

# Technical Memorandum

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**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

***7 May 1999***

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

## TABLE OF CONTENTS

| Section                                    | Page |
|--|------|
| 1 Introduction                             | 1    |
| 2 Field Activities                         | 1    |
| 3 References and/or Sources of Information | 2    |

### Tables

|          |   |
|----------|---|
| Table 1. | History and Status of Soil Vapor Extraction (SVE) Testing Operations at IRP Site 24 |
|----------|---|

### Exhibits

|   |  |
|---|--|
| 1 | Selected Influent Vapor Concentrations at Wells 24SVE2, 24SVE13, and 24SVE54 |
| 2 | Photograph of Portable SVE Unit at Well 24SVE2                               |



**OHM Remediation  
Services Corp.**

A Member of The IT Group

May 12, 1999

Ms. Bozier H. Demaree  
Contracting Officer  
Naval Facilities Engineering Command  
Southwest Division  
1220 Pacific Highway  
San Diego, CA 92132-5187

Attention: Ms. Lynn Hornecker

**Subject: Transmittal of May 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 4 copies of the May 1999 Progress Report for IRP Site 24, as requested in our discussions on May 6, 1999. Additional copies have been forwarded, with the cover Transmittal from Dave DeMars, directly to the following persons:

Mr. Glenn Kistner, RPM, U.S. EPA Region IX (2 copies)  
Mr. Tayseer Mahmoud, RPM, California DTSC (2 copies)  
Ms. Patricia Hannon, RPM, Regional Water Quality Control Board, Santa Ana Region (2 copies)  
Pat Brooks, Bechtel National Inc. (2 copies)  
Polin Modanlou, (Orange County) (1 copy)  
Eric Peterson/Crispin Wanyoike, Earth Tech (2 copies)  
Michael Pound (RTM) (1 copy)  
Joseph Joyce (BEC) (1 copy)  
Scott Kehe, (ROICC) (1 copy)  
Lucretria Holloway, (COTR) (1 copy)

Two copies have also been sent to the Administrative Record, as you requested.

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

Sincerely,

William Sedlak  
Sr. Project Manager

cc: OHM PMO File (1C/1E)  
Project File, Correspondence B.01.018

## **Section 1**

### ***Introduction***

The purpose of this technical memorandum is to provide an update on the 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 activities that were conducted during the period from late March through April 1999.

## **Section 2**

### ***Field Activities***

#### ***Central Soil Vapor Extraction Treatment System (Central System) Start-up Activities***

The Central System was tested on ambient air during April 1999.

#### ***Soil Gas Surveying Activities***

Soil gas samples were collected in the vicinity of Building 435, Building 360, and near Agua Chinon Wash during April 1999.

#### ***Soil Vapor Extraction (SVE) Testing Activities***

Soil vapor extraction rebound tests, utilizing portable SVE treatment units, were conducted at Wells 24SVE2, 24SVE13, and 24SVE54 during April 1999. Selected influent TCE vapor concentrations and flow information are presented in Table 1. Selected influent concentrations from wells 24SVE2, 24SVE13, and 24SVE54 are presented on Exhibit 1. A photograph of a portable SVE unit operating at well 24SVE2 is presented as Exhibit 2.

#### ***Remediation at Remote Well Locations***

Portable SVE units will continue to be utilized to conduct additional tests, as necessary, and to remediate the vadose zone at remote well locations.

### **Tentative Schedule for Central System and Other Activities**

| <b>Activity</b>  | <b>Tentative<br/>Completion Date</b> |
|--|--------------------------------------|
| <i>Start-up Activities</i>                                   |                                      |
| 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)             |
| LRA Site Visit   | 19 February 1999 (actual)            |
| Begin Remediation Activities                                 | 30 March 1999 (actual)               |
| Rebound Testing at Existing Wells                            | May 1999                             |
| Central System Start-up and Testing                          | July 1999                            |
| Soil Gas Sampling  | July 1999                            |
| Phase I SVE Well Construction and<br>Vapor Conveyance Piping | September 1999                       |

## **Section 3**

### ***References and/or Sources of Information***

Bechtel National, Inc. 1995. Final Field Sampling Plan, Phase II Remedial Investigation/Feasibility Study, Marine Corps Air Station, El Toro, California.

Bechtel National, Inc. 1995. Investigation-Derived Waste Management Plan, Marine Corps Air Station, El Toro, California.

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CDM Federal Programs Corporation. 1997. Final Groundwater Monitoring Report, July 1997 Sampling Round, Groundwater Monitoring Program for Marine Corps Air Station, El Toro. October. [Navy Contract N68711-96-D-2029, Delivery Order 5]

Earth Tech. 1998. Work Plan, Soil Vapor Extraction (SVE) System Demonstration at Marine Corps Air Station (MCAS), El Toro, California. [USAF Contract Number F11623-94-D-0024, Delivery Order RL 67]

OHM. 1996. Technical Memorandum, Continuation of CLEAN II Site 24 Soil Vapor Extraction Pilot Test, Marine Corps Air Station, El Toro, California. October. [Includes Standard Operating Procedures and Health and Safety Plan]

OHM. 1998 and 1999. IRP Site 24, Marine Corps Air Station, El Toro, Preliminary Laboratory Data Packages for Soil Vapor Extraction Tests and Remediation Activities and Soil Gas Surveys at IRP Site 24.

Southwest Division, Naval Facilities Engineering Command. 1998 and 1999. Technical Memorandum, Progress Report, Phase I Vadose Zone Remediation Activities, IRP Site 24, MCAS El Toro. (December 1998, January 1999, February 1999, March 1999, April 1999).

United States Marine Corps Air Station, El Toro. 1998. Correspondence: Letter dated 2 December 1998 to BRAC Cleanup Team Members pertaining to Central SVE System Start-Up, Testing, and Evaluation Activities.

*For discussion only*

**Table 1. History and Status of Soil Vapor Extraction (SVE) Testing Operations at IRP Site 24, MCAS El Toro (Updated 4 May 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.<br><br>19 days (10 Jun - 8 Jul 1996)<br>1 day or 4 hours (23 Oct 96)<br>84 days or 1,981.5 hours (18 Dec 96 - 12 Mar 97)<br>1 day or 4 hours (14 Mar 97)<br>1 day or 4 hours (12 May 97)<br>5 days approximately (1 - 5 Jun 98)<br>54 days (7 Oct - 30 Nov 98)<br><b>TOTAL: 164 days approximately</b> | 910<br>120<br>73<br>89<br>37<br>8.7                                    | 23 Oct 96<br>12 May 97<br>5 Jun 98<br>9 Oct 98<br>5 Nov 98<br>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)<br><br><b>435 pounds (through 1997)</b><br>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.<br><br>1 day or 4 hours (11 Nov 96)<br>4 days (7 - 11 Jan 99)<br>21 April 99 - TEST IN PROGRESS   | 160<br>230<br>240 (230 duplicate)<br>320<br>200<br>170 (170 duplicate) | 11 Nov 96<br>7 Jan 99<br>8 Jan 99<br>11 Jan 99<br>21 Apr 99<br>23 Apr 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.<br><br>1 day or 4 hours (13 Nov 96)<br>2 days (11 - 13 Jan 99)   | 150<br>57<br>75  | 13 Nov 96<br>11 Jan 99<br>13 Jan 99                                      |   | 44 cfm at 80" (1996)                               | 0.08 pound (1996)  |
| 24SVP2<br>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.<br><br>1 day or 4 hours (4 Nov 96)<br>65 days or 1,536 hours (21 July - 24 September 1997)<br>6 days (22 - 28 Dec 98)<br><b>TOTAL: 72 days approximately</b>  | 1100<br>980<br>160<br>140 (139 duplicate)<br>110                       | 4 Nov 96<br>21 Jul 97<br>24 Sep 97<br>23 Dec 98<br>28 Dec 98             |   | 22 cfm at 100" (1996)                              | 0.36 pound (1996)<br><b>59 pounds (through 1997)</b>   |
| 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.<br><br>1 day or 4 hours (5 Nov 96)<br>7 days (28 Dec 98 - 4 Jan 99)<br><b>TOTAL: 7 days approximately</b>  | 130<br>0.39 (1.2 duplicate)<br>7.5                                     | 5 Nov 96<br>28 Dec 98<br>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.<br><br>1 day or 4 hours (14 Nov 96)<br>3 days (7 Jan - 13 Jan (water in well caused system shut-down during test (9-11 Jan 99))<br><b>TOTAL: 3 days approximately</b> | 280<br>60<br>34 (56 duplicate)<br>28<br>0.026                   | 14 Nov 96<br>7 Jan 99<br>8 Jan 99<br>11 Jan 99<br>13 Jan 99 | GW in well | >131 at 55"<br>(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.<br><br>1 day or 4 hours (18 Nov 96)<br>20 days (10 Mar-30 Mar 98)<br><b>TOTAL: 21 days approximately</b>   | 220<br>20<br>7.7<br>0.014                                       | 18 Nov 96<br>24 Mar 98<br>30 Mar 98<br>27 Jan 99            |            | 27 cfm at 110"<br>(1996)                                 | 0.09 pound (1996)<br>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.<br><br>1 day or 4 hours (20 Nov 96)   | 360<br>0.75   | 20 Nov 96<br>27 Jan 99                                      |            | 65 cfm at 100"<br>(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.<br><br>1 day or 4 hours (8 Nov 96)<br>6 days (28 Dec 98- 4 Jan 99)<br><b>TOTAL: 7 days approximately</b>   | 440<br>6.3<br>24<br>23 (21 duplicate)                           | 8 Nov 96<br>28 Dec 98<br>29 Dec 98<br>4 Jan 99              |            | >131 at 30"<br>(1996)                                    | 0.86 pound (1996)  |
| 24SVP6<br>Piezometer     | 50 to 50.5<br>(approximately) | Note: Piezometer was constructed in 1995. Preliminary testing completed January 1999.  | 0.14  | 11 Jan 99   |            | Not measured   |  |
| 24SVP6A<br>Piezometer    | 67 to 67.5<br>(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.<br><br>1 day or 4 hours (31 Oct 96)<br>2 days (13 - 15 January 1999)   | 54<br>140<br>170 (130 duplicate)<br>180                         | 31 Oct 96<br>13 Jan 99<br>14 Jan 99<br>15 Jan 99            | GW in well | 180 cfm at 135"<br>(1996)<br>~ 5 cfm at 120"<br>(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.<br><br>1 day or 4 hours (1 Nov 96)<br>3 days (15 - 18 January 1999)  | 30<br>16  | 1 Nov 96<br>18 Jan 99                                       |            | 28 cfm at 110"<br>(1996)                                 | 0.01 pound (1996)  |
| 24SVP7<br>Piezometer     | 54.5 to 55<br>(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.<br>1 day or 4 hours (25 Oct 96)<br>2 days (4 - 6 Jan 99)  | 100<br>17<br>18 (19 duplicate)                                  | 25 Oct 96<br>4 Jan 99<br>6 Jan 99  |  | 30 cfm at 105"<br>(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.<br>1 day or 4 hours (24 Oct 96)<br>2 days approximately (19 - 21 Jan 99)   | 45<br>4.6<br>12 (12 duplicate)<br>18 (2.9 duplicate)            | 24 Oct 96<br>19 Jan 99<br>20 Jan 99<br>22 Jan 99                         |  | 70 cfm at 100"<br>(1996)                           | 0.05 pound (1996)  |
| 24SVP8<br>Piezometer     | 30.5 to 31<br>(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.<br>1 day or 4 hours (21 Nov 96)<br>62 days or 1,450.8 hours (15 May - 16 Jul 97)<br>4 days (8 - 12 Jun 98)<br><b>TOTAL: 67 days</b> | 550<br>170<br>58<br>41  | 21 Nov 96<br>16 Jul 97<br>12 Jun 98<br>27 Jan 99                         | Travel time: 0.77 days per pore volume (EDR). Approx. 80 pore volumes removed during tests.                                  | 60 cfm at 95"<br>(1996)                            | 19 pounds (through 1997)<br>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.<br>1 day or 4 hours (22 Nov 96)   | 36<br>0.04  | 22 Nov 96<br>27 Jan 99   |  | 20 cfm at 100"<br>(1996)                           | 0.01 pound (1996)  |
| 24SVP9<br>Piezometer     | 35.5 to 36<br>(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.<br>1 day or 4 hours (15 Nov 96)<br>44 days or 1,005.9 hours (24 Mar - 7 May 97)<br>26 days (25 Sep 97 - 20 Oct 97)<br>1 day (10-11 December 1998)<br><b>TOTAL: 72 days approximately</b>                            | 1400<br>230<br>140<br>26<br>30 (33 duplicate)<br>32.5           | 15 Nov 96<br>7 May 97<br>2 Oct 97<br>10 Dec 98<br>11 Dec 98<br>27 Jan 99 | 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"<br>(1996)                           | 5.24 pounds (1996)<br>308 pounds (through May 1997)<br>Calculations in progress for late 1997 and 1998 tests |
| 24SVP10<br>Piezometer    | 55.5 to 56<br>(approximately) | Note: Piezometer was constructed in 1995. Evaluation of condition of piezometer is in progress.   | Not measured  |  |  | Not measured                                       |  |
| 24SVP10A<br>Piezometer   | 38 to 38.5<br>(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.<br><br>1 day or 4 hours (25 Nov 96)<br>24 days (28 Apr - 21 May 98)<br>2 days (13 - 15 January 1999)<br><b>TOTAL: 26 days approximately</b> | 300<br>23<br>160<br>120<br>96 (83 duplicate)  | 25 Nov 96<br>29 Apr 98<br>8 May 98<br>21 May 98<br>14 Jan 99  | GW in well  | 60 cfm at 100"<br>(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.<br><br>1 day or 4 hours (26 Nov 96)<br>3 days (15 - 18 January 1999)  | 0.14<br>38  | 26 Nov 96<br>18 Jan 99  |   | 27 cfm at 115"<br>(1996)                           |  |
| 24SVP11<br>Piezometer    | 23.5 to 24<br>(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.<br>1 day or 4 hours (30 Dec 97)<br>6 days (26 January - 1 February 1999)  | 330<br>160<br>77<br>110 (100 duplicate)   | 30 Dec 97<br>28 Jan 99<br>29 Jan 99<br>1 Feb 99   |   |  | 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.<br><br>1 day or 4 hours (27 Nov 96)<br>28 days (12 Nov - 17 Dec 98)<br>26 April 1999 - TEST IN PROGRESS                                       | 4.1 (TCE)<br>120 (PCE)<br>92 (PCE)<br>42 (PCE)<br>4.1 (TCE)<br>86 (PCE)<br>2.4 (TCE)                        | 27 Nov 96<br>27 Nov 96<br>18 Nov 98<br>17 Dec 98<br>17 Dec 98<br>30 Apr 99<br>30 Apr 99                         |   | 40 cfm at 110"<br>(1996)                           | Calculations in progress (PCE mass)                |
| 24SVP13<br>Piezometer    | 71.5 to 72<br>(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.<br>1 day or 4 hours (7 Nov 96)<br>6 days (21 Dec - 28 Dec 98)<br>65 days approximately (19 Jan - 26 Mar 99)   | 110<br>760<br>940<br>780<br>420 (120 duplicate)<br>410 (140 duplicate)<br>180<br>168 (172 duplicate)<br>110 | 7 Nov 96<br>21 Dec 98<br>22 Dec 98<br>28 Dec 98<br>20 Jan 99<br>25 Jan 99<br>2 Feb 99<br>16 Feb 99<br>26 Mar 99 | 124 IWG applied at 24SVE14 resulted in 0.7 IWG at 24SVE8 (450 feet away) during 1996 pilot test | 120 cfm at 120"<br>(1996)                          | 0.2 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 |
|-----------------------------------|-------------------------------|--|---|--|--|--|--------------------------------|
| 24SVP14<br>Piezometer             | 49.5 to 50<br>(approximately) | Note: Piezometer was constructed in 1995. Preliminary testing completed January 1999.  | 27  | 11 Jan 99  |  |  |                                |
| 24SVP14A<br>Piezometer            | 29.5 to 30<br>(approximately) | Note: Piezometer was constructed in 1995. Preliminary testing completed January 1999.  | 33  | 11 Jan 99  |  |  |                                |
| 24SVP14S<br>Piezometer<br>[PZ14S] | 83.0 to 88.0                  | Constructed 1 March 1999. One-half inch diameter PVC.  | 0.52  | 3 Mar 99   |  |  |                                |
| 24SVE104B                         | 25 to 45                      | Note: Well 24SVE104B was constructed 16 Nov 1998.<br>2 days (30 Nov 98 – 2 Dec 98)   | 1.3 (1.3 duplicate)<br>1.8<br>1.2   | 1 Dec 98<br>2 Dec 98<br>27 Jan 99  | Located within 500 ug/L TCE vapor concentration contour for shallow zone established in 1995                     | ~200 cfm at ~20"<br>(22 cfm at 92 IWG per EDR)     |                                |
| 24SVE107                          | 70 to 95                      | Note: Well 24SVE107 was constructed 17 Nov 1998.<br>5 days (2 Dec – 7 Dec 98)  | 14<br>4.4<br>7.5  | 3 Dec 98<br>7 Dec 98<br>27 Jan 99  |  | ~40 cfm at ~100"<br>(22 cfm at 92 IWG per EDR)     |                                |
| 24SVE161                          | 70 to 95                      | Note: Well 24SVE161 was constructed 19 Nov 1998.<br>3 days (7 Dec 98 – 10 Dec 98)  | 82<br>61  | 7 Dec 98<br>9 Dec 98   | GW in well (Dec 98)<br>Located within 500 ug/L TCE vapor concentration contour for deep zone established in 1995 | ~50 cfm at ~95"<br>(228 cfm at 47 IWG per EDR)     |                                |
| 24SVE116                          | 75 to 95                      | Note: Well 24SVE116 was constructed 16 Dec 1998.<br>4 days (17-21 Dec 98) approximately  | 130<br>82<br>65   | 17 Dec 98<br>21 Dec 98<br>27 Jan 99  |  | ~75 cfm at ~80"<br>(22 cfm at 92 IWG per EDR)      |                                |
| 24SVE54                           | 75 to 95                      | Note: Well 24SVE54 was constructed 17 Dec 1998.<br>2 days (5 – 7 Jan 1999)<br>41 days approximately (2 February – 16 April 1999) | 26<br>460<br>400 (430 duplicate)<br>144<br>106<br>75 (65 duplicate)<br>49 | 5 Jan 99<br>6 Jan 99<br>7 Jan 99<br>4 Feb 99<br>9 Feb 99<br>24 Mar 99<br>16 Apr 99 |  | ~20 cfm at 100"<br>(22 cfm at 92 IWG per EDR)      |                                |

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         |
|-------------------------------------|------------------------------|---|---|-------------------------------|------------------|--|--|
| 24SVP54N<br>Piezometer<br>[PZ54-N]  | 91.5 to 96.5                 | Constructed 25 February 1999. One-half inch diameter PVC.   | 0.5   | 1 Mar 99                      | Preliminary Data |  |  |
| 24SVP54S<br>Piezometer<br>[PZ54-S]  | 83.5 to 88.5                 | Constructed 26 February 1999. One-half inch diameter PVC.   | 90  | 1 Mar 99                      | Preliminary Data |  |  |
| <b>Central System Low-Flow Test</b> |                              | 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). | 26<br>18  | 27 Jan 99<br>28 Jan 99        |                  | Approximately 700 scfm                             |  |
|                                     |                              | <i>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).</i>                     |   |                               |                  |  |  |
| 24EX3                               | 105-180                      | 132-day vacuum-enhanced GW extraction pilot test (22 Oct 97 – 15 May 98)  | 39<br>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<br>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<br>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<br>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.

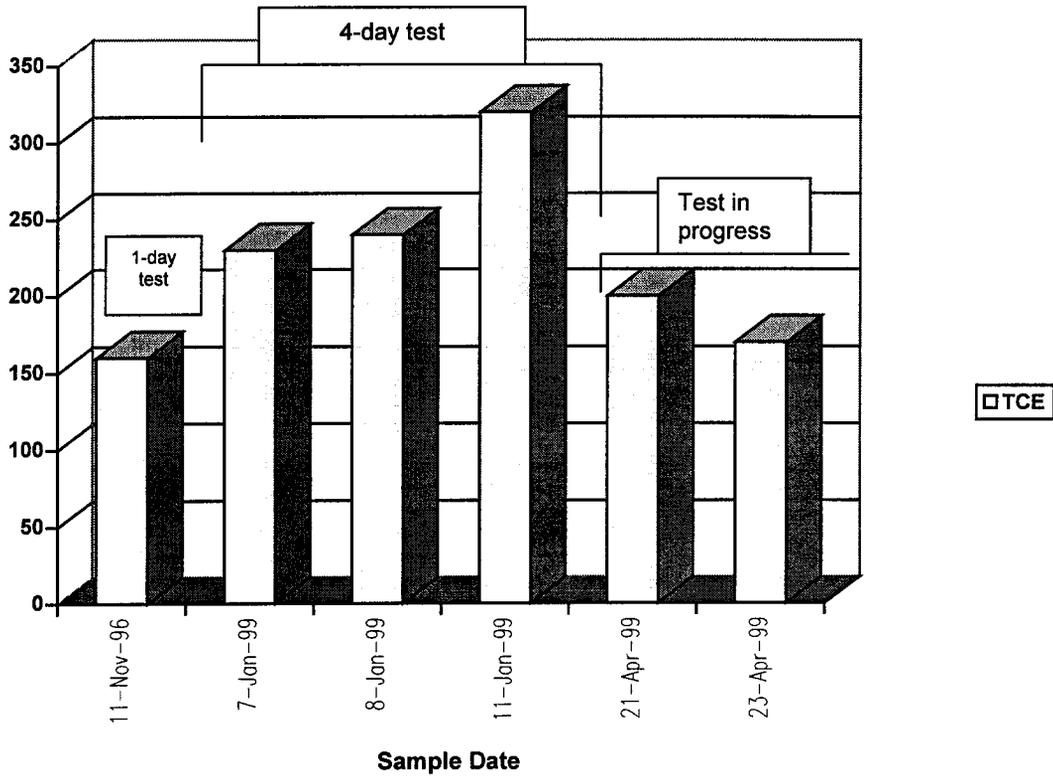
The Draft Final Interim Record of Decision, Operable Unit 2A, Site 24 – VOC Source Area, Vadose Zone, Marine Corps Air Station, El Toro (September 1997) states that approximately 870 pounds of TCE mass were removed during the SVE pilot test activities conducted during 1996 and 1997.

## Exhibits

- 1 Selected Influent Vapor Concentrations at Wells 24SVE2, 24SVE13, and 24SVE54
- 2 Photograph of Portable SVE Unit at Well 24SVE2

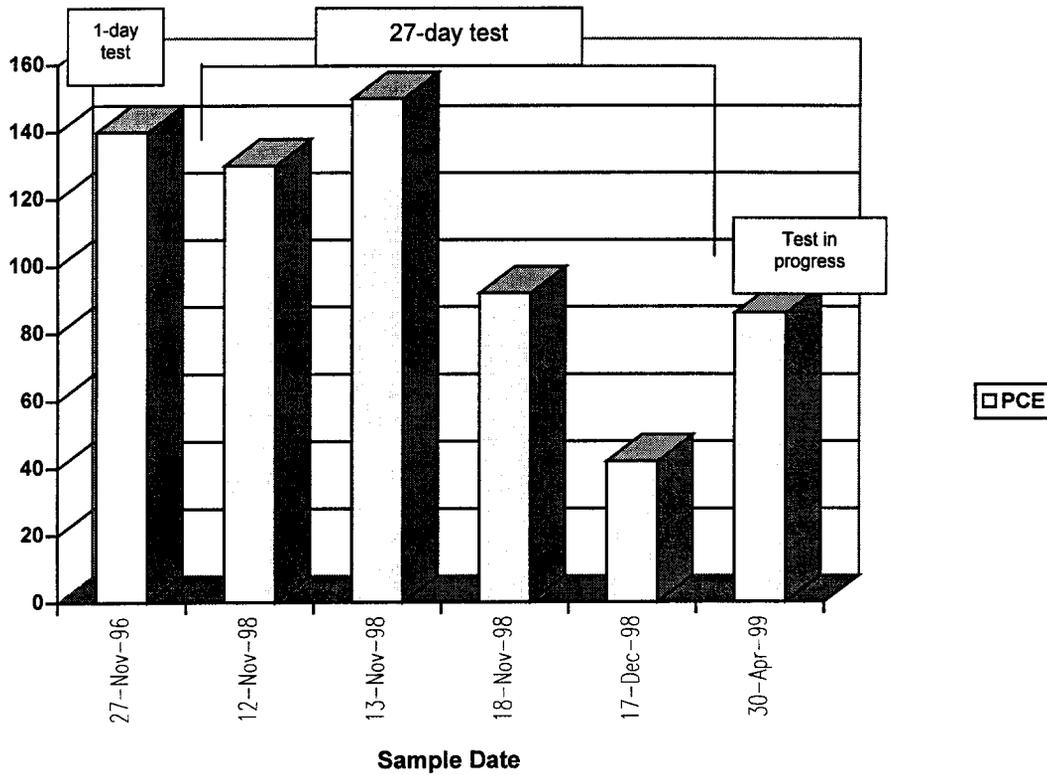
## Selected Influent TCE Vapor Concentrations at Vapor Extraction Well 24SVE2 Marine Corps Air Station, El Toro

TCE  
(Micrograms per liter)



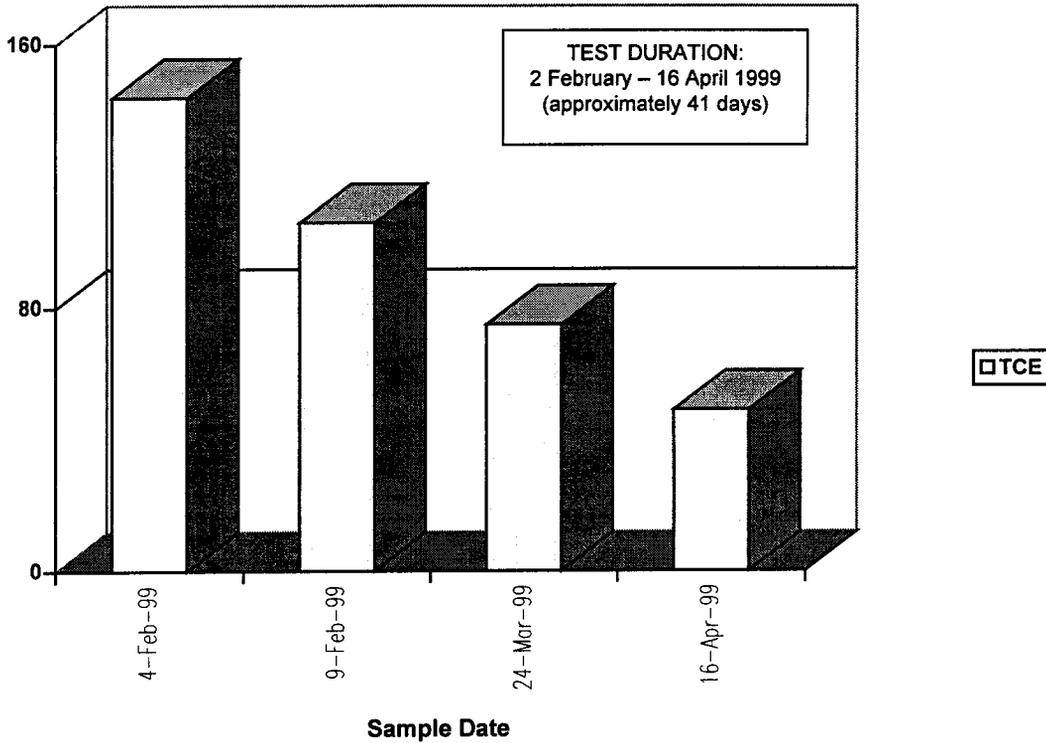
## Selected Influent PCE Vapor Concentrations at Vapor Extraction Well 24SVE13 Marine Corps Air Station, El Toro

PCE  
(Micrograms per liter)



## Selected Influent TCE Vapor Concentrations at Vapor Extraction Well 24SVE54 Marine Corps Air Station, El Toro

TCE  
(Micrograms per liter)



Portable Soil Vapor Extraction Treatment Unit at Well 24SVE2  
Installation Restoration Program (IRP) Site 24  
Marine Corps Air Station, El Toro  
April 1999



## Selected SVE Data (Preliminary Results)



D:\GCMSA-11990426\A2853.D

## Quanterra Air Toxics Lab

Sample Name: CV9VD102 OHM M9D300218-2 Data Analyzed: 1 May 1999 14:51  
 Misc. Info: 10ml 18708-1028 TEDLAR BAG Method: MSA0501  
 Data Name: A2853.D Shift Call File: CC05011.D  
 Data Path: D:\GCMSA-11990426\ Dilution Factor: 50

| Compound                          | dRT   | Result(ug/L)               | RL(ug/L) |
|-----------------------------------|-------|----------------------------|----------|
| 2) Dichlorodifluoromethane (12)   |       | ND                         | 0.4935   |
| 3) Chloromethane                  |       | ND                         | 0.4122   |
| 4) 1,2-Di-1,1,2,2-F ethane (114)  |       | ND                         | 0.6976   |
| 5) Vinyl Chloride                 |       | ND                         | 0.2551   |
| 6) Bromomethane                   | -0.21 | ND                         | 0.3875   |
| 7) Chloroethane                   |       | ND                         | 0.5266   |
| 8) Trichlorofluoromethane (11)    |       | ND                         | 0.5507   |
| 9) 1,1-Dichloroethane             | -0.00 | ND                         | 0.3957   |
| 10) Carbon Disulfide              | -0.01 | ND                         | 1.5540   |
| 11) 1,1,2-Di-1,2,2-F ethane (113) | -0.03 | 1.3843                     | 0.7648   |
| 12) Acetone                       | 0.02  | ND                         | 1.1855   |
| 13) Methylene Chloride            | 0.02  | ND                         | 0.3467   |
| 14) 1,1,2-Dichloroethane          |       | ND                         | 0.3957   |
| 15) 1,1-Dichloroethane            |       | ND                         | 0.4039   |
| 16) Vinyl Acetate                 | 0.14  | ND                         | 1.7570   |
| 17) <i>c</i> -1,2-Dichloroethane  |       | ND                         | 0.3957   |
| 18) 2-Butanone                    |       | ND                         | 1.4715   |
| 19) Chloroform                    | 0.03  | ND                         | 0.4873   |
| 20) 1,1,1-Trichloroethane         |       | ND                         | 0.5445   |
| 21) Carbon Tetrachloride          | -0.00 | ND                         | 0.6278   |
| 23) Benzene                       | -0.05 | ND                         | 0.3188   |
| 25) 1,2-Dichloroethane            |       | ND                         | 0.4039   |
| 26) Trichloroethane               | 0.01  | 2.4260                     | 0.5363   |
| 27) 1,2-Dichloropropane           |       | ND                         | 0.4612   |
| 28) Bromodichloromethane          |       | ND                         | 0.6687   |
| 29) <i>c</i> -1,3-Dichloropropene |       | ND                         | 0.4529   |
| 30) 4-Methyl-2-Pentanone          | -0.03 | ND                         | 2.0440   |
| 32) Toluene                       |       | ND                         | 0.3767   |
| 34) <i>t</i> -1,3-Dichloropropene |       | ND                         | 0.4529   |
| 35) 1,1,2-Trichloroethane         | 0.16  | ND <del>0.5832</del> RC ms | 0.5445   |
| → 36) Tetrachloroethene           | 0.02  | 86.2667                    | 0.6769   |
| 37) 2-Hexanone                    |       | ND                         | 6.1320   |
| 38) Dibromochloromethane          |       | ND                         | 0.8502   |
| 39) 1,2-Dibromoethane             |       | ND                         | 0.7668   |
| 40) Chlorobenzene                 |       | ND                         | 0.4594   |
| 41) Ethylbenzene                  | -0.42 | ND                         | 0.4333   |
| 42) <i>p,m</i> -Xylene            |       | ND                         | 0.4333   |
| 43) <i>o</i> -Xylene              |       | ND                         | 0.4333   |
| 44) Styrene                       |       | ND                         | 0.4251   |
| 45) Bromoform                     |       | ND                         | 1.0316   |

0.95

Preliminary Test Results – Data Evaluation In Progress

D:\GCMSA-1\990426\A2653.D

Sample Name: CV9VD102 OHM M9D300218-2 Data Analyzed: 05/1/99 -1:4:  
 Misc. Info: 10ml 18708-1028 TEDLAR BAG Method: MSA0501  
 Data Name: A2653.D Shift Call File: CC05011.D  
 Data Path: D:\GCMSA-1\990426\ Dilution Factor: 50

| Compound                      | dRT  | Result(ug/L) | RL(ug/L) |
|-------------------------------|------|--------------|----------|
| 47) 1,1,2,2-Tetrachloroethane |      | ND           | 0.6851   |
| 48) Benzyl Chloride           |      | ND           | 2.5880   |
| 49) 4-Ethyl Toluene           | 0.28 | ND           | 0.4906   |
| 50) 1,3,5-Trimethylbenzene    |      | ND           | 0.4906   |
| 51) 1,2,4-Trimethylbenzene    | 0.07 | ND           | 0.4906   |
| 52) 1,3-Dichlorobenzene       |      | ND           | 0.6000   |
| 53) 1,4-Dichlorobenzene       |      | ND           | 0.6000   |
| 54) 1,2-Dichlorobenzene       |      | ND           | 0.6000   |
| 55) 1,2,4-Trichlorobenzene    |      | ND           | 7.4060   |
| 56) Hexachlorobutadiene       |      | ND           | 2.1286   |

MTBE

ND

1.8

| LS.                 | Daily Area | Sample Area | Area Criteria | Daily R.T. | Sample R.T. | R.T. Criteria |
|---------------------|------------|-------------|---------------|------------|-------------|---------------|
| Bromochloromethane  | 316228     | 346429      | OK            | 7.57       | 7.59        | OK            |
| 1,4-Difluorobenzene | 1500309    | 1659562     | OK            | 9.26       | 9.29        | OK            |
| Chlorobenzene-d5    | 781505     | 813765      | OK            | 14.74      | 14.75       | OK            |

| Surrogates           | Spiked | Found | %Recovery |
|----------------------|--------|-------|-----------|
| 1,2-Dichloroethane   | 50     | 49.41 | 98.8      |
| Toluene-d8           | 50     | 48.94 | 97.9      |
| 4-Bromofluorobenzene | 50     | 42.93 | 85.9      |

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Foot Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

1st Review: LR 5/3/99 2nd Review: \_\_\_\_\_

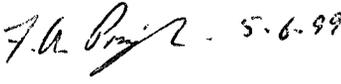
Preliminary Test Results – Data Evaluation In Progress

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## Transmittal

Date: May 7, 1999

From: David B. DeMars   
Remedial Project Manager  
IRP Site 24, MCAS El Toro

Via: Andy Piszkin  - 5-6-99  
Lead Remedial Project Manager  
MCAS El Toro

To: Glenn Kistner, Remedial Project Manager  
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State of California Environmental Protection Agency  
Department of Toxic Substances Control  
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Southern California Operations  
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Cypress, CA 90630-4700

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

Subj: May 1999 Progress Report  
Phase I Vadose Zone Remediation, Installation Restoration Program Site 24  
Marine Corps Air Station, El Toro

Transmitted for your information is the subject progress report. Please do not hesitate to contact me at (619) 532-4163 if you have questions pertaining to this project.

CF:  
Joseph Joyce (MCAS El Toro)  
Polin Modanlou (Orange County)  
Pat Brooks (Bechtel National, Inc.)  
Eric Peterson, Crispin Wanyoike (Earth Tech)  
Bill Sedlak (OHM/IT)  
Project Files



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Building 131  
1220 Pacific Highway  
San Diego, California 92132-5101

**Date:** 13-May-99

**D.O.:** 65

**Location:** MCAS EL TORO

**FROM:**

*James Franklin FOR*  
Stewart Bornhoft, Program Manager

Edwin G. Bond, Contracts Manager

**DESCRIPTION OF ENCLOSURE:** *Tranmittal of May 1999 Progress Report, Phase I Vadose Zone Remediation, IRP Site 24, Removal and Remedial Actions for IRP Sites, dated May 12, 1999*

**TYPE:** Contract Deliverable ( ) D. O. Deliverable (X) Request for Change ( ) Other ( )  
( \$ ) (Tech)

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