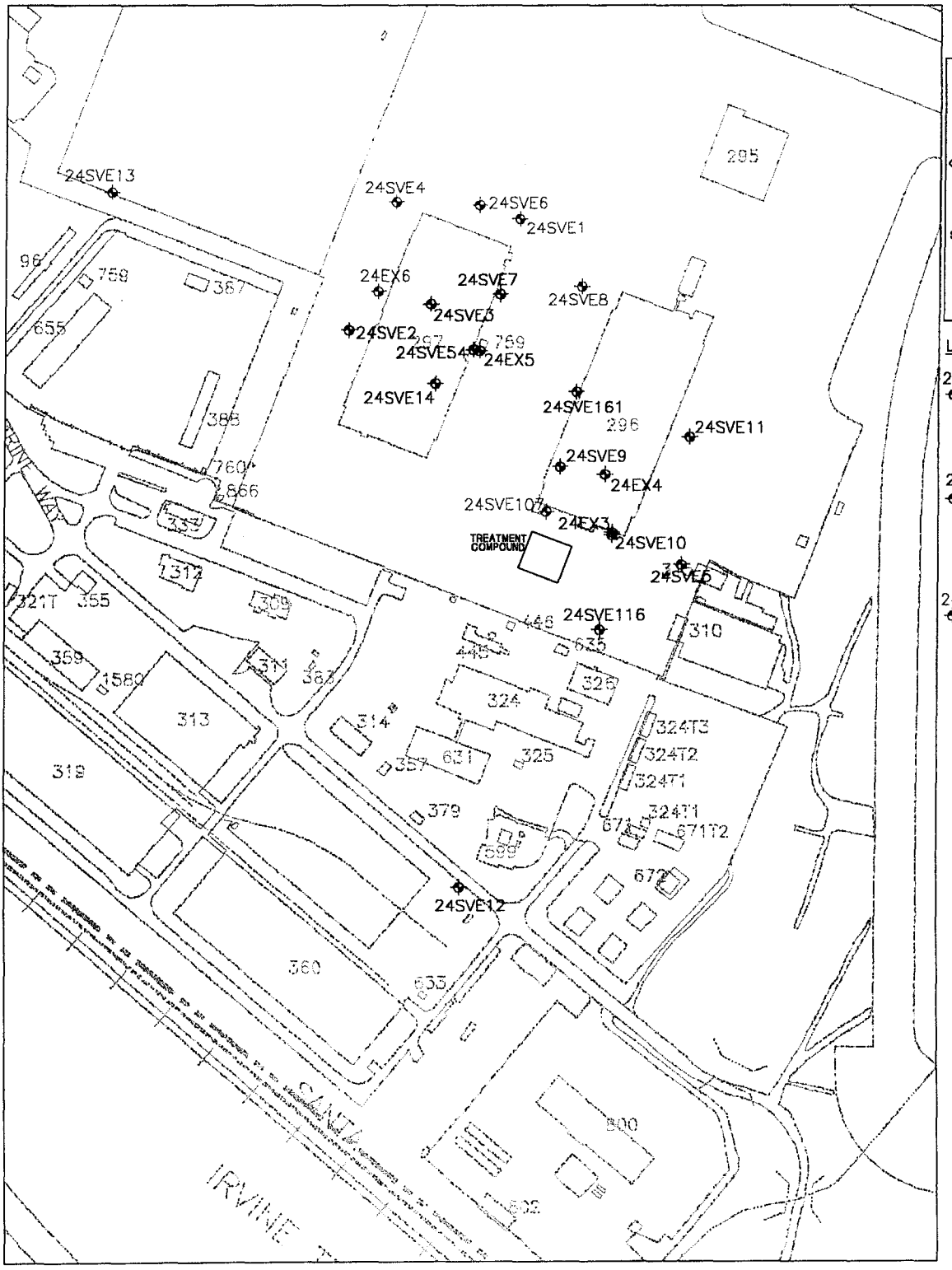
Vapor Extraction Well ID	Screened Interval (Feet BGS)	Approximate Date(s) of SVE Operations	TCE Vapor Influent Concentrations (ug/L) unless otherwise noted	Date(s) of TCE Vapor Analyses	Comments	Average Flows (from various tests or from the EDR)	TCE Soil Gas Removal Estimates
		NOTE: Data from the Groundwater Remediation Pilot Test is presented for reference only (Source of Information: Draft Groundwater Remediation Pilot Test Report – Site 24 (Bechtel, December 1998).					
24EX3	105-180	132-day vacuum-enhanced GW extraction pilot test (22 Oct 97 – 15 May 98)	**39** **Range: ND to 148**	15 May 98	Near 24SVE10	Approximate range: 80-140 scfm	55.45 pounds of TCE vapor mass removed
24EX4	104-190	19-day vacuum-enhanced GW extraction pilot test (6 Jan 98 – 27 Jan 98)	**75** **Range: 42 to 258**	27 Jan 98	Near 24SVE9	Approximate range: 20-29 scfm	4.06 pounds of TCE vapor mass removed
24EX5	104-154	20-day vacuum-enhanced GW extraction pilot test (31 Mar 98 – 21 Apr 98)	**38** **Range: ND to 118**	21 Apr 98	Near 24SVE54	Approximate range: 5 to 28 scfm	1.04 pound of TCE vapor mass removed
24EX6	103-173	21-day vacuum-enhanced GW extraction pilot test (2 Jun 98 – 29 Jun 98)	**26** **Range: ND to 455**	29 Jun 98	Near 24SVE2	Approximate range: 62 to 69 scfm	2.93 pounds of TCE vapor mass removed

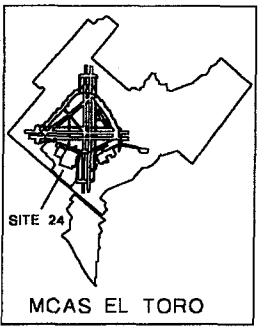
Mass calculations are in progress for the rebound and initial testing operations.

The Draft Final Interim Record of Decision, Operable Unit 2A, Site 24 – VOC Source Area, Vadose Zone, Marine Corps Air Station, El Toro (September 1997) states that approximately 870 pounds of TCE mass were removed during the SVE pilot test activities conducted during 1996 and 1997.

Exhibits

1 TCE Concentrations in the Deep Vadose Zone as of January 1999
2 TCE Concentrations in the Shallow and Intermediate Vadose Zones as of January 1999
3 Locations of Water Wells and Vadose Zone Wells at IRP Site 24
4 Selected SVE Test Data
5 Photograph of Central SVE System
6 Public Notice from the Orange County Register dated 16 January 1999





LEGEND

24SVE2
VAPOR EXTRACTION WELLS GREATER THAN 100 ug/L

24SVE9
VAPOR EXTRACTION WELLS BETWEEN TARGET CLEANUP LEVEL AND 100 ug/L

24SVE6
VAPOR EXTRACTION WELLS WITH CONCENTRATIONS EQUAL TO OR LESS THAN THE TARGET CLEANUP LEVELS ESTABLISHED IN THE INTERIM ROD

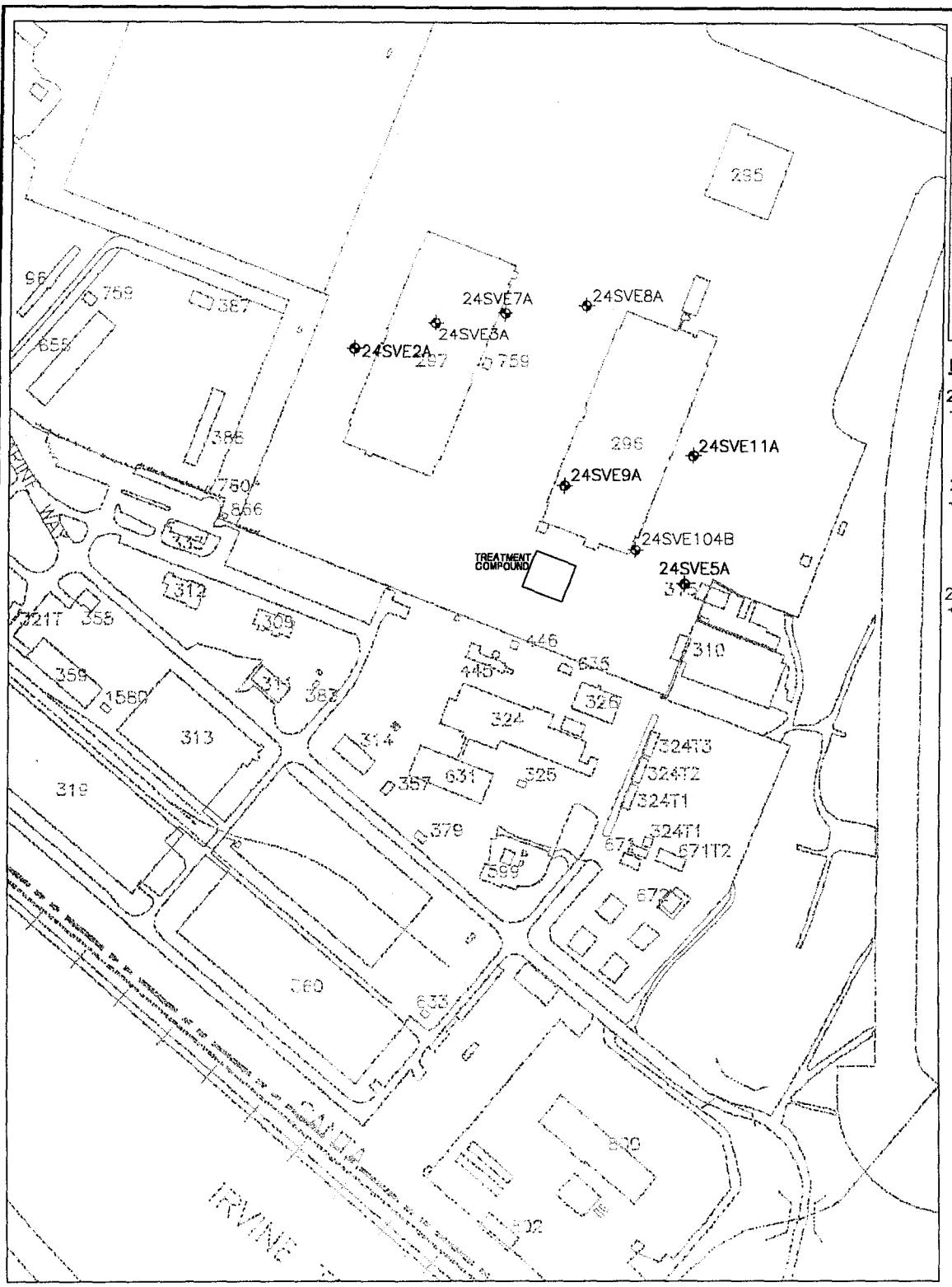
N

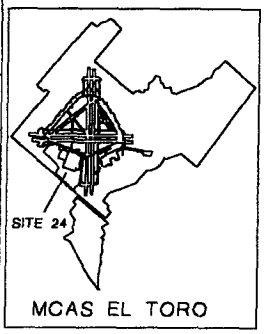
GRAPHIC SCALE
0 100 200 400
(IN FEET)

NOTES:
1. PRIMARY SOURCES OF INFORMATION ARE THE DRAFT FINAL ENGINEERING DESIGN REPORT (BECHTEL, 1998), THE DRAFT GROUNDWATER REMEDIATION PILOT TEST REPORT (BECHTEL, 1998), THE "DRAFT FINAL INTERIM RECORD OF DECISION, OPERABLE UNIT 2A, SITE 24–VOC SOURCE AREA, VADOSE ZONE, MCAS EL TORO (MCAS EL TORO, SEPTEMBER 1997), AND PRELIMINARY LABORATORY DATA PACKAGES (IT/OHM, 1998–1999)".
2. GROUNDWATER EXTRACTION WELLS 24EX3, 24EX4, 24EX5 AND 24EX6 ARE PRESENTED ON THIS MAP BECAUSE THEY ARE LOCATED INSIDE OF THE 500 MICROGRAM PER LITER CONTOUR FOR TCE (AS ESTABLISHED DURING THE REMEDIAL INVESTIGATION OF 1995) AND BECAUSE VACUUM–ENHANCED GROUNDWATER EXTRACTION UTILIZING A PORTABLE SOIL VAPOR EXTRACTION (SVE) TREATMENT SYSTEM WAS CONDUCTED AT THESE WELLS DURING THE PILOT TESTS OF 1997 AND 1998.
3. LOCATIONS OF WELLS AND SURFACE FEATURES ARE INTENDED FOR ILLUSTRATION AND GENERAL USE ONLY. LOCATIONS OF WELLS ARE APPROXIMATE.

SOUTHWEST DIVISION NAVAL FACILITIES ENGINEERING COMMAND		
MCAS EL TORO, CA		
TCE CONCENTRATIONS IN THE DEEP VADOSE ZONE AS OF JANUARY 1999 VADOSE ZONE REMEDIATION – IRP SITE 24		
FILE NO. 18292121.DWG	EXHIBIT 1	DATE

Witzel-Yanez Design 2/8/99 4:32 PM 18292121.dwg





LEGEND

24SVE3A
VAPOR EXTRACTION WELLS GREATER THAN 100 ug/L

24SVE9A
VAPOR EXTRACTION WELLS BETWEEN TARGET CLEANUP LEVEL AND 100 ug/L

24SVE7A
VAPOR EXTRACTION WELLS WITH CONCENTRATIONS EQUAL TO OR LESS THAN THE TARGET CLEANUP LEVELS ESTABLISHED IN THE INTERIM ROD

N

GRAPHIC SCALE
0 100 200 400
(IN FEET)

NOTES:
1. PRIMARY SOURCES OF INFORMATION ARE THE DRAFT FINAL ENGINEERING DESIGN REPORT (BECHTEL, 1998), THE DRAFT GROUNDWATER REMEDIATION PILOT TEST REPORT (BECHTEL, 1998), THE "DRAFT FINAL INTERIM RECORD OF DECISION, OPERABLE UNIT 2A, SITE 24–VOC SOURCE AREA, VADOSE ZONE, MCAS EL TORO (MCAS EL TORO, SEPTEMBER 1997), AND PRELIMINARY LABORATORY DATA PACKAGES (IT/OHM, 1998–1999)".
2. LOCATIONS OF WELLS AND SURFACE FEATURES ARE INTENDED FOR ILLUSTRATION AND GENERAL USE ONLY. LOCATIONS OF WELLS ARE APPROXIMATE.

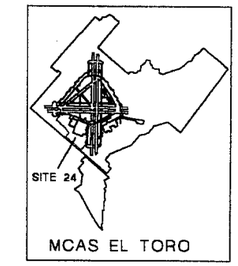
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND

MCAS EL TORO, CA

TCE CONCENTRATIONS IN THE INTERMEDIATE AND SHALLOW VADOSE ZONES AS OF JANUARY 1999 VADOSE ZONE REMEDIATION – IRP SITE 24

FILE NO.		DATE
18292127.DWG	EXHIBIT 2	

Witzel-Yanez Design 2/8/99 5:46 PM 18292127.dwg



LEGEND

24SVE4 SVE WELL

07_DBMW70 GROUNDWATER WELL

N

GRAPHIC SCALE

0 125 250 500

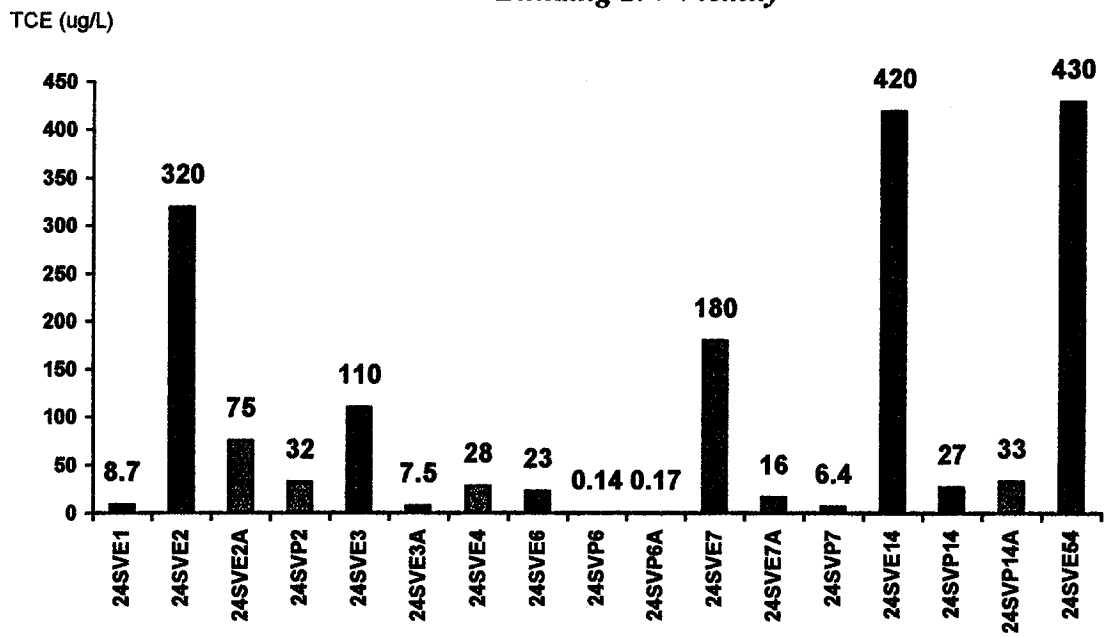
(IN FEET)

NOTES:
1. LOCATIONS OF WELLS AND SURFACE FEATURES ARE INTENDED FOR ILLUSTRATION AND GENERAL USE ONLY. LOCATIONS OF WELLS ARE APPROXIMATE.

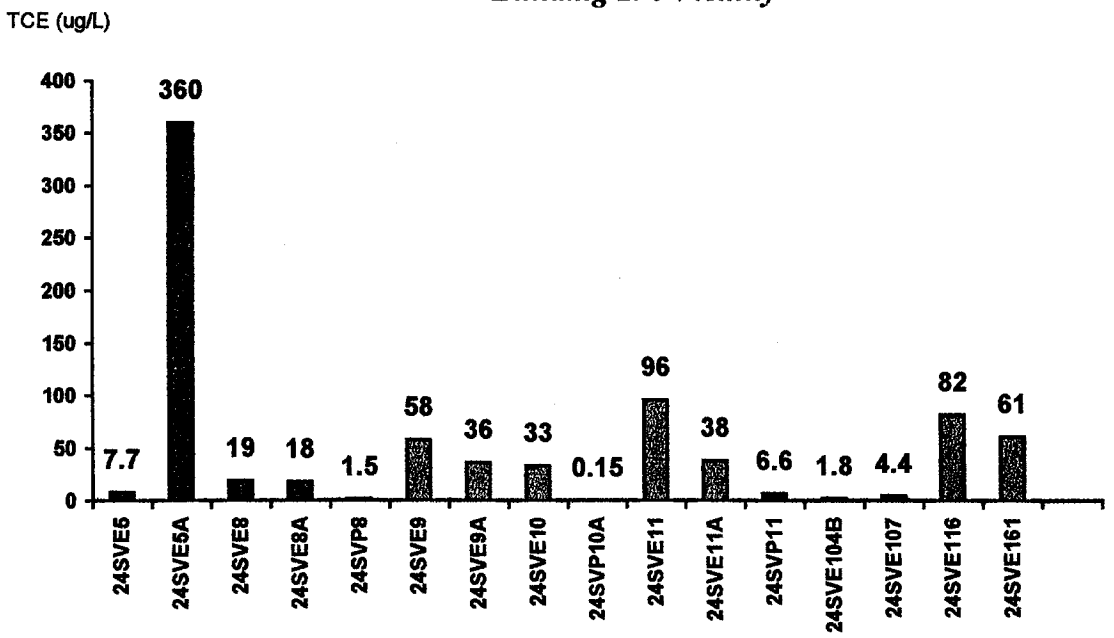
SOUTHWEST DIVISION NAVAL FACILITIES ENGINEERING COMMAND		
MCAS EL TORO, CA		
WATER WELLS AND VADOSE ZONE WELL LOCATIONS VADOSE ZONE REMEDIATION – IRP SITE 24		
FILE NO. 18292125.DWG	EXHIBIT 3	DATE

Selected SVE Test Data

Recent TCE Vapor Concentrations at Selected Vapor Extraction Wells
(as of 31 January 1999)
IRP Site 24 - VOC Source Area, MCAS El Toro
Building 297 Vicinity



Building 296 Vicinity



Legend

24SVE1 Deep Vadose Zone Well
24SVE2A Intermediate Depth Vadose Zone Well
24SVE104B Shallow Vadose Zone Well
24SVP6 Piezometer

At or below 27 ug/L TCE
28-100 ug/L TCE
Greater than 100 ug/L TCE

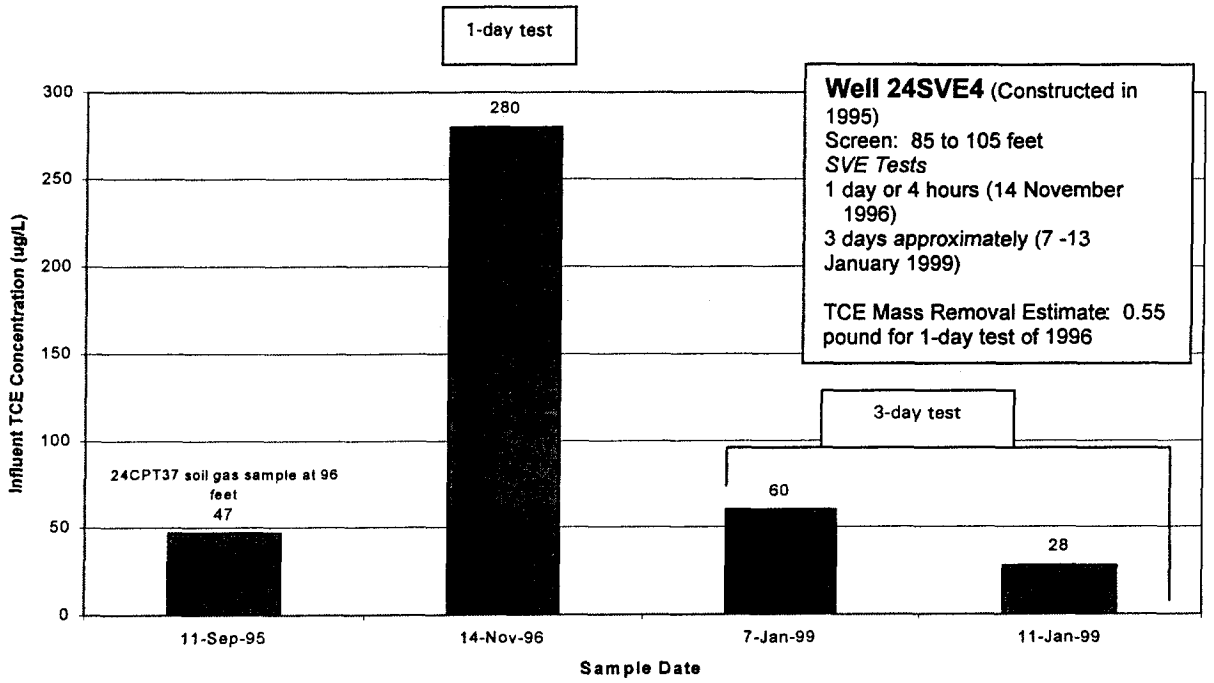
Target Threshold Levels (Draft Final Interim ROD, September 1997)
TCE 27 ug/L C Cl4 61 ug/L
PCE 69 ug/L 1,1 DCE 563 ug/L
Freon 113 234,000 ug/L

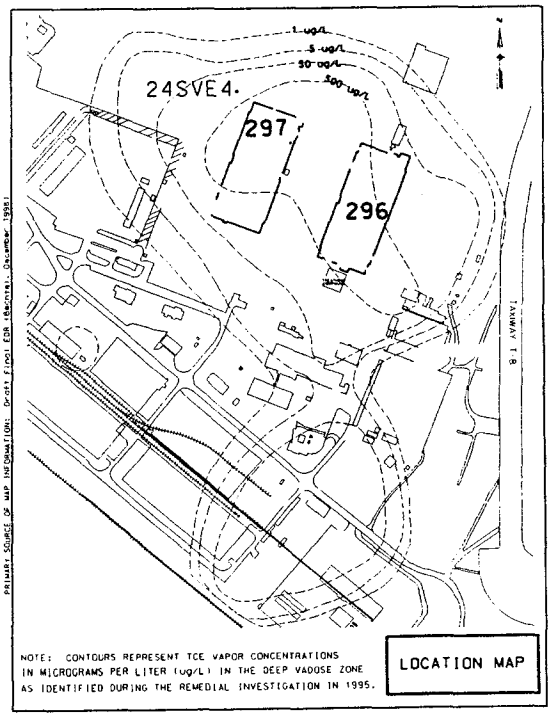
SOUTHWESTNAVFACENGCOM
Code 56MC.LMH
Telephone: (619) 532-4162/Fax: (619) 532-4160

File: svelog4

PRELIMINARY – FOR DISCUSSION ONLY

Soil Gas Data (1995) with Selected Influent TCE Concentrations at Well 24SVE4
MCAS El Toro



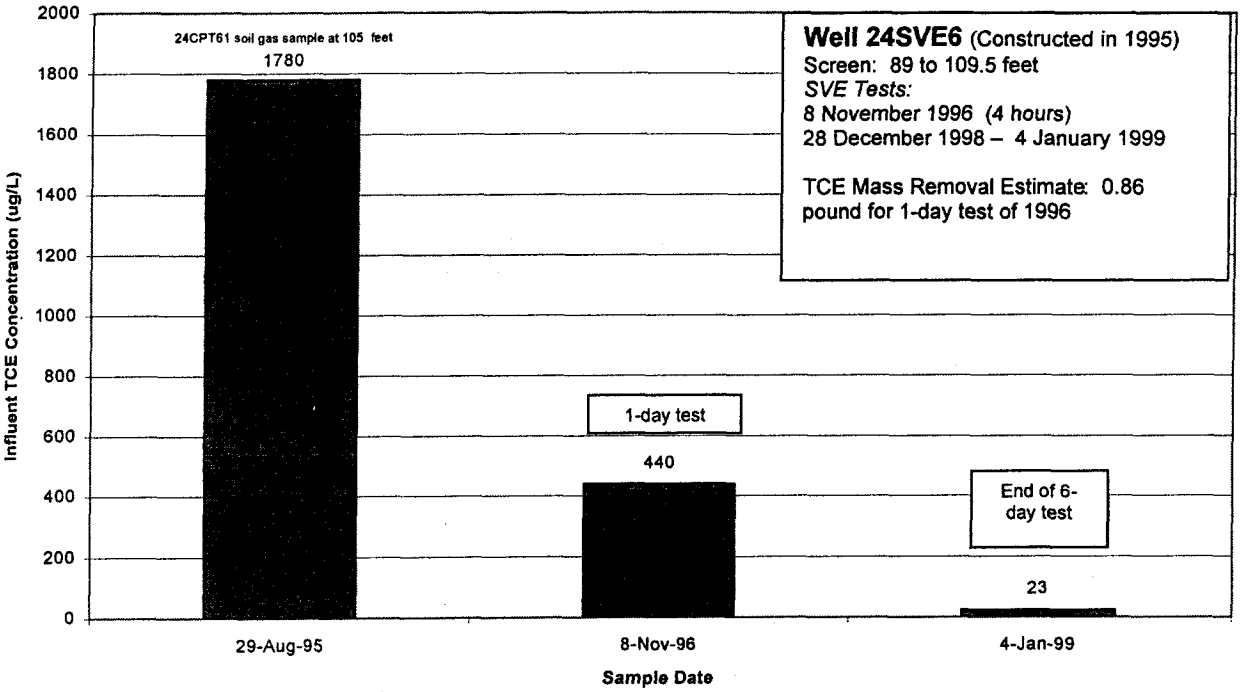


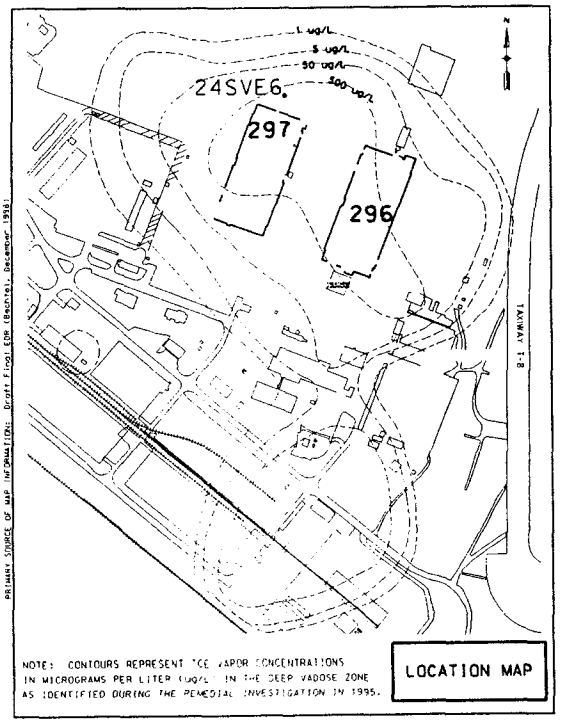
SOUTHWESTNAVFACENGCOM
Code 56MC.LMH
Telephone: (619) 532-4162/Fax: (619) 532-4160

File: svelog4

PRELIMINARY – FOR DISCUSSION ONLY

Soil Gas Data (1995) with Selected Influent TCE Concentrations at Well 24SVE6
MCAS El Toro



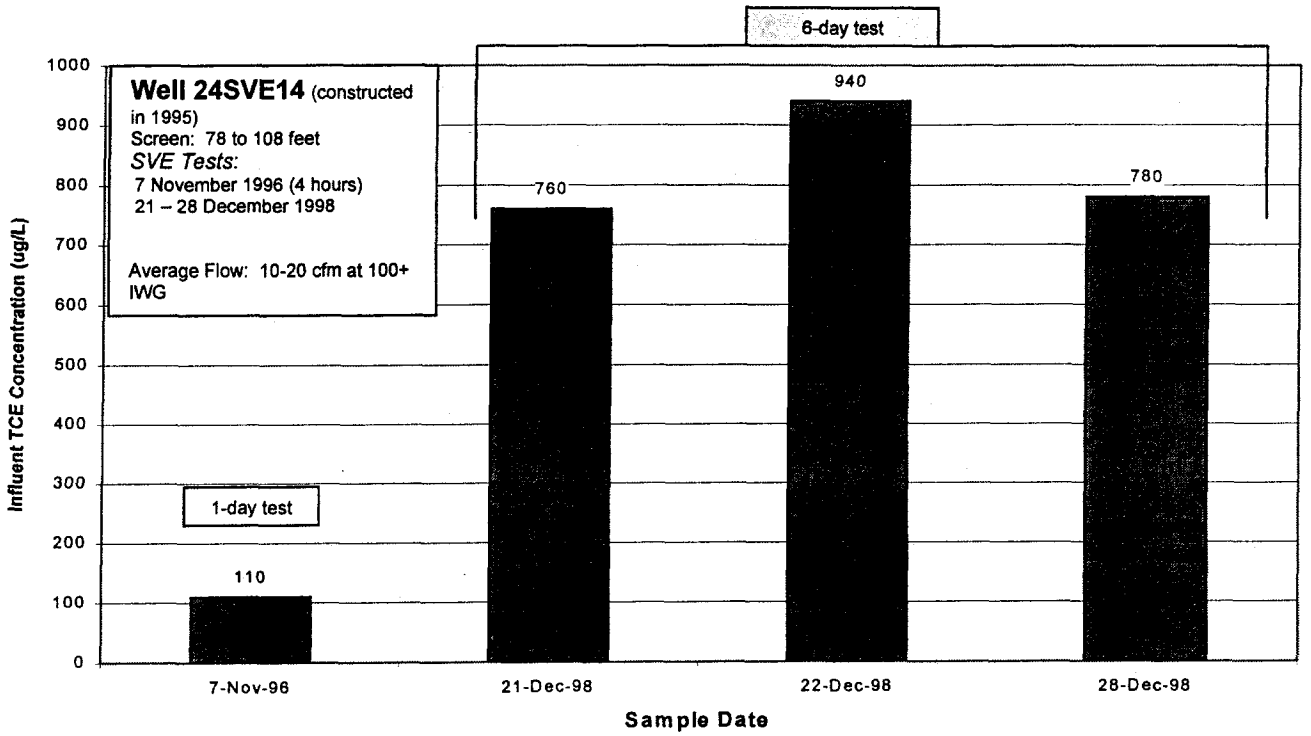


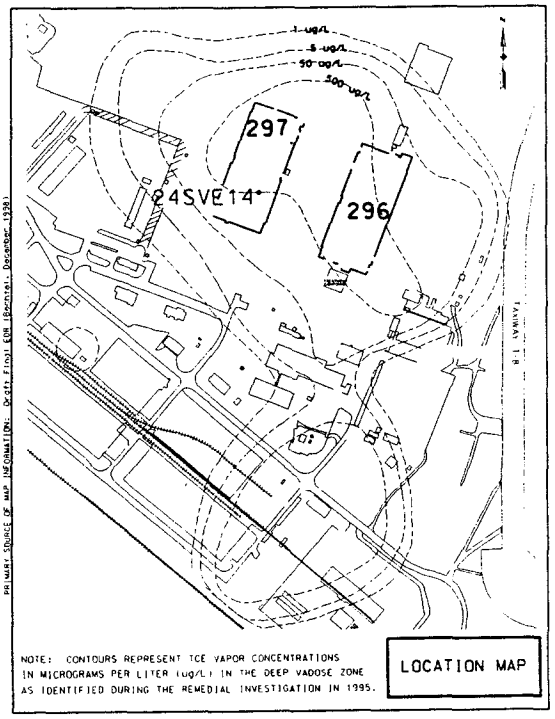
SOUTHWESTNAVFACENGCOM
Code 56MC.LMH
Telephone: (619) 532-4162/Fax: (619) 532-4160

File: svelog4

PRELIMINARY – FOR DISCUSSION ONLY

Selected Influent TCE Concentrations at Well 24SVE14, MCAS El Toro

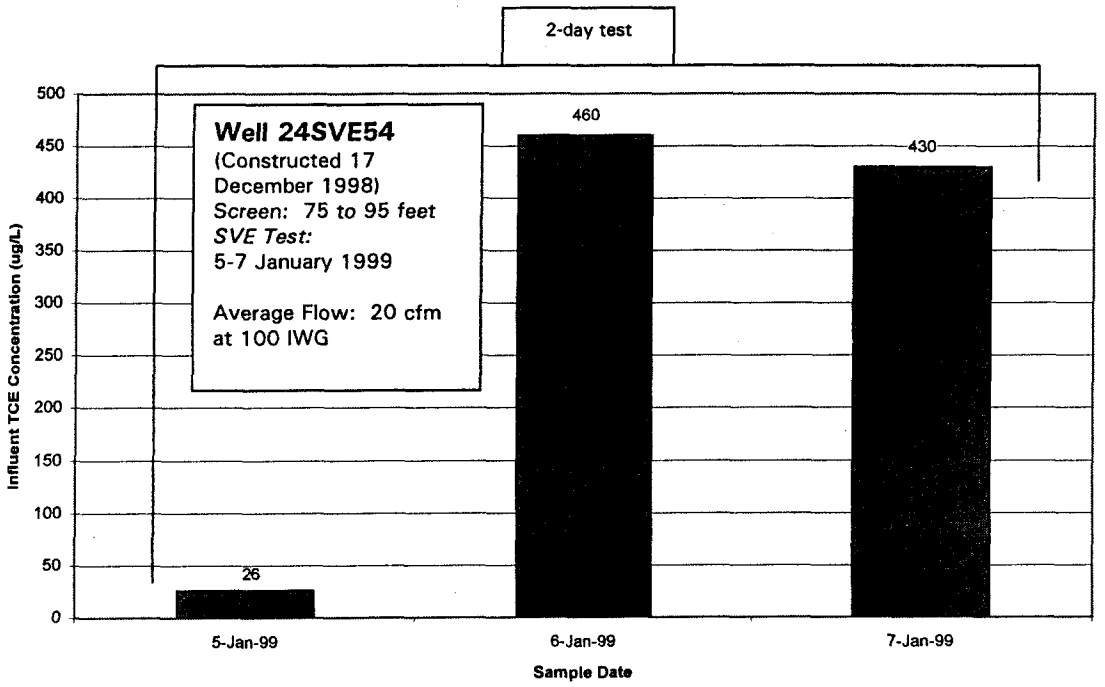


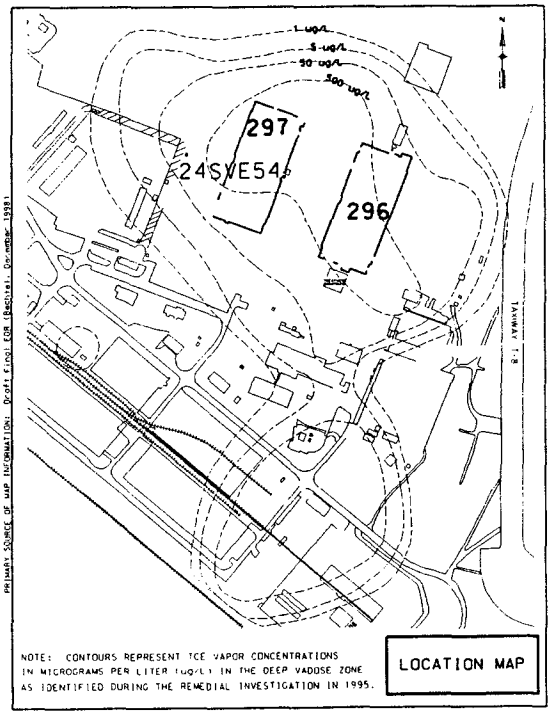


SOUTHWESTNAVFACENGCOM
Code 56MC.LMH
1220 Pacific Highway
San Diego, CA 92132
Telephone: (619) 532-4162/Fax: (619) 532-4160

File: svelog3

Selected Influent TCE Concentrations at Well 24SVE54, MCAS El Toro

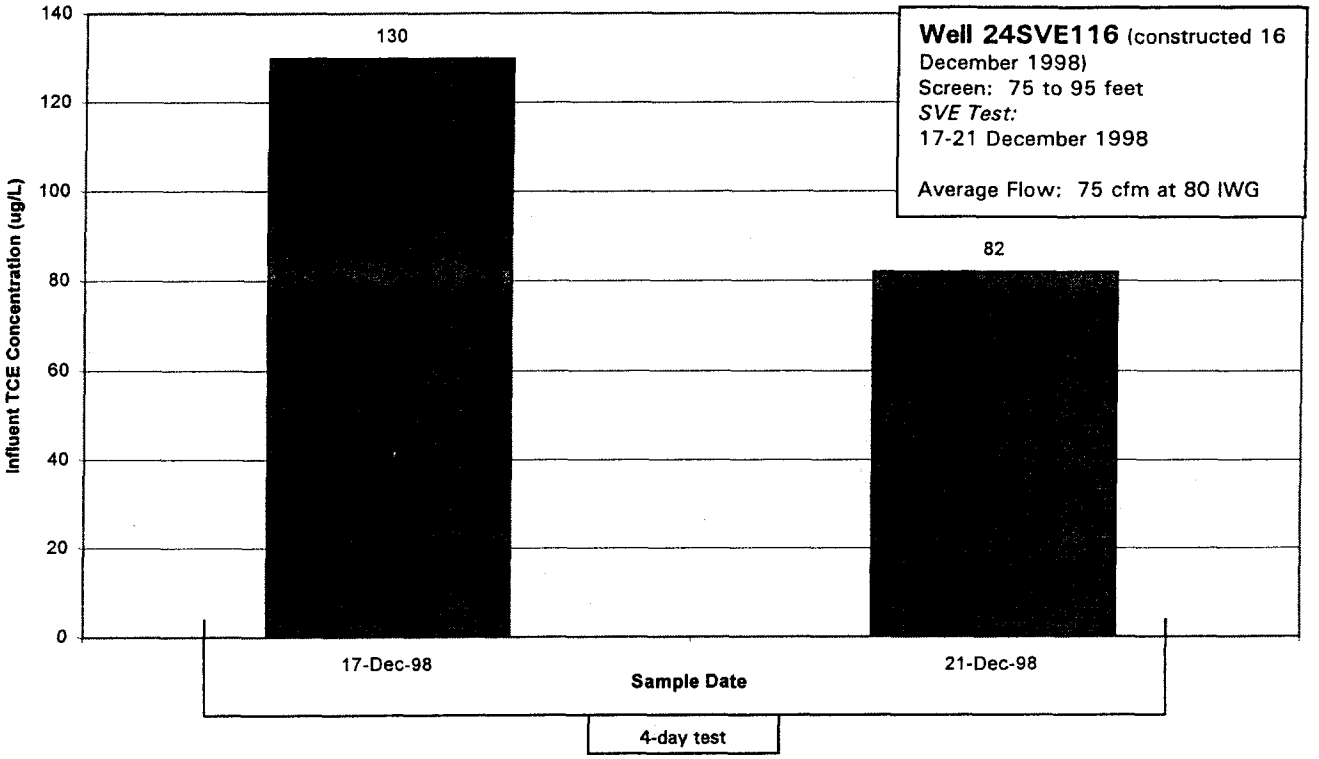


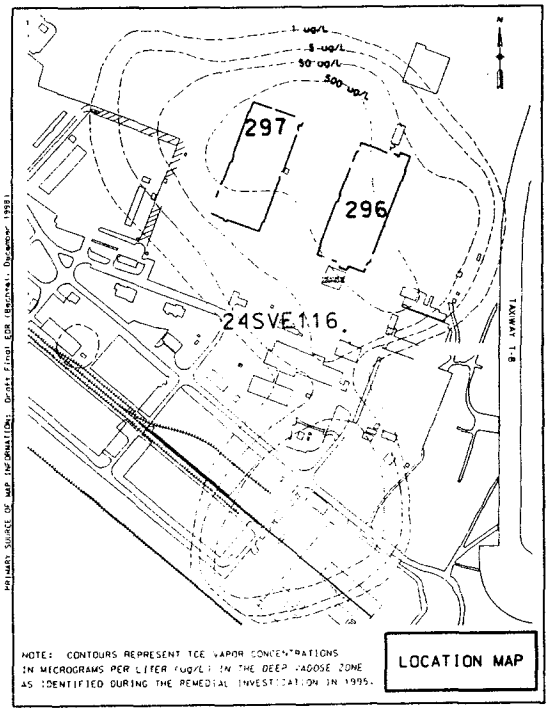


SOUTHWESTNAVFACENGCOM
Code 56MC.LMH
1220 Pacific Highway
San Diego, CA 92132
Telephone: (619) 532-4162/Fax: (619) 532-4160

File: svelog3

Selected Influent TCE Concentrations at Well 24SVE116, MCAS El Toro





OHM Remediation Services Corp.
Subsidiary of OHM Corporation
U.S. Route 224 East • Findlay, Ohio 45840 • (419) 423-3526

CHAIN-OF-CUSTODY RECORD

PROJECT DATA MANAGER'S COPY
217299
FORM 0019 REV. 2-97

OHM's LAB COORDINATOR: Thizar Tintul Williams	LAB COORDINATOR'S PHONE: (949) 263-1146	LAB COORDINATOR'S FAX: (949) 475-5433	LABORATORY SERVICE ID: Q135795	LABORATORY CONTACT: MARIA JONES	MAIL REPORT (COMPANY NAME): OHM Remediation
PROJECT NAME: SVE 6 @ Site 24	PROJECT LOCATION: MCAS EL TORO	PROJECT NUMBER: 18708	LABORATORY PHONE: (626) 965-1006	LABORATORY FAX:	RECIPIENT NAME: Dwayne Bhida
PROJECT CONTACT: Thizar Tintul Williams	PROJECT PHONE NUMBER: (949) 263-1146	PROJECT FAX: (949) 263-1147	LABORATORY ADDRESS: Quanterra		ADDRESS: 3031 Main Street
PROJECT ADDRESS: MCAS EL TORO	CITY, STATE AND ZIPCODE: Santa Ana, CA	CLIENT: Lynn Hornecker, SW DIV.	CITY, STATE AND ZIPCODE: City of Industry, CA		CITY, STATE, AND ZIPCODE: Irvine CA
PROJECT MANAGER: BILL SEDIAK	PROJECT MANAGER'S PHONE: (949) 263-1146	PROJECT MANAGER'S FAX: (949) 263-1147			

Analyze 'A' bag first

Item	Sample Identifier	Matrix	Date	Time	Preserved	# of Cont.	QC Level	T.A.T.	Analyses: TO-14	Analyses: Hold. Conditioned	Comments
1	18708-504	Vapor	1/4/99	0820	Ambient	2	III	5-DAY	X		
2	18708-505	Vapor	1/4/99	0825	Ambient	3	III	24-hr.	X		
3	18708-506	Vapor	1/4/99	0830	Ambient	3	III	24-hr	X		
4	18708-507	Vapor	1/4/99	0835	Ambient	2	III	24-hr		X	Analyze only 18708-506 is detected
5	18708-508	Vapor	1/4/99	0840	Ambient	2	III	24-hr		X	Analyze only 18708-507 is detected
6	18708-509	Vapor	1/4/99	0826	Ambient	2	IV	5-DAY	X		
7											
8											
9											
10											

1/4/99

SAMPLES COLLECTED BY: [signature]
COURIER AND AIR BILL NUMBER:
COOLER TEMPERATURE UPON RECEIPT:

RELINQUISHED BY	RECEIVED BY	DATE	TIME	SAMPLE'S CONDITION UPON RECEIPT
[signature]	[signature]	1/4/99	1311	

Distribution: White - Laboratory (To be returned with Analytical Report); Goldenrod - Project File; Yellow - Project Data Manager

Project Information Section For Project Personnel Only Do Not Submit to Laboratory

Sample Point Location	G	C	F	QC
1. 24SVE6 - Ambient	X		X	X
2. 24SVE6 - Inf.	X		X	
3. 24SVE6 - Mid 1	X		X	
4. 24SVE6 - Mid 2	X		X	
5. 24SVE6 - Eff.	X		X	
6. 24SVE6 - Inf (Dup)	X		X	X

Comments
(2) and (6) are duplicates.
System Shut-down

Sample Type: G - Grab, C - Composite, F - Field Sample, QC - Quality Control Sample

Well 24SVE6
Influent Vapor Sample Collected on 4 January 1999

Preliminary – Data Evaluation In Progress

Volatile Organics by GCMS - EPA TO14

Client Name: OHM Remediation Services Corporation
Client ID: 18708-509 ←
AB ID: 135795-0006-SA
Matrix: AIR — Sampled: 04 JAN 99 — Received: 04 JAN 99
Authorized: 04 JAN 99 — Prepared: N/A — Analyzed: 05 JAN 99
Instrument: GC/MS-B — Dilution: 20

Parameter	Result	Qualifier	RL	Units
Dichlorodifluoromethane	ND		0.20	ug/L
Chloromethane	ND		0.16	ug/L
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.28	ug/L
Vinyl chloride	ND		0.10	ug/L
Bromomethane	ND		0.16	ug/L
Chloroethane	ND		0.22	ug/L
Trichlorofluoromethane	ND		0.22	ug/L
1,1-Dichloroethene	1.7		0.16	ug/L
Carbon disulfide	ND		0.62	ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	4.6		0.30	ug/L
Acetone	ND		0.48	ug/L
Methylene chloride	ND		0.14	ug/L
trans-1,2-Dichloroethene	ND		0.16	ug/L
Methyl t-butyl ether	ND		0.72	ug/L
1,1-Dichloroethane	ND		0.16	ug/L
Vinyl acetate	ND		0.70	ug/L
cis-1,2-Dichloroethene	ND		0.16	ug/L
-Butanone	ND		0.58	ug/L
hloroform	ND		0.19	ug/L
1,1,1-Trichloroethane	ND		0.22	ug/L
Carbon tetrachloride	ND		0.26	ug/L
Benzene	ND		0.13	ug/L
1,2-Dichloroethane	ND		0.16	ug/L
Trichloroethene	21		0.22	ug/L
1,2-Dichloropropane	ND		0.18	ug/L
Bromodichloromethane	ND		0.26	ug/L
cis-1,3-Dichloropropene	ND		0.18	ug/L
4-Methyl-2-pentanone	ND		0.82	ug/L
Toluene	ND		0.38	ug/L
trans-1,3-Dichloropropene	ND		0.18	ug/L
1,1,2-Trichloroethane	ND		0.22	ug/L
Tetrachloroethene	0.45		0.28	ug/L
2-Hexanone	ND		2.4	ug/L
Dibromochloromethane	ND		0.34	ug/L
1,2-Dibromoethane (EDB)	ND		0.30	ug/L
Chlorobenzene	ND		0.18	ug/L
Ethylbenzene	ND		0.17	ug/L
Xylenes (total)	ND		0.17	ug/L
Styrene	ND		0.17	ug/L
Bromoform	ND		0.42	ug/L
1,1,2,2-Tetrachloroethane	ND		0.28	ug/L
Benzyl chloride	ND		1.0	ug/L
4-Ethyltoluene	ND		0.20	ug/L
1,3,5-Trimethylbenzene	ND		0.20	ug/L

ND = Not Detected

Preliminary – Data Evaluation In Progress

Volatile Organics by GCMS - EPA TO14 (cont.)

Client Name:	OHM Remediation Services Corporation		
Client ID:	18708-509		
LAB ID:	135795-0006-SA		
Matrix:	AIR	Sampled: 04 JAN 99	Received: 04 JAN 99
Authorized:	04 JAN 99	Prepared: N/A	Analyzed: 05 JAN 99
Instrument:	GC/MS-B	Dilution: 20	

Parameter	Result	Qualifier	RL	Units
1,2,4-Trimethylbenzene	ND		0.20	ug/L
1,3-Dichlorobenzene	ND		0.24	ug/L
1,4-Dichlorobenzene	ND		0.24	ug/L
1,2-Dichlorobenzene	ND		0.24	ug/L
1,2,4-Trichlorobenzene	ND		3.0	ug/L
Hexachlorobutadiene	ND		0.84	ug/L

ND = Not Detected

Preliminary – Data Evaluation In Progress

OHM Remediation Services Corp.
Subsidiary of OHM Corporation
U.S. Route 224 East • Findlay, Ohio 45840 • (419) 423-3526

CHAIN-OF-CUSTODY RECORD

PROJECT DATA MANAGER'S COPY
217288
FORM 0019 REV. 2-97

LAB COORDINATOR: Sar Tintul-Williams	LAB COORDINATOR'S PHONE: (949) 263-1146	LAB COORDINATOR'S FAX: (949) 475-5433	LABORATORY SERVICE ID:	LABORATORY CONTACT: MARIA JONES	MAIL REPORT (COMPANY NAME): OHM Remediation
NAME: .14 @ Site 24	PROJECT LOCATION: MCAS EL TORO	PROJECT NUMBER: 18708	LABORATORY PHONE: (626) 965-1006	LABORATORY FAX:	RECIPIENT NAME: Dwayne Ishida
CONTACT: Sar Tintul-Williams	PROJECT PHONE NUMBER: (949) 263-1146	PROJECT FAX: (949) 263-1147	LABORATORY ADDRESS: Quanterra		ADDRESS: 2031 Main Street
ADDRESS: AS EL TORO	CITY, STATE AND ZIPCODE: Santa Ana, CA	CLIENT: Lynn Hornecker-SWDIV.	CITY, STATE AND ZIPCODE: Santa Ana, CA		CITY, STATE, AND ZIPCODE: Irvine, CA
MANAGER: L SEDLAK	PROJECT MANAGER'S PHONE: (949) 263-1146	PROJECT MANAGER'S FAX: (949) 263-1147			

Analyze 'A' bag first

Sample Identifier	Matrix	Date	Time	Preserved	# of Cont.	QC Level	T.A.T.	Analyses: TO-14	HOLD-Conditional	Comments
18708-446	Vapor	12/22/98	1420	Ambient	2	III	5 DAY	X		
18708-447	Vapor	12/22/98	1440	Ambient	3	III	24 hr	X		
18708-448	Vapor	12/22/98	1435	Ambient	3	III	24 hr	X		
18708-449	Vapor	12/22/98	1430	Ambient	2	III	24 hr		X	Analyze only if 18708-448 is detected
18708-450	Vapor	12/22/98	1425	Ambient	2	III	24 hr		X	Analyze only if 18708-449 is detected.
18708-451	Vapor	12/22/98	1441	Ambient	2	IV	5 DAY	X		

(2) 12/22/98

Sample Point Location	G	C	F	QC
1. 24SVE14 - Ambient	X		X	X
2. 24SVE14 - Influent	X		X	
3. 24SVE14 - Mid 1	X		X	
4. 24SVE14 - Mid 2	X		X	
5. 24SVE14 - Eff	X		X	
6. 24SVE14 - Influent (dup)	X		X	X

Comments: (2) and (6) are duplicates. 1st day sampling.

Sample Type: G - Grab, C - Composite, F - Field Sample, QC - Quality Control Sample

ES COLLECTED BY: [signature]
RELINQUISHED BY: [signature]

COURIER AND AIR BILL NUMBER:

RECEIVED BY	DATE	TIME	SAMPLE'S CONDITION UPON RECEIPT
[illegible]	12/22/98	[illegible]	

COOLER TEMPERATURE UPON RECEIPT:

Distribution: White - Laboratory (To be returned with Analytical Report); Goldenrod - Project File; Yellow - Project Data Manager

Project Information Section For Project Personnel Only Do Not Submit to Laboratory

Well 24SVE14
Influent Vapor Sample Collected on 22 December 1998

Preliminary – Data Evaluation In Progress

Volatile Organics by GCMS - EPA TO14

Client Name: OHM Remediation Services Corporation
Client ID: 18708-451
LAB ID: 135725-0006-SA
Matrix: AIR — Sampled: 22 DEC 98 — Received: 22 DEC 98
Authorized: 22 DEC 98 — Prepared: N/A — Analyzed: 23 DEC 98
Instrument: GC/MS-B — Dilution: 1000

Parameter	Result	Qualifier	RL	Units
Dichlorodifluoromethane	ND		9.9	ug/L
Chloromethane	ND		8.2	ug/L
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		14	ug/L
Vinyl chloride	ND		5.1	ug/L
Bromomethane	ND		7.8	ug/L
Chloroethane	ND		11	ug/L
Trichlorofluoromethane	ND		11	ug/L
1,1-Dichloroethene	25		7.9	ug/L
Carbon disulfide	ND		31	ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	74		15	ug/L
Acetone	ND		24	ug/L
Methylene chloride	ND		6.9	ug/L
trans-1,2-Dichloroethene	ND		7.9	ug/L
Methyl t-butyl ether	ND		36	ug/L
1,1-Dichloroethane	ND		8.1	ug/L
Vinyl acetate	ND		35	ug/L
cis-1,2-Dichloroethene	ND		7.9	ug/L
2-Butanone	ND		29	ug/L
Chloroform	ND		9.7	ug/L
1,1,1-Trichloroethane	ND		11	ug/L
Carbon tetrachloride	ND		13	ug/L
Benzene	ND		6.4	ug/L
1,2-Dichloroethane	ND		8.1	ug/L
Trichloroethene	940		11	ug/L
1,2-Dichloropropane	ND		9.2	ug/L
Bromodichloromethane	ND		13	ug/L
cis-1,3-Dichloropropene	ND		9.1	ug/L
4-Methyl-2-pentanone	ND		41	ug/L
Toluene	ND		19	ug/L
trans-1,3-Dichloropropene	ND		9.1	ug/L
1,1,2-Trichloroethane	ND		11	ug/L
Tetrachloroethene	24		14	ug/L
2-Hexanone	ND		120	ug/L
Dibromochloromethane	ND		17	ug/L
1,2-Dibromoethane (EDB)	ND		15	ug/L
Chlorobenzene	ND		9.2	ug/L
Ethylbenzene	ND		8.7	ug/L
Xylenes (total)	ND		8.7	ug/L
Styrene	ND		8.5	ug/L
Bromoform	ND		21	ug/L
1,1,2,2-Tetrachloroethane	ND		14	ug/L
Benzyl chloride	ND		52	ug/L
4-Ethyltoluene	ND		9.9	ug/L
1,3,5-Trimethylbenzene	ND		9.8	ug/L

ND = Not Detected

Preliminary – Data Evaluation In Progress

Volatile Organics by GCMS - EPA TO14 (cont.)

'ient Name: OHM Remediation Services Corporation
ient ID: 18708-451
AB ID: 135725-0006-SA
Matrix: AIR Sampled: 22 DEC 98 Received: 22 DEC 98
Authorized: 22 DEC 98 Prepared: N/A Analyzed: 23 DEC 98
Instrument: GC/MS-B Dilution: 1000

Parameter	Result	Qualifier	RL	Units
1,2,4-Trimethylbenzene	ND		9.8	ug/L
1,3-Dichlorobenzene	ND		12	ug/L
1,4-Dichlorobenzene	ND		12	ug/L
1,2-Dichlorobenzene	ND		12	ug/L
1,2,4-Trichlorobenzene	ND		150	ug/L
Hexachlorobutadiene	ND		42	ug/L

ND = Not Detected

Preliminary – Data Evaluation In Progress

OHM Remediation Services Corp.
Subsidiary of OHM Corporation
U.S. Route 224 East • Findlay, Ohio 45840 • (419) 423-3526

CHAIN-OF-CUSTODY RECORD

PROJECT DATA MANAGER'S COPY

217260

FORM 0019 REV. 2-97

OHM's LAB COORDINATOR: Thizar Tintut-Williams	LAB COORDINATOR'S PHONE: (949) 263-1146	LAB COORDINATOR'S FAX: (949) 263-1147	LABORATORY SERVICE ID: Q135590	LABORATORY CONTACT: MARIA JONES	MAIL REPORT (COMPANY NAME): OHM Remediation
PROJECT NAME: SVE 10 Q Sik 24	PROJECT LOCATION: MCAS EL TORO	PROJECT NUMBER: 18708	LABORATORY PHONE: (626) 965-1006	LABORATORY FAX	RECIPIENT NAME: Dr. Wayne Ishida
PROJECT CONTACT: Thizar Tintut-Williams	PROJECT PHONE NUMBER: (949) 263-1146	PROJECT FAX: (949) 263-1147	LABORATORY ADDRESS: Quanterra	ADDRESS: 2031 Main Street	
PROJECT ADDRESS: MCAS EL TORO	CITY, STATE AND ZIPCODE: Santa Ana, CA	CLIENT: Lynn Homecker, SWDIV	CITY, STATE AND ZIPCODE: City of Industry, CA	CITY, STATE AND ZIPCODE: Irvine, CA	
PROJECT MANAGER: BILL SEDLAK	PROJECT MANAGER'S PHONE: (949) 263-1146	PROJECT MANAGER'S FAX: (949) 263-1147			

Analyze 'A' bag first.

Item	Sample Identifier	Matrix	Date	Time	Preserved	# of Cont.	QC Level	T.A.T.	Analyses TO-14	Hold Conditional	Comments
1	18708-406	Vapor	12/11/98	1240	Ambient	2	III	5 DAY	X		
2	18708-407	Vapor	12/11/98	1245	Ambient	3	III	5 DAY	X		
3	18708-408	Vapor	12/11/98	1250	Ambient	3	III	24-hr	X		
4	18708-409	Vapor	12/11/98	1255	Ambient	2	IV	24-hr		X	Analyze only if 18708-408 is detected.
5	18708-410	Vapor	12/11/98	1300	Ambient	2	III	24-hr		X	Analyze only if 18708-409 is detected.
6	18708-411	Vapor	12/11/98	1246	Ambient	2	III	5 DAY	X		
7											
8											
9											
10											

SAMPLES COLLECTED BY: [signature]

COURIER AND AIR BILL NUMBER:

COOLER TEMPERATURE UPON RECEIPT:

RELINQUISHED BY	RECEIVED BY	DATE	TIME	SAMPLE'S CONDITION UPON RECEIPT
[signature]	[signature]	12/11/98	1:41	

Distribution: White - Laboratory (To be returned with Analytical Report); Goldenrod - Project File; Yellow - Project Data Manager

Project Information Section
For Project Personnel Only
Do Not Submit to Laboratory

Sample Point Location	Sample Type G	C	F	QC
1. Ambient	X		X	X
2. 24-SVE10-INF	X		X	
3. 24-SVE10-MID1	X		X	
4. 24-SVE10-MID2	X		X	
5. 24-SVE10-Eff	X		X	
6. 24-SVE10-INF (DUP)	X		X	X

Comments

② and ⑥ are duplicates.

system shut-down

Sample Type: G - Grab, C - Composite, F - Field Sample, QC - Quality Control Sample

Well 24 SVE 10
Influent Vapor Sample Collected on 11 December 1998

Preliminary – Data Evaluation In Progress

Volatile Organics by GCMS - EPA TO14

lient Name: OHM Remediation Services Corporation
.ient ID: 18708-407
LAB ID: 135590-0002-SA
Matrix: AIR — Sampled: 11 DEC 98 — Received: 11 DEC 98
Authorized: 11 DEC 98 — Prepared: N/A — Analyzed: 11 DEC 98
Instrument: GC/MS-A — Dilution: 25

Parameter	Result	Qualifier	RL	Units
Dichlorodifluoromethane	ND		0.25	ug/L
Chloromethane	ND		0.20	ug/L
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.35	ug/L
Vinyl chloride	ND		0.13	ug/L
Bromomethane	ND		0.20	ug/L
Chloroethane	ND		0.28	ug/L
Trichlorofluoromethane	ND		0.28	ug/L
1,1-Dichloroethene	0.34		0.20	ug/L
Carbon disulfide	ND		0.78	ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	26		0.38	ug/L
Acetone	ND		0.60	ug/L
Methylene chloride	ND		0.17	ug/L
trans-1,2-Dichloroethene	ND		0.20	ug/L
Methyl t-butyl ether	ND		0.90	ug/L
1,1-Dichloroethane	ND		0.20	ug/L
Vinyl acetate	ND		0.88	ug/L
cis-1,2-Dichloroethene	ND		0.20	ug/L
Butanone	ND		0.72	ug/L
Chloroform	ND		0.24	ug/L
1,1,1-Trichloroethane	ND		0.28	ug/L
Carbon tetrachloride	ND		0.32	ug/L
Benzene	ND		0.16	ug/L
1,2-Dichloroethane	ND		0.20	ug/L
Trichloroethene	30		0.28	ug/L
1,2-Dichloropropane	ND		0.23	ug/L
Bromodichloromethane	ND		0.32	ug/L
cis-1,3-Dichloropropene	ND		0.23	ug/L
4-Methyl-2-pentanone	ND		1.0	ug/L
Toluene	ND		0.48	ug/L
trans-1,3-Dichloropropene	ND		0.23	ug/L
1,1,2-Trichloroethane	ND		0.28	ug/L
Tetrachloroethene	ND		0.35	ug/L
2-Hexanone	ND		3.0	ug/L
Dibromochloromethane	ND		0.42	ug/L
1,2-Dibromoethane (EDB)	ND		0.38	ug/L
Chlorobenzene	ND		0.23	ug/L
Ethylbenzene	ND		0.22	ug/L
Xylenes (total)	ND		0.22	ug/L
Styrene	ND		0.21	ug/L
Bromoform	ND		0.52	ug/L
1,1,2,2-Tetrachloroethane	ND		0.35	ug/L
Benzyl chloride	ND		1.3	ug/L
4-Ethyltoluene	ND		0.25	ug/L
1,3,5-Trimethylbenzene	ND		0.24	ug/L

D = Not Detected

Preliminary – Data Evaluation In Progress

Volatile Organics by GCMS - EPA TO14 (cont.)

lient Name: OHM Remediation Services Corporation
:lient ID: 18708-407
LAB ID: 135590-0002-SA
Matrix: AIR — Sampled: 11 DEC 98 — Received: 11 DEC 98
Authorized: 11 DEC 98 — Prepared: N/A — Analyzed: 11 DEC 98
Instrument: GC/MS-A — Dilution: 25

Parameter	Result	Qualifier	RL	Units
1,2,4-Trimethylbenzene	ND		0.24	ug/L
1,3-Dichlorobenzene	ND		0.30	ug/L
1,4-Dichlorobenzene	ND		0.30	ug/L
1,2-Dichlorobenzene	ND		0.30	ug/L
1,2,4-Trichlorobenzene	ND		3.8	ug/L
Hexachlorobutadiene	ND		1.0	ug/L

ND = Not Detected

Preliminary – Data Evaluation In Progress

OHM Remediation Services Corp.
Subsidiary of OHM Corporation
U.S. Route 224 East • Findlay, Ohio 45840 • (419) 423-3526

CHAIN-OF-CUSTODY RECORD

PROJECT DATA MANAGER'S COPY
217292
FORM 0019 REV. 2-97

LAB COORDINATOR: Nizar Tintul-Williams	LAB COORDINATOR'S PHONE: (949) 263-1146	LAB COORDINATOR'S FAX: (949) 475-5433	LABORATORY SERVICE ID:	LABORATORY CONTACT: MARIA JONE	MAIL REPORT (COMPANY NAME): OHM Remediation
PROJECT NAME: VE 116 @ Site 24	PROJECT LOCATION: MCAS EL TORO	PROJECT NUMBER: 18708	LABORATORY PHONE: (626) 965-1006	LABORATORY FAX:	RECIPIENT NAME: Dwayne Ishida
PROJECT CONTACT: Nizar Tintul-Williams	PROJECT PHONE NUMBER: (949) 263-1146	PROJECT FAX: (949) 263-1147	LABORATORY ADDRESS: ~~ABC~~ Quantera	ADDRESS: 2031 Main Street	
PROJECT ADDRESS: MCAS EL TORO	CITY, STATE AND ZIPCODE: Santa Ana, CA	CLIENT: Lynn Hornecker. SW DIV.	CITY, STATE AND ZIPCODE: City of Industry	CITY, STATE, AND ZIP CODE: Irvine, CA	
PROJECT MANAGER: BILL SEDLAK	PROJECT MANAGER'S PHONE: (949) 263-1146	PROJECT MANAGER'S FAX: (949) 263-1147			

Analyze 'A' bag first.

Sample Identifier	Matrix	Date	Time	Preserved	# of Cont.	QC Level	T.A.T.	Analyses: TO-14	Hold (additional)	Comments
18708-430	Vapor	12/21/98	0745	Ambient	2	III	5-DAY	X		
18708-431	Vapor	12/21/98	0750	Ambient	3	III	5-DAY	X		
18708-432	Vapor	12/21/98	0755	Ambient	3	III	5-DAY	X		
18708-433	Vapor	12/21/98	0800	Ambient	2	III	5-DAY		X	Analyze only if 18708-432 is detected.
18708-434	Vapor	12/21/98	0805	Ambient	2	III	5-DAY		X	Analyze only if 18708-433 is detected.

A 12/21/98

SAMPLES COLLECTED BY: [signature]
RELINQUISHED BY: [signature]
COURIER AND AIR BILL NUMBER:
RECEIVED BY: F. Bautista
DATE: 12/21/98 TIME: 1130
COOLER TEMPERATURE UPON RECEIPT:
SAMPLE'S CONDITION UPON RECEIPT

Distribution: White - Laboratory (To be returned with Analytical Report); Goldenrod - Project File; Yellow - Project Data Manager

Project Information Section
For Project Personnel Only
Do Not Submit to Laboratory

Sample Point Location	Sample Type: G	C	F	QC
(1) Ambient	X		X	
(2) 24SVE116 - INF	X		X	
(3) 24SVE116 - MID1	X		X	
(4) 24SVE116 - MID2	X		X	
(5) 24SVE116 - EFF	X		X	

Comments: System shut-down Sam

Sample Type: G - Grab, C - Composite, F - Field Sample
QC - Quality Control Sample

Well 24SVE116
Influent Vapor Sample Collected on 21 December 1998

Preliminary – Data Evaluation In Progress

Volatile Organics by GCMS - EPA TO14

ent Name:	OHM Remediation Services Corporation		
ent ID:	18708-431 ←		
LAB ID:	135702-0002-SA		
Matrix:	AIR	Sampled: 21 DEC 98	Received: 21 DEC 98
Authorized:	21 DEC 98	Prepared: N/A	Analyzed: 21 DEC 98
Instrument:	GC/MS-B	Dilution: 67	

Parameter	Result	Qualifier	RL	Units
Dichlorodifluoromethane	ND		0.66	ug/L
Chloromethane	ND		0.55	ug/L
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		0.93	ug/L
Vinyl chloride	ND		0.34	ug/L
Bromomethane	ND		0.52	ug/L
Chloroethane	ND		0.73	ug/L
Trichlorofluoromethane	ND		0.73	ug/L
1,1-Dichloroethene	1.4		0.53	ug/L
Carbon disulfide	ND		2.1	ug/L
1,1,2-Trichloro-1,2,2-trifluoroethane	120		1.0	ug/L
Acetone	ND		1.6	ug/L
Methylene chloride	ND		0.46	ug/L
trans-1,2-Dichloroethene	ND		0.53	ug/L
Methyl t-butyl ether	ND		2.4	ug/L
1,1-Dichloroethane	ND		0.54	ug/L
Vinyl acetate	ND		2.3	ug/L
s-1,2-Dichloroethene	ND		0.53	ug/L
Butanone	ND		1.9	ug/L
Chloroform	ND		0.65	ug/L
1,1,1-Trichloroethane	ND		0.73	ug/L
Carbon tetrachloride	ND		0.87	ug/L
Benzene	ND		0.43	ug/L
1,2-Dichloroethane	ND		0.54	ug/L
Trichloroethene	82		0.73	ug/L
1,2-Dichloropropane	ND		0.61	ug/L
Bromodichloromethane	ND		0.87	ug/L
cis-1,3-Dichloropropene	ND		0.61	ug/L
4-Methyl-2-pentanone	ND		2.7	ug/L
Toluene	ND		1.3	ug/L
trans-1,3-Dichloropropene	ND		0.61	ug/L
1,1,2-Trichloroethane	ND		0.73	ug/L
Tetrachloroethene	1.4		0.93	ug/L
2-Hexanone	ND		8.0	ug/L
Dibromochloromethane	ND		1.1	ug/L
1,2-Dibromoethane (EDB)	ND		1.0	ug/L
Chlorobenzene	ND		0.61	ug/L
Ethylbenzene	ND		0.58	ug/L
Xylenes (total)	ND		0.58	ug/L
Styrene	ND		0.57	ug/L
Bromoform	ND		1.4	ug/L
1,1,2,2-Tetrachloroethane	ND		0.93	ug/L
Benzyl chloride	ND		3.5	ug/L
4-Ethyltoluene	ND		0.66	ug/L
1,3,5-Trimethylbenzene	ND		0.65	ug/L

ND = Not Detected

Preliminary – Data Evaluation In Progress

Volatile Organics by GCMS - EPA TO14 (cont.)

Client Name: OHM Remediation Services Corporation
Client ID: 18708-431
LAB ID: 135702-0002-SA
Matrix: AIR Sampled: 21 DEC 98 Received: 21 DEC 98
Authorized: 21 DEC 98 Prepared: N/A Analyzed: 21 DEC 98
Instrument: GC/MS-B Dilution: 67

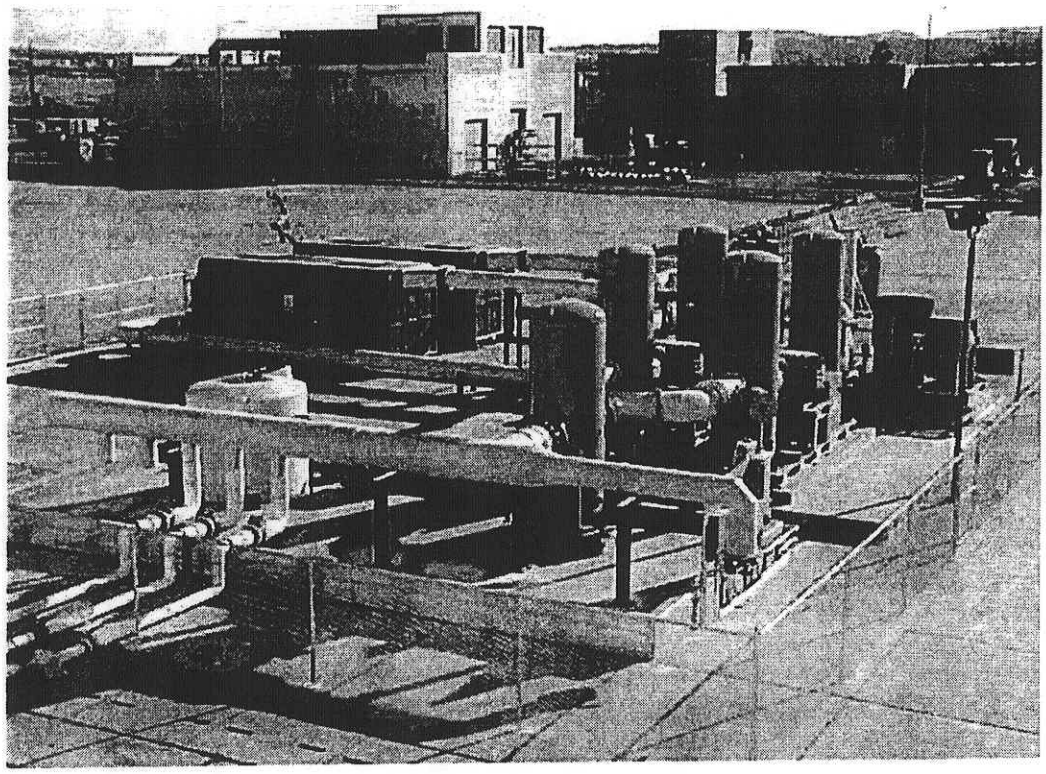
Parameter	Result	Qualifier	RL	Units
1,2,4-Trimethylbenzene	ND		0.65	ug/L
1,3-Dichlorobenzene	ND		0.80	ug/L
1,4-Dichlorobenzene	ND		0.80	ug/L
1,2-Dichlorobenzene	ND		0.80	ug/L
1,2,4-Trichlorobenzene	ND		10	ug/L
Hexachlorobutadiene	ND		2.8	ug/L

ND = Not Detected

Preliminary – Data Evaluation In Progress

Exhibit 5.
Central SVE System
IRP Site 24

Photograph provided by
MCAS El Toro ROICC.



Central SVE System Looking Southwest from Building 296, IRP Site 24, MCAS El Toro

Public Notice

Ran Sat., 16 Jan 99

1E13000900

PUBLIC NOTICE

Marine Corps Air Station
El Toro

Interim Remedial Action at Installation Restoration Site 24, Volatile Organic Compound (VOC) Source Area

The U.S. Marine Corps is announcing its intent to proceed with the Interim Remedial Action phase of the Installation Restoration Program (IRP) Process at Site 24, VOC Source area on no later than March 30, 1999. (The Remedial Action for Site 24 is referred to as "interim" because only soil remediation is addressed in this action. Remediation of groundwater at Site 24 will be accomplished in a subsequent action). The Remedial Action objective at Site 24 is to reduce the concentration of VOCs in the soil, which will prevent or significantly minimize the migration of VOCs from the soil into the groundwater. The Marine Corps' preferred remedy for remediation of the soil contamination at Site 24 is Soil Vapor Extraction (SVE), the U.S. Environmental Protection Agency (EPA) presumptive remedy. The soil cleanup is expected to take up to 2 years to complete and will be conducted entirely on site without excavating any contaminated soil.

The Interim Remedial Action will be conducted in accordance with the approved Proposed Plan, Record of Decision and Remedial Design documents. These and other documents that pertain to Site 24 are available at the following location:

Information Repository
Irvine Heritage Park
Regional Library
14361 Yale Avenue
Irvine, California 92604
(714) 551-7151

For further information please contact Mr. Joseph Joyce at (949) 726-3470 or the following representatives from USEPA or Cal EPA.

Mr. Glenn Kistner, Remedial Project Manager (USEPA)
(415) 744-2210
Mr. Andrew Bain, Community Involvement Coordinator (USEPA)
1-800-231-3075
Ms. Marsha Mingay, Public Participation Specialist (Cal EPA)
(562) 590-4461

Publish: Orange County Register
January 16, 1999
1E7000100 R-62

PUBLIC NOTICE

Marine Corps Air Station
El Toro

Interim Remedial Action at Installation Restoration Site 24, Volatile Organic Compound (VOC) Source Area

The U.S. Marine Corps is announcing its intent to proceed with the Interim Remedial Action phase of the Installation Restoration Program (IRP) Process at Site 24, VOC Source area on no later than March 30, 1999. (The Remedial Action for Site 24 is referred to as "interim" because only soil remediation is addressed in this action. Remediation of groundwater at Site 24 will be accomplished in a subsequent action). The Remedial Action objective at Site 24 is to reduce the concentration of VOCs in the soil, which will prevent or significantly minimize the migration of VOCs from the soil into the groundwater. The Marine Corps' preferred remedy for remediation of the soil contamination at Site 24 is Soil Vapor Extraction (SVE), the U.S. Environmental Protection Agency (EPA) presumptive remedy. The soil cleanup is expected to take up to 2 years to complete and will be conducted entirely on site without excavating any contaminated soil.

The Interim Remedial Action will be conducted in accordance with the approved Proposed Plan, Record of Decision and Remedial Design documents. These and other documents that pertain to Site 24 are available at the following location.

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Regional Library
14361 Yale Avenue
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(714) 551-7151

For further information please contact Mr. Joseph Joyce at (949) 726-3470 or the following representatives from USEPA or Cal EPA.

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1-800-231-3075
Ms. Marsha Mingay, Public Participation Specialist (Cal EPA)
(562) 590-4461

Publish: Orange County Register
January 16, 1999
1E7000100 R-62

Enlargement