0.5

CAMBRIA

October 10, 2000

ENVIRONMENTAL PROTECTION

00 OCT 17 PM 2:39

Ms. Eva Chu
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502

Allow plume to equilibrate after air sparge is turned off - Sample wells for a minimum of 2 qtrs to verify that HC conc. will not increase.

Re: **Third Quarter 2000 Monitoring Report**
ARCO Service Station No. 0771
899 Rincon Avenue
Livermore, California
Cambria Project #436-1607

Dear Ms. Chu:

On behalf of ARCO, Cambria Environmental Technology, Inc. (Cambria) is submitting the attached report which presents the results of the third quarter 2000 groundwater monitoring program at ARCO Service Station No. 0771, located at 899 Rincon Avenue, Livermore, California. The monitoring program complies with ACHCSA requirements regarding underground tank investigations.

How long is air sparge system on between 2 hr interval.

Please call if you have questions.

Sincerely,

**Cambria Environmental Technology, Inc.**

D. Ataide

Darryk Ataide, REA
Senior Project Manager

Attachment: Quarterly Groundwater Monitoring Report, Third Quarter 2000

cc: Paul Supple, ARCO. PO Box 6549 Moraga, CA 94570
Danielle Stefani, City of Livermore Fire Dept. 4550 East Avenue, Livermore, CA 94550

Oakland, CA
San Ramon, CA
Sonoma, CA
Portland, OR

**Cambria Environmental Technology, Inc.**

1144 65th Street
Suite B
Oakland, CA 94608
Tel (510) 420-0700
Fax (510) 420-9170

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CAMBRIA

# Quarterly Groundwater Monitoring Report

## Third Quarter 2000

**ARCO Service Station No. 0771**
**899 Rincon Avenue,**
**Livermore, California**
**Cambria Project #436-1607**

Prepared For:

Mr. Paul Supple
ARCO
October 10, 2000

Prepared By:
Cambria Environmental Technology, Inc.
1144 65th Street, Suite B
Oakland, California 94608

REGISTERED GEOLOGIST • RONALD A. SCHEELE • No. 6842 • STATE OF CALIFORNIA

Written by:

Jason D. Olson
Staff Environmental Scientist

Ron Scheele, RG
Senior Project Manager

CAMBRIA

Date: October 10, 2000
Quarter: 3rd Quarter, 2000

# ARCO QUARTERLY GROUNDWATER MONITORING REPORT

Station No.: 0771 Address: 899 Rincon Avenue, Livermore, California
ARCO Environmental Engineer/Phone No.: Paul Supple /(925) 299-8891
Consulting Co./Contact Person: Cambria Environmental Technology, Inc./Darryk Ataide, REA
Consultant Project No.: 436-1607
Primary Agency/Regulatory ID No.: ACHCSA

## WORK PERFORMED THIS QUARTER (THIRD - 2000):

1. Submitted quarterly groundwater monitoring report for second quarter 2000.
2. Revised groundwater monitoring schedule per ACHCSA letter dated July 7, 2000.
3. Performed third quarter groundwater monitoring and sampling on August 31, 2000.
4. Operated air-sparge system.

## WORK PROPOSED FOR NEXT QUARTER (FOURTH - 2000):

1. Prepare and submit quarterly groundwater monitoring report for third quarter 2000.
2. Perform quarterly groundwater monitoring and sampling for fourth quarter 2000.
3. Shut down air sparge system.
4. Develop site conceptual model per ACHCSA letter dated July 7, 2000.
5. Prepare closure summary.

## QUARTERLY MONITORING:

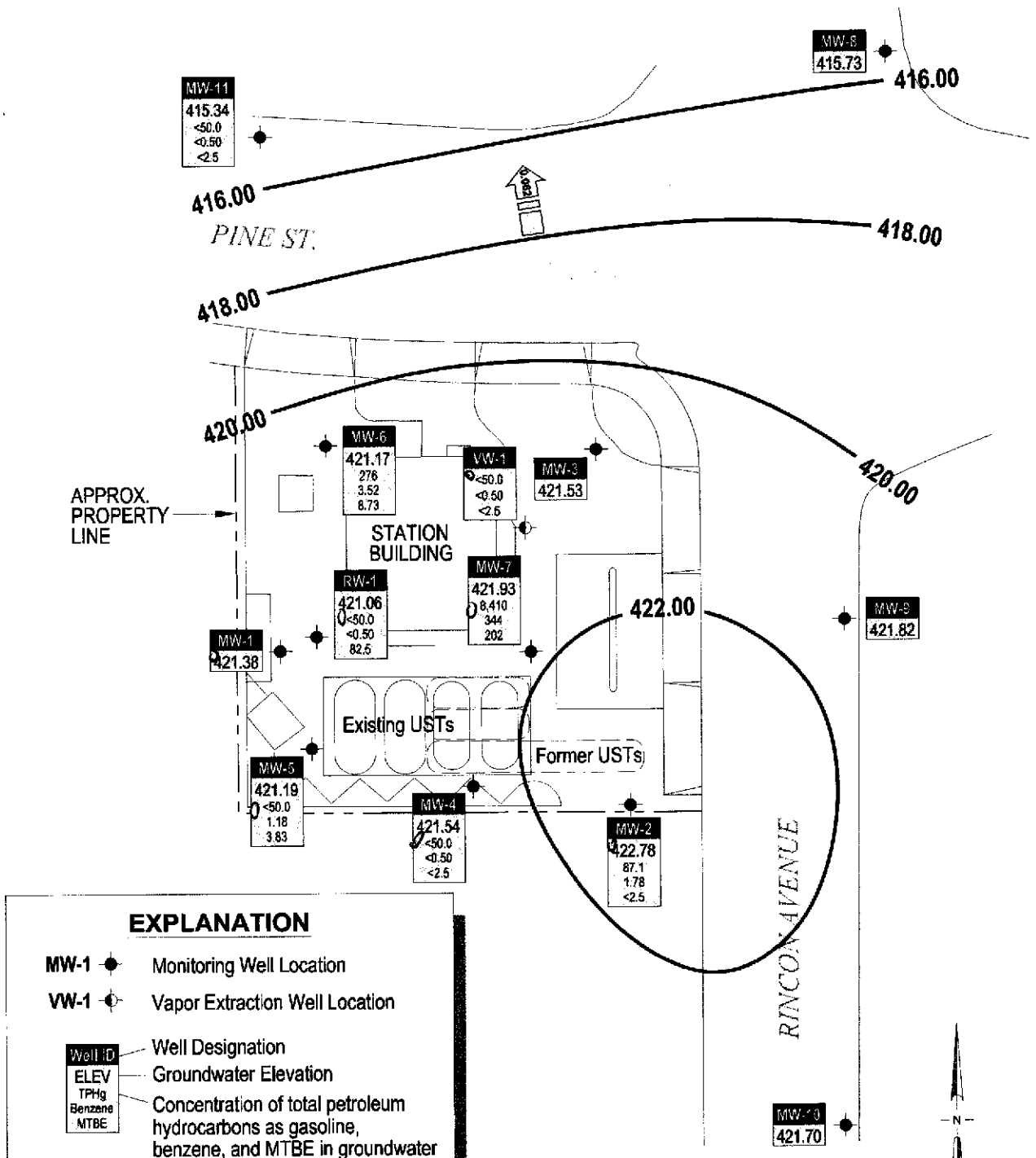
| | |
|---|---|
| Current Phase of Project: | Quarterly Groundwater Monitoring and Operation and Maintenance of Remediation System.<br>Soil Vapor Extraction (SVE) system was shut down on 10-10-95 due to low hydrocarbon vapor.<br>Air sparge system cycles every two hours at 5 to 7 scfm total in wells VW-1, MW-1, MW-2, MW-4, MW-5, MW-7, and RW-1. |
| Frequency of Sampling: | Annual (3rd Quarter): MW-2, MW-5, MW-11<br>Semi-Annual (1st/3rd Quarter): MW-4, MW-6, MW-7, RW-1, VW-1 |
| Frequency of Monitoring: | Semi-annual (groundwater), Monthly (SVE and air-sparge) |
| Is Free Product (FP) Present On-site: | No |
| Cumulative FP Recovered to Date : | 3.06 gallons, Wells MW-1, MW-2, and MW-5 |
| FP Recovered This Quarter : | None (FP was last recovered in 1992.) |
| Bulk Soil Removed to Date : | 1,700 cubic yards of TPH-impacted soil |
| Water Wells or Surface Waters Within 2000 ft., impacted by site: | None |
| Current Remediation Techniques: | Enhanced Bioremediation (Air Sparge) |
| Average Depth to Groundwater: | 29.02 feet |
| Groundwater Flow Direction and Gradient | 0.062 ft/ft towards north-northwest |

CAMBRIA

Date: October 10, 2000
Quarter: 3rd Quarter, 2000

**ATTACHMENTS:**

- Table 1 - Groundwater Monitoring Data
- Table 2 - Groundwater Flow Direction and Gradient
- Figure 1 - Groundwater Elevation Contour and Analytical Summary Map
- Appendix A - Sampling and Analysis Procedures
- Appendix B - Certified Analytical Reports and Chain-of-Custody Documentation
- Appendix C - Field Data Sheets




## EXPLANATION

- MW-1 — Monitoring Well Location
- VW-1 — Vapor Extraction Well Location
- Well ID / ELEV / TPHg / Benzene / MTBE — Well Designation; Groundwater Elevation; Concentration of total petroleum hydrocarbons as gasoline, benzene, and MTBE in groundwater in micrograms per liter (ug/l). Samples collected on 08/31/00
- 420.00 — Groundwater elevation contour
- 0.050 — Approximate groundwater flow direction and gradient

◊ Air sparged wells

FIGURE 1

H:\ARCO\0771\FIGURES\SGD-00.DWG

**ARCO Service Station 0771**

899 Rincon Avenue

Livermore, California

CAMBRIA

**Groundwater Elevation Contours**

August 31, 2000

# Table 1
## Groundwater Monitoring Data

## ARCO Service Station 771
## 899 Rincon Avenue, Livermore, California

| Well Designation | Monitoring Date | Top of Casing Elevation ft-MSL | Depth to Water | Free Product Thickness feet | Ground-water Elevation ft-MSL | Sample Date | TPHg µg/L | Benzene µg/L | Toluene µg/L | Ethyl-benzene µg/L | Total Xylenes µg/L | MTBE µg/L | Dissolved Oxygen mg/L | Purged/ Not Purged (P/NP) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-1 | 03-20-95 | 451.73 | 24.50 | 0.00 | 427.23 | 03-20-95 | 90,000 | 1,800 | 1,100 | 1,000 | 5,600 | -- | -- | -- |
| MW-1 | 06-02-95 | 451.73 | 25.60 | 0.00 | 426.13 | 06-03-95 | 81,000 | 2,000 | 1,400 | 990 | 4,600 | -- | -- | -- |
| MW-1 | 08-23-95 | 451.73 | 29.04 | 0.00 | 422.69 | 08-23-95 | 44,000 | 2,400 | 1,900 | 670 | 3,800 | <300 | -- | -- |
| MW-1 | 12-04-95 | 451.73 | 31.31 | 0.00 | 420.42 | 12-04-95 | 22,000 | 870 | 660 | 390 | 2,200 | -- | -- | -- |
| MW-1 | 02-20-96 | 451.73 | 22.26 | 0.00 | 429.47 | 02-20-96 | 21,000 | 1,500 | 1,200 | 650 | 3,500 | <300 | -- | -- |
| MW-1 | 05-15-96 | 451.73 | 23.42 | 0.00 | 428.31 | 05-15-96 | 36,000 | 3,000 | 2,500 | 960 | 5,700 | <250 | -- | -- |
| MW-1 | 08-13-96 | 451.73 | 26.83 | 0.00 | 424.90 | 08-13-96 | 19,000 | 730 | 580 | 450 | 2,500 | <200 | -- | -- |
| MW-1 | 11-13-96 | 451.73 | 31.05 | 0.00 | 420.68 | 11-13-96 | 6,600 | 47 | 16 | 74 | 160 | <30 | -- | -- |
| MW-1 | 03-26-97 | 451.73 | 26.29 | 0.00 | 425.44 | 03-27-97 | 1,900 | 100 | 55 | 37 | 200 | <30 | -- | -- |
| MW-1 | 05-15-97 | 451.73 | 28.65 | 0.00 | 423.08 | 05-15-97 | 16,000 | 490 | 250 | 250 | 1,100 | <120 | -- | -- |
| MW-1 | 08-26-97 | 451.73 | 31.53 | 0.00 | 420.20 | 08-26-97 | 190 | 7 | 3 | 6 | 25 | <3 | -- | -- |
| MW-1 | 11-05-97 | 451.73 | 33.93 | 0.00 | 417.80 | 11-05-97 | 63 | 1 | <0.5 | 1 | 2 | 29 | -- | -- |
| MW-1 | 02-18-98 | 451.73 | 20.46 | 0.00 | 431.27 | 02-18-98 | 23,000 | 1,500 | 610 | 550 | 3,000 | <120 | -- | -- |
| MW-1 | 05-20-98 | 451.73 | 23.84 | 0.00 | 427.89 | 05-21-98 | 50,000 | 4,400 | 1,900 | 1,400 | 80,000 | <300 | -- | -- |
| MW-1 | 07-30-98 | 451.73 | 26.94 | 0.00 | 424.79 | 07-30-98 | 150 | <0.5 | <0.5 | <0.5 | 2 | <3 | 8.7 | P |
| MW-1 | 10-29-98 | 451.73 | 32.58 | 0.00 | 419.15 | 10-29-98 | <50 | <0.5 | <0.5 | <0.5 | 2 | <3 | 2.0 | NP |
| MW-1 | 03-16-99 | 451.73 | 26.20 | 0.00 | 425.53 | 03-16-99 | 3,200 | 160 | 32 | 89 | 390 | 270 | 2.0 | P |
| MW-1 | 05-05-99 | 451.73 | 27.57 | 0.00 | 424.16 | 05-05-99 | 3,600 | 140 | 46 | 76 | 290 | 170 | 11.65 | P |
| MW-1 | 08-26-99 | 451.73 | 30.25 | 0.00 | 421.48 | 08-26-99 | 3,200 | 210 | 29 | 100 | 220 | 120 | 1.43 | P |
| MW-1 | 12-03-99 | 451.73 | 32.70 | 0.00 | 419.03 | 12-03-99 | 53 | <0.5 | <0.5 | <0.5 | 1 | <3 | 2.12 | NP |
| MW-1 | 03-13-00 | 451.73 | 24.45 | 0.00 | 427.28 | 03-13-00 | <50 | <0.5 | <0.5 | <0.5 | <1 | <3 | 5.81 | P |
| DUP | 06-20-00 | -- | -- | -- | -- | 06-20-00 | 67.4 | 3.88 | <0.500 | 1.78 | 1.48 | <2.50 | -- | -- |
| MW-1 | 06-20-00 | 451.73 | 27.79 | 0.00 | 423.94 | 06-20-00 | 356 | 40.1 | 7.17 | 11.9 | 22.7 | <2.50 | 5.10 | P |
| **MW-1** | **08-31-00** | **451.73** | **30.35** | **0.00** | **421.38** | **08-31-00** | **Well no longer part of sampling schedule----------** | | | | | | | |
| MW-2 | 03-20-95 | 449.49 | 20.27 | 0.00 | 429.22 | 03-20-95 | 54,000 | 2,600 | 1,600 | 1,200 | 7,600 | -- | -- | -- |
| MW-2 | 06-02-95 | 449.49 | 22.32 | 0.00 | 427.17 | 06-03-95 | 37,000 | 2,200 | 800 | 980 | 4,800 | -- | -- | -- |

# Table 1
## Groundwater Monitoring Data

## ARCO Service Station 771
## 899 Rincon Avenue, Livermore, California

| Well Designation | Monitoring Date | Top of Casing Elevation ft-MSL | Depth to Water | Free Product Thickness feet | Ground-water Elevation ft-MSL | Sample Date | TPHg µg/L | Benzene µg/L | Toluene µg/L | Ethyl-benzene µg/L | Total Xylenes µg/L | MTBE µg/L | Dissolved Oxygen mg/L | Purged/ Not Purged (P/NP) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-2 | 08-23-95 | 449.49 | 25.69 | 0.00 | 423.80 | 08-23-95 | 65,000 | 1,100 | 310 | 840 | 3,000 | <500 | -- | -- |
| MW-2 | 12-04-95 | 449.49 | 28.52 | 0.00 | 420.97 | 12-04-95 | 19,000 | 680 | 150 | 410 | 1,600 | -- | -- | -- |
| MW-2 | 02-20-96 | 449.49 | 19.00 | 0.00 | 430.49 | 02-20-96 | 22,000 | 1,200 | 240 | 590 | 2,200 | <300 | -- | -- |
| MW-2 | 05-15-96 | 449.49 | 20.03 | 0.00 | 429.46 | 05-15-96 | 25,000 | 1,200 | 240 | 610 | 2,100 | <300 | -- | -- |
| MW-2 | 08-13-96 | 449.49 | 24.44 | 0.00 | 425.05 | 08-13-96 | 19,000 | 640 | 110 | 420 | 1,200 | <300 | -- | -- |
| MW-2 | 11-13-96 | 449.49 | 28.42 | 0.00 | 421.07 | 11-13-96 | 15,000 | 260 | 52 | 220 | 640 | <200 | -- | -- |
| MW-2 | 03-26-97 | 449.49 | 22.98 | 0.00 | 426.51 | 03-27-97 | 17,000 | 580 | 120 | 360 | 980 | <120 | -- | -- |
| MW-2 | 05-15-97 | 449.49 | 25.40 | 0.00 | 424.09 | 05-15-97 | 18,000 | 420 | 63 | 340 | 730 | <120 | -- | -- |
| MW-2 | 08-26-97 | 449.49 | 28.38 | 0.00 | 421.11 | 08-26-97 | 5,300 | 210 | 26 | 140 | 270 | <120 | -- | -- |
| MW-2 | 11-05-97 | 449.49 | 31.93 | 0.00 | 417.56 | 11-05-97 | 560 | 42 | 3 | 7 | 9 | <40 | -- | -- |
| MW-2 | 02-18-98 | 449.49 | 16.87 | 0.00 | 432.62 | 02-18-98 | 18,000 | 710 | 120 | 480 | 1,100 | 130 | -- | -- |
| MW-2 | 05-20-98 | 449.49 | 20.29 | 0.00 | 429.20 | 05-21-98 | 16,000 | 480 | 72 | 440 | 1,100 | <120 | -- | -- |
| MW-2 | 07-30-98 | 449.49 | 23.51 | 0.00 | 425.98 | 07-30-98 | 9,700 | 240 | 33 | 210 | 490 | <120 | 9.2 | P |
| MW-2 | 10-29-98 | 449.49 | 30.08 | 0.00 | 419.41 | 10-29-98 | 58 | <0.5 | <0.5 | <0.5 | 1 | <3 | 1.0 | NP |
| MW-2 | 03-16-99 | 449.49 | 23.22 | 0.00 | 426.27 | 03-16-99 | 4,700 | 120 | 13 | 90 | 220 | 60 | 2.0 | P |
| MW-2 | 05-05-99 | 449.49 | 24.05 | 0.00 | 425.44 | 05-05-99 | 5,500 | 58 | 7.1 | 58 | 98 | 17 | 9.09 | P |
| MW-2 | 08-26-99 | 449.49 | 26.44 | 0.00 | 423.05 | 08-26-99 | 3,700 | 55 | 11 | 60 | 64 | 26 | 1.90 | P |
| MW-2 | 12-03-99 | 449.49 | 30.15 | 0.00 | 419.34 | 12-03-99 | 130 | <0.5 | <0.5 | 0.7 | 1.8 | <3 | 1.96 | NP |
| MW-2 | 03-13-00 | 449.49 | 20.68 | 0.00 | 428.81 | 03-13-00 | <50 | <0.5 | <0.5 | <0.5 | <1 | <3 | NM | P |
| MW-2 | 06-20-00 | 449.49 | 23.08 | 0.00 | 426.41 | 06-20-00 | 226 | 2.20 | <0.500 | 4.83 | 7.88 | <2.50 | 4.90 | P |
| **MW-2** | **08-31-00** | **449.49** | **26.71** | **0.00** | **422.78** | **08-31-00** | **87.1** | **1.78** | **<0.500** | **1.33** | **1.15** | **<2.50** | **1.59** | **P** |
| MW-3 | 03-20-95 | 450.28 | 22.19 | 0.00 | 428.09 | 03-20-95 | 94 | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | -- |
| MW-3 | 06-02-95 | 450.28 | 23.28 | 0.00 | 427.00 | 06-02-95 | 72 | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | -- |
| MW-3 | 08-23-95 | 450.28 | 26.55 | 0.00 | 423.73 | 08-23-95 | 98 | <0.5 | <0.5 | <0.6 | 1 | <3 | -- | -- |
| MW-3 | 12-04-95 | 450.28 | 29.52 | 0.00 | 420.76 | 12-04-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | -- |
| MW-3 | 02-20-96 | 450.28 | 19.83 | 0.00 | 430.45 | 02-20-96 | 130 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |

# Table 1
## Groundwater Monitoring Data

## ARCO Service Station 771
## 899 Rincon Avenue, Livermore, California

| Well Designation | Monitoring Date | Top of Casing Elevation ft-MSL | Depth to Water | Free Product Thickness feet | Ground-water Elevation ft-MSL | Sample Date | TPHg µg/L | Benzene µg/L | Toluene µg/L | Ethyl-benzene µg/L | Total Xylenes µg/L | MTBE µg/L | Dissolved Oxygen mg/L | Purged/ Not Purged (P/NP) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-3 | 05-15-96 | 450.28 | 21.03 | 0.00 | 429.25 | 05-15-96 | 120 | <0.5 | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- |
| MW-3 | 08-13-96 | 450.28 | 25.67 | 0.00 | 424.61 | 08-13-96 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-3 | 11-13-96 | 450.28 | 21.57 | 0.00 | 428.71 | 11-13-96 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-3 | 03-26-97 | 450.28 | 24.15 | 0.00 | 426.13 | 03-26-97 | <50 | 1 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-3 | 05-15-97 | 450.28 | 26.85 | 0.00 | 423.43 | 05-15-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-3 | 08-26-97 | 450.28 | 30.07 | 0.00 | 420.21 | 08-26-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-3 | 11-05-97 | 450.28 | 32.46 | 0.00 | 417.82 | 11-05-97 | <50 | <0.5 | 1 | <0.5 | <0.5 | <3 | -- | -- |
| MW-3 | 02-18-98 | 450.28 | 17.82 | 0.00 | 432.46 | 02-18-98 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-3 | 05-20-98 | 450.28 | 21.41 | 0.00 | 428.87 | 05-20-98 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-3 | 07-30-98 | 450.28 | 26.41 | 0.00 | 423.87 | 07-30-98 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | 9.6 | P |
| MW-3 | 10-29-98 | 450.28 | 31.33 | 0.00 | 418.95 | 10-29-98 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | 1.0 | P |
| MW-3 | 03-16-99 | 450.28 | 24.61 | 0.00 | 425.67 | 03-16-99 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | 1.0 | P |
| MW-3 | 05-05-99 | 450.28 | 25.75 | 0.00 | 424.53 | 05-05-99 | 140 | <0.5 | <0.5 | 0.6 | <0.5 | <3 | 4.43 | P |
| MW-3 | 08-26-99 | 450.28 | 28.49 | 0.00 | 421.79 | 08-26-99 | 80 | 0.6 | 0.6 | 0.6 | 1 | <3 | 1.69 | P |
| MW-3 | 12-03-99 | 450.28 | 31.45 | 0.00 | 418.83 | 12-03-99 | <50 | <0.5 | <0.5 | <0.5 | <1 | <3 | 2.26 | P |
| MW-3 | 03-13-00 | 450.28 | 22.18 | 0.00 | 428.10 | 03-13-00 | <50 | <0.5 | <0.5 | <0.5 | <1 | <3 | 4.41 | P |
| MW-3 | 06-20-00 | 450.28 | 26.03 | 0.00 | 424.25 | 06-20-00 | <50.0 | <0.500 | <0.500 | <0.500 | <0.500 | <2.50 | 2.30 | P |
| **MW-3** | **08-31-00** | **450.28** | **28.75** | **0.00** | **421.53** | **08-31-00** | **Well no longer part of sampling schedule----------** | | | | | | | |
| MW-4 | 03-20-95 | 451.09 | 22.68 | 0.00 | 428.41 | 03-20-95 | 12,000 | 1,000 | 100 | 450 | 700 | -- | -- | -- |
| MW-4 | 06-02-95 | 451.09 | 24.41 | 0.00 | 426.68 | 06-02-95 | 9,000 | 850 | 56 | 380 | 430 | -- | -- | -- |
| MW-4 | 08-23-95 | 451.09 | 27.72 | 0.00 | 423.37 | 08-23-95 | 5,300 | 400 | 25 | 240 | 170 | <100 | -- | -- |
| MW-4 | 12-04-95 | 451.09 | 29.85 | 0.00 | 421.24 | 12-04-95 | 6,700 | 100 | <10 | 90 | 38 | -- | -- | -- |
| MW-4 | 02-20-96 | 451.09 | 21.16 | 0.00 | 429.93 | 02-20-96 | 7,000 | 360 | 22 | 180 | 160 | <70 | -- | -- |
| MW-4 | 05-15-96 | 451.09 | 22.18 | 0.00 | 428.91 | 05-15-96 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-4 | 08-13-96 | 451.09 | 26.20 | 0.00 | 424.89 | 08-13-96 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-4 | 11-13-96 | 451.09 | 29.72 | 0.00 | 421.37 | 11-13-96 | Not sampled: well sampled annually, during the first quarter | | | | | | | |

# Table 1
## Groundwater Monitoring Data

## ARCO Service Station 771
## 899 Rincon Avenue, Livermore, California

| Well Designation | Monitoring Date | Top of Casing Elevation ft-MSL | Depth to Water | Free Product Thickness feet | Ground-water Elevation ft-MSL | Sample Date | TPHg µg/L | Benzene µg/L | Toluene µg/L | Ethyl-benzene µg/L | Total Xylenes µg/L | MTBE µg/L | Dissolved Oxygen mg/L | Purged/ Not Purged (P/NP) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-4 | 03-26-97 | 451.09 | 21.86 | 0.00 | 429.23 | 03-27-97 | 8,900 | 390 | 33 | 200 | 250 | <70 | -- | -- |
| MW-4 | 05-15-97 | 451.09 | 26.92 | 0.00 | 424.17 | 05-15-97 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-4 | 08-26-97 | 451.09 | 29.30 | 0.00 | 421.79 | 08-26-97 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-4 | 11-05-97 | 451.09 | 32.14 | 0.00 | 418.95 | 11-05-97 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-4 | 02-18-98 | 451.09 | 19.30 | 0.00 | 431.79 | 02-18-98 | 5,300 | 220 | 19 | 160 | 130 | 120 | -- | -- |
| MW-4 | 05-20-98 | 451.09 | 22.40 | 0.00 | 428.69 | 05-21-98 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-4 | 07-30-98 | 451.09 | 25.74 | 0.00 | 425.35 | 07-30-98 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-4 | 10-29-98 | 451.09 | 31.26 | 0.00 | 419.83 | 10-29-98 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-4 | 03-16-99 | 451.09 | 25.05 | 0.00 | 426.04 | 03-16-99 | 1,900 | 49 | <5 | 43 | <5 | 82 | 1.5 | P |
| MW-4 | 05-05-99 | 451.09 | 26.15 | 0.00 | 424.94 | 05-05-99 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-4 | 08-26-99 | 451.09 | 28.60 | 0.00 | 422.49 | 08-26-99 | Not sampled: well sampled annually, during the first quart | | | | | | 1.43 | |
| MW-4 | 12-03-99 | 451.09 | 31.53 | 0.00 | 419.56 | 12-03-99 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-4 | 03-13-00 | 451.09 | 23.61 | 0.00 | 427.48 | 03-13-00 | <50 | <0.5 | <0.5 | <0.5 | <1 | <3 | 3.82 | P |
| MW-4 | 06-20-00 | 451.09 | 26.38 | 0.00 | 424.71 | 06-20-00 | Not sampled: well sampled annually, during the first quart | | | | | | 0.40 | |
| **MW-4** | **08-31-00** | **451.09** | **29.55** | **0.00** | **421.54** | **08-31-00** | **<50.0** | **<0.500** | **<0.500** | **<0.500** | **<0.500** | **<2.50** | **1.04** | **NP** |
| MW-5 | 03-20-95 | 451.40 | 23.20 | 0.00 | 428.20 | 03-20-95 | 26,000 | 1,300 | 180 | 890 | 2,900 | -- | -- | -- |
| MW-5 | 06-02-95 | 451.40 | 24.80 | 0.00 | 426.60 | 06-02-95 | 39,000 | 940 | 160 | 740 | 1,900 | -- | -- | -- |
| MW-5 | 08-23-95 | 451.40 | 28.10 | 0.00 | 423.30 | 08-23-95 | 14,000 | 490 | 74 | 250 | 890 | <300 | -- | -- |
| MW-5 | 12-04-95 | 451.40 | 29.83 | 0.00 | 421.57 | 12-04-95 | 7,600 | 230 | 13 | 61 | 80 | -- | -- | -- |
| MW-5 | 02-20-96 | 451.40 | 21.63 | 0.00 | 429.77 | 02-20-96 | 4,300 | 220 | 12 | 45 | 130 | <50 | -- | -- |
| MW-5 | 05-15-96 | 451.40 | 22.87 | 0.00 | 428.53 | 05-15-96 | 2,200 | 380 | 17 | 58 | 84 | <40 | -- | -- |
| MW-5 | 08-13-96 | 451.40 | 26.48 | 0.00 | 424.92 | 08-13-96 | 1,700 | 150 | 16 | 24 | 35 | 47 | -- | -- |
| MW-5 | 11-13-96 | 451.40 | 29.68 | 0.00 | 421.72 | 11-13-96 | 850 | 150 | 11 | 19 | 37 | 66 | -- | -- |
| MW-5 | 03-26-97 | 451.40 | 25.14 | 0.00 | 426.26 | 03-26-97 | 2,400 | 440 | 21 | 79 | 210 | 68 | -- | -- |
| MW-5 | 05-15-97 | 451.40 | 27.38 | 0.00 | 424.02 | 05-15-97 | 3,900 | 510 | 19 | 140 | 240 | 48 | -- | -- |
| MW-5 | 08-26-97 | 451.40 | 29.89 | 0.00 | 421.51 | 08-26-97 | 76 | 5 | <0.5 | 2 | 2 | 9 | -- | -- |

# Table 1
## Groundwater Monitoring Data

## ARCO Service Station 771
## 899 Rincon Avenue, Livermore, California

| Well Designation | Monitoring Date | Top of Casing Elevation ft-MSL | Depth to Water | Free Product Thickness feet | Ground-water Elevation ft-MSL | Sample Date | TPHg µg/L | Benzene µg/L | Toluene µg/L | Ethyl-benzene µg/L | Total Xylenes µg/L | MTBE µg/L | Dissolved Oxygen mg/L | Purged/ Not Purged (P/NP) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-5 | 11-05-97 | 451.40 | 32.57 | 0.00 | 418.83 | 11-05-97 | 63 | 1 | <0.5 | <0.5 | 1 | 34 | -- | -- |
| MW-5 | 02-18-98 | 451.40 | 19.99 | 0.00 | 431.41 | 02-18-98 | 6,200 | 630 | 70 | 320 | 640 | 320 | -- | -- |
| MW-5 | 05-20-98 | 451.40 | 23.21 | 0.00 | 428.19 | 05-20-98 | 2,300 | 340 | 21 | 110 | 140 | 62 | -- | -- |
| MW-5 | 07-30-98 | 451.40 | 26.19 | 0.00 | 425.21 | 07-30-98 | <50 | 1 | <0.5 | 1 | 1 | <3 | 8.8 | P |
| MW-5 | 10-29-98 | 451.40 | 31.92 | 0.00 | 419.48 | 10-29-98 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | 2.0 | NP |
| MW-5 | 03-16-99 | 451.40 | 25.80 | 0.00 | 425.60 | 03-16-99 | 1,300 | 170 | 8 | 59 | 65 | 120 | 2.0 | P |
| MW-5 | 05-05-99 | 451.40 | 27.09 | 0.00 | 424.31 | 05-05-99 | 320 | 31 | 1.1 | 13 | 13 | 19 | 12.09 | P |
| MW-5 | 08-26-99 | 451.40 | 29.67 | 0.00 | 421.73 | 08-26-99 | 260 | 13 | 1.7 | 4.2 | 6.3 | 150 | 1.31 | P |
| MW-5 | 12-03-99 | 451.40 | Not surveyed: well inaccessible | | | | | | | | | | | |
| MW-5 | 03-13-00 | 451.40 | 24.51 | 0.00 | 426.89 | 03-13-00 | <50 | <0.5 | <0.5 | <0.5 | <1 | <3 | 4.41 | P |
| MW-5 | 06-20-00 | 451.40 | 27.37 | 0.00 | 424.03 | 06-20-00 | 60.8 | 4.84 | <0.500 | 1.90 | 1.59 | <2.50 | 5.30 | P |
| **MW-5** | **08-31-00** | **451.40** | **30.21** | **0.00** | **421.19** | **08-31-00** | **<50.0** | **1.18** | **<0.500** | **<0.500** | **<0.500** | **3.83** | **0.97** | **P** |
| MW-6 | 03-20-95 | 451.37 | 25.19 | 0.00 | 426.18 | 03-20-95 | 2,600 | 210 | 87 | 82 | 140 | -- | -- | -- |
| MW-6 | 06-02-95 | 451.37 | 25.75 | 0.00 | 425.62 | 06-02-95 | 1,600 | 55 | 8 | 40 | 26 | -- | -- | -- |
| MW-6 | 08-23-95 | 451.37 | 29.53 | 0.00 | 421.84 | 08-23-95 | 1,400 | 42 | 3 | 36 | 13 | <20 | -- | -- |
| MW-6 | 12-04-95 | 451.37 | 32.28 | 0.00 | 419.09 | 12-04-95 | 2,500 | 52 | 6 | 59 | 13 | -- | -- | -- |
| MW-6 | 02-20-96 | 451.37 | 22.27 | 0.00 | 429.10 | 02-20-96 | 2,500 | 120 | 16 | 73 | 12 | <30 | -- | -- |
| MW-6 | 05-15-96 | 451.37 | 23.86 | 0.00 | 427.51 | 05-15-96 | 2,000 | 71 | 6 | 47 | 25 | <15 | -- | -- |
| MW-6 | 08-13-96 | 451.37 | 28.55 | 0.00 | 422.82 | 08-13-96 | 3,800 | 91 | 8 | 69 | 25 | <20 | -- | -- |
| MW-6 | 11-13-96 | 451.37 | 32.04 | 0.00 | 419.33 | 11-13-96 | 1,900 | 55 | 3 | 55 | 9 | 16 | -- | -- |
| MW-6 | 03-26-97 | 451.37 | 26.84 | 0.00 | 424.53 | 03-26-97 | 1,800 | 51 | 5 | 32 | 15 | <30 | -- | -- |
| MW-6 | 05-15-97 | 451.37 | 29.58 | 0.00 | 421.79 | 05-15-97 | 2,400 | 46 | 3 | 29 | 9 | <12 | -- | -- |
| MW-6 | 08-26-97 | 451.37 | 32.67 | 0.00 | 418.70 | 08-26-97 | 1,400 | 61 | 6 | 33 | 10 | <12 | -- | -- |
| MW-6 | 11-05-97 | 451.37 | 34.62 | 0.00 | 416.75 | 11-05-97 | 690 | 29 | 3 | 18 | 3 | 9 | -- | -- |
| MW-6 | 02-18-98 | 451.37 | 20.09 | 0.00 | 431.28 | 02-18-98 | 1,800 | 74 | 5 | 24 | 12 | 19 | -- | -- |
| MW-6 | 05-20-98 | 451.37 | 24.05 | 0.00 | 427.32 | 05-20-98 | 1,900 | 280 | 4 | 31 | 16 | 9 | -- | -- |

# Table 1
## Groundwater Monitoring Data

## ARCO Service Station 771
## 899 Rincon Avenue, Livermore, California

| Well Designation | Monitoring Date | Top of Casing Elevation ft-MSL | Depth to Water | Free Product Thickness feet | Ground-water Elevation ft-MSL | Sample Date | TPHg µg/L | Benzene µg/L | Toluene µg/L | Ethyl-benzene µg/L | Total Xylenes µg/L | MTBE µg/L | Dissolved Oxygen mg/L | Purged/ Not Purged (P/NP) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-6 | 07-30-98 | 451.37 | 28.72 | 0.00 | 422.65 | 07-30-98 | 2,300 | 110 | 7 | 36 | 20 | <15 | NM | P |
| MW-6 | 10-29-98 | 451.37 | 32.77 | 0.00 | 418.60 | 10-29-98 | 2,500 | 14 | 13 | 17 | 12 | <12 | 1.0 | P |
| MW-6 | 03-16-99 | 451.37 | 26.45 | 0.00 | 424.92 | 03-16-99 | 1,200 | 65 | 4 | 27 | 13 | 18 | 0.5 | P |
| MW-6 | 05-05-99 | 451.37 | 27.86 | 0.00 | 423.51 | 05-05-99 | 2,200 | 53 | 4 | 26 | 6 | 25 | 5.59 | P |
| MW-6 | 08-26-99 | 451.37 | 30.49 | 0.00 | 420.88 | 08-26-99 | 1,100 | 11 | 6 | 10 | 4 | 13 | 2.35 | P |
| MW-6 | 12-03-99 | 451.37 | 32.35 | 0.00 | 419.02 | 12-03-99 | 370 | <0.5 | <0.5 | 0.8 | <1 | 4 | 2.36 | P |
| MW-6 | 03-13-00 | 451.37 | 28.36 | 0.00 | 423.01 | 03-13-00 | 54 | 2.1 | 0.5 | 0.9 | 1.4 | <3 | 4.22 | P |
| MW-6 | 06-20-00 | 451.37 | 28.35 | 0.00 | 423.02 | 06-20-00 | 195 | 1.83 | <0.500 | 0.528 | <0.500 | <2.50 | 3.50 | P |
| **MW-6** | **08-31-00** | **451.37** | **30.20** | **0.00** | **421.17** | **08-31-00** | **276** | **3.52** | **0.788** | **1.15** | **0.621** | **8.73** | **7.00** | **P** |
| MW-7 | 03-20-95 | 450.33 | 22.07 | 0.00 | 428.26 | 03-20-95 | 31,000 | 2,300 | 400 | 620 | 2,900 | -- | -- | -- |
| MW-7 | 06-02-95 | 450.33 | 23.42 | 0.00 | 426.91 | 06-03-95 | 40,000 | 1,400 | 280 | 610 | 2,400 | -- | -- | -- |
| MW-7 | 08-23-95 | 450.33 | 27.13 | 0.00 | 423.20 | 08-23-95 | 25,000 | 1,400 | 200 | 600 | 1,600 | 350 | -- | -- |
| MW-7 | 12-04-95 | 450.33 | 29.45 | 0.00 | 420.88 | 12-04-95 | 23,000 | 1,100 | 74 | 490 | 720 | -- | -- | -- |
| MW-7 | 02-20-96 | 450.33 | 20.25 | 0.00 | 430.08 | 02-20-96 | 39,000 | 1,200 | 140 | 640 | 1,800 | <400 | -- | -- |
| MW-7 | 05-15-96 | 450.33 | 21.38 | 0.00 | 428.95 | 05-15-96 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-7 | 08-13-96 | 450.33 | 25.52 | 0.00 | 424.81 | 08-13-96 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-7 | 11-13-96 | 450.33 | 29.38 | 0.00 | 420.95 | 11-13-96 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-7 | 03-26-97 | 450.33 | 24.36 | 0.00 | 425.97 | 03-27-97 | 35,000 | 1,100 | 180 | 460 | 1,700 | <300 | -- | -- |
| MW-7 | 05-15-97 | 450.33 | 26.90 | 0.00 | 423.43 | 05-15-97 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-7 | 08-26-97 | 450.33 | 30.21 | 0.00 | 420.12 | 08-26-97 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-7 | 11-05-97 | 450.33 | 32.49 | 0.00 | 417.84 | 11-05-97 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-7 | 02-18-98 | 450.33 | 18.10 | 0.00 | 432.23 | 02-18-98 | 19,000 | 1,100 | 120 | 460 | 1,700 | 240 | -- | -- |
| MW-7 | 05-20-98 | 450.33 | 21.68 | 0.00 | 428.65 | 05-21-98 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-7 | 07-30-98 | 450.33 | 26.07 | 0.00 | 424.26 | 07-30-98 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-7 | 10-29-98 | 450.33 | 31.13 | 0.00 | 419.20 | 10-29-98 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-7 | 03-16-99 | 450.33 | 24.45 | 0.00 | 425.88 | 03-16-99 | 8,600 | 430 | 51 | 200 | 680 | <120 | 1.5 | P |

# Table 1
## Groundwater Monitoring Data

## ARCO Service Station 771
## 899 Rincon Avenue, Livermore, California

| Well Designation | Monitoring Date | Top of Casing Elevation ft-MSL | Depth to Water | Free Product Thickness feet | Ground-water Elevation ft-MSL | Sample Date | TPHg µg/L | Benzene µg/L | Toluene µg/L | Ethyl-benzene µg/L | Total Xylenes µg/L | MTBE µg/L | Dissolved Oxygen mg/L | Purged/ Not Purged (P/NP) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-7 | 05-05-99 | 450.33 | 25.84 | 0.00 | 424.49 | 05-05-99 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-7 | 08-26-99 | 450.33 | 28.28 | 0.00 | 422.05 | 08-26-99 | Not sampled: well sampled annually, during the first quart | | | | | | 1.51 | |
| MW-7 | 12-03-99 | 450.33 | 31.57 | 0.00 | 418.76 | 12-03-99 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-7 | 03-13-00 | 450.33 | Not surveyed: well inaccessible | | | | | | | | | | | |
| MW-7 | 06-20-00 | 450.33 | 25.91 | 0.00 | 424.42 | 06-20-00 | Not sampled: well sampled annually, during the first quarter | | | | | | 5.40 | |
| **MW-7** | **08-31-00** | **450.33** | **28.40** | **0.00** | **421.93** | **08-31-00** | **8410** | **344** | **58.9** | **276** | **581** | **202** | **0.09** | |
| MW-8 | 03-20-95 | 449.43 | 24.75 | 0.00 | 424.68 | 03-20-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | -- |
| MW-8 | 06-02-95 | 449.43 | 24.95 | 0.00 | 424.48 | 06-02-95 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-8 | 08-23-95 | 449.43 | 30.94 | 0.00 | 418.49 | 08-23-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-8 | 12-04-95 | 449.43 | 31.99 | 0.00 | 417.44 | 12-04-95 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-8 | 02-20-96 | 449.43 | 21.13 | 0.00 | 428.30 | 02-20-96 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-8 | 05-15-96 | 449.43 | 21.96 | 0.00 | 427.47 | 05-15-96 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-8 | 08-13-96 | 449.43 | 30.20 | 0.00 | 419.23 | 08-13-96 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-8 | 11-13-96 | 449.43 | 33.24 | 0.00 | 416.19 | 11-13-96 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-8 | 03-26-97 | 449.43 | 26.85 | 0.00 | 422.58 | 03-26-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-8 | 05-15-97 | 449.43 | 29.69 | 0.00 | 419.74 | 05-15-97 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-8 | 08-26-97 | 449.43 | 34.00 | 0.00 | 415.43 | 08-26-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-8 | 11-05-97 | 449.43 | 35.94 | 0.00 | 413.49 | 11-05-97 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-8 | 02-18-98 | 449.43 | 18.18 | 0.00 | 431.25 | 02-18-98 | <50 | 1 | 1 | <0.5 | 1 | <3 | -- | -- |
| MW-8 | 05-20-98 | 449.43 | 22.85 | 0.00 | 426.58 | 05-20-98 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-8 | 07-30-98 | 449.43 | 30.31 | 0.00 | 419.12 | 07-30-98 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | 8.2 | NP |
| MW-8 | 10-29-98 | 449.43 | 35.88 | 0.00 | 413.55 | 10-29-98 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-8 | 03-16-99 | 449.43 | 28.50 | 0.00 | 420.93 | 03-16-99 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | 1.0 | NP |
| MW-8 | 05-05-99 | 449.43 | 29.76 | 0.00 | 419.67 | 05-05-99 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-8 | 08-26-99 | 449.43 | 33.51 | 0.00 | 415.92 | 08-26-99 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | 4.93 | P |
| MW-8 | 12-03-99 | 449.43 | 35.83 | 0.00 | 413.60 | 12-03-99 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |

# Table 1
## Groundwater Monitoring Data

## ARCO Service Station 771
## 899 Rincon Avenue, Livermore, California

| Well Designation | Monitoring Date | Top of Casing Elevation ft-MSL | Depth to Water | Free Product Thickness feet | Ground-water Elevation ft-MSL | Sample Date | TPHg µg/L | Benzene µg/L | Toluene µg/L | Ethyl-benzene µg/L | Total Xylenes µg/L | MTBE µg/L | Dissolved Oxygen mg/L | Purged/ Not Purged (P/NP) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-8 | 03-13-00 | 449.43 | 26.12 | 0.00 | 423.31 | 03-13-00 | <50 | <0.5 | <0.5 | <0.5 | <1 | <3 | 2.81 | P |
| MW-8 | 06-20-00 | 449.43 | 30.91 | 0.00 | 418.52 | 06-20-00 | Not sampled: well sampled semi-annually, during the first and thi | | | | | | 5.80 | |
| **MW-8** | **08-31-00** | **449.43** | **33.70** | **0.00** | **415.73** | **08-31-00** | **Well no longer part of sampling schedule----------** | | | | | | | |
| MW-9 | 03-20-95 | 449.21 | 19.11 | 0.00 | 430.10 | 03-20-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | - - | - - | - - |
| MW-9 | 06-02-95 | 449.21 | 21.23 | 0.00 | 427.98 | 06-02-95 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-9 | 08-23-95 | 449.21 | 24.33 | 0.00 | 424.88 | 08-23-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | - - | - - |
| MW-9 | 12-04-95 | 449.21 | 27.90 | 0.00 | 421.31 | 12-04-95 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-9 | 02-20-96 | 449.21 | 17.86 | 0.00 | 431.35 | 02-20-96 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | - - | - - |
| MW-9 | 05-15-96 | 449.21 | 18.69 | 0.00 | 430.52 | 05-15-96 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-9 | 08-13-96 | 449.21 | 24.17 | 0.00 | 425.04 | 08-13-96 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-9 | 11-13-96 | 449.21 | 28.01 | 0.00 | 421.20 | 11-13-96 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-9 | 03-26-97 | 449.21 | 22.58 | 0.00 | 426.63 | 03-26-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | - - | - - |
| MW-9 | 05-15-97 | 449.21 | 25.12 | 0.00 | 424.09 | 05-15-97 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-9 | 08-26-97 | 449.21 | 28.28 | 0.00 | 420.93 | 08-26-97 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-9 | 11-05-97 | 449.21 | 31.18 | 0.00 | 418.03 | 11-05-97 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-9 | 02-18-98 | 449.21 | 16.03 | 0.00 | 433.18 | 02-18-98 | <50 | 1 | 1 | <0.5 | 1 | <3 | - - | - - |
| MW-9 | 05-20-98 | 449.21 | 19.31 | 0.00 | 429.90 | 05-20-98 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-9 | 07-30-98 | 449.21 | 24.90 | 0.00 | 424.31 | 07-30-98 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-9 | 10-29-98 | 449.21 | 30.08 | 0.00 | 419.13 | 10-29-98 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-9 | 03-16-99 | 449.21 | 22.68 | 0.00 | 426.53 | 03-16-99 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | 1.0 | P |
| MW-9 | 05-05-99 | 449.21 | 23.82 | 0.00 | 425.39 | 05-05-99 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-9 | 08-26-99 | 449.21 | 26.57 | 0.00 | 422.64 | 08-26-99 | Not sampled: well sampled annually, during the first quarter | | | | | | 5.08 | |
| MW-9 | 12-03-99 | 449.21 | Not surveyed: well inaccessible | | | | | | | | | | | |
| MW-9 | 03-13-00 | 449.21 | 25.62 | 0.00 | 423.59 | 03-13-00 | <50 | <0.5 | <0.5 | <0.5 | <1 | <3 | 5.43 | P |
| MW-9 | 06-20-00 | 449.21 | 23.55 | 0.00 | 425.66 | 06-20-00 | Not sampled: well sampled annually, during the first quarter | | | | | | 6.20 | |
| **MW-9** | **08-31-00** | **449.21** | **27.39** | **0.00** | **421.82** | **08-31-00** | **Well no longer part of sampling schedule----------** | | | | | | | |

# Table 1
## Groundwater Monitoring Data

## ARCO Service Station 771
## 899 Rincon Avenue, Livermore, California

| Well Designation | Monitoring Date | Top of Casing Elevation ft-MSL | Depth to Water | Free Product Thickness feet | Ground-water Elevation ft-MSL | Sample Date | TPHg µg/L | Benzene µg/L | Toluene µg/L | Ethyl-benzene µg/L | Total Xylenes µg/L | MTBE µg/L | Dissolved Oxygen mg/L | Purged/ Not Purged (P/NP) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-10 | 03-20-95 | 449.22 | 20.96 | 0.00 | 428.26 | 03-20-95 | Not sampled: well sampled annually, during the third quarter | | | | | | | |
| MW-10 | 06-02-95 | 449.22 | 22.15 | 0.00 | 427.07 | 06-02-95 | Not sampled: well sampled annually, during the third quarter | | | | | | | |
| MW-10 | 08-23-95 | 449.22 | 24.47 | 0.00 | 424.75 | 08-23-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-10 | 12-04-95 | 449.22 | 26.97 | 0.00 | 422.25 | 12-04-95 | Not sampled: well sampled annually, during the third quarter | | | | | | | |
| MW-10 | 02-20-96 | 449.22 | 18.40 | 0.00 | 430.82 | 02-20-96 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-10 | 05-15-96 | 449.22 | NM | -- | NM | 05-15-96 | Not surveyed: vehicle was parked on well | | | | | | | |
| MW-10 | 08-13-96 | 449.22 | 23.70 | 0.00 | 425.52 | 08-13-96 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-10 | 11-13-96 | 449.22 | 27.15 | 0.00 | 422.07 | 11-13-96 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-10 | 03-26-97 | 449.22 | 22.23 | 0.00 | 426.99 | 03-26-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-10 | 05-15-97 | 449.22 | 24.57 | 0.00 | 424.65 | 05-15-97 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-10 | 08-26-97 | 449.22 | 27.62 | 0.00 | 421.60 | 08-26-97 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-10 | 11-05-97 | 449.22 | 30.79 | 0.00 | 418.43 | 11-05-97 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-10 | 02-18-98 | 449.22 | NM | -- | NM | 02-18-98 | Not sampled: car parked on well | | | | | | | |
| MW-10 | 05-20-98 | 449.22 | NM | -- | NM | 05-20-98 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-10 | 07-30-98 | 449.22 | 23.90 | 0.00 | 425.32 | 07-30-98 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-10 | 10-29-98 | 449.22 | 30.55 | 0.00 | 418.67 | 10-29-98 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-10 | 03-16-99 | 449.22 | 23.05 | 0.00 | 426.17 | 03-16-99 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | 1.0 | P |
| MW-10 | 05-05-99 | 449.22 | 24.00 | 0.00 | 425.22 | 05-05-99 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-10 | 08-26-99 | 449.22 | 26.50 | 0.00 | 422.72 | 08-26-99 | Not sampled: well sampled annually, during the first quarter | | | | | | 5.15 | |
| MW-10 | 12-03-99 | 449.22 | 30.80 | 0.00 | 418.42 | 12-03-99 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| MW-10 | 03-13-00 | 449.22 | 26.21 | 0.00 | 423.01 | 03-13-00 | Not sampled: vehicle was parked on well | | | | | | | |
| MW-10 | 06-20-00 | 449.22 | 23.52 | 0.00 | 425.70 | 06-20-00 | Not sampled: well sampled annually, during the first quarter | | | | | | 5.5 | |
| **MW-10** | **08-31-00** | **449.22** | **27.52** | **0.00** | **421.70** | **08-31-00** | **Well no longer part of sampling schedule**---------- | | | | | | | |
| MW-11 | 03-20-95 | 448.02 | 25.02 | 0.00 | 423.00 | 03-20-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- | -- |
| MW-11 | 06-02-95 | 448.02 | 23.82 | 0.00 | 424.20 | 06-02-95 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |

# Table 1
## Groundwater Monitoring Data

## ARCO Service Station 771
## 899 Rincon Avenue, Livermore, California

| Well Designation | Monitoring Date | Top of Casing Elevation ft-MSL | Depth to Water | Free Product Thickness feet | Ground-water Elevation ft-MSL | Sample Date | TPHg µg/L | Benzene µg/L | Toluene µg/L | Ethyl-benzene µg/L | Total Xylenes µg/L | MTBE µg/L | Dissolved Oxygen mg/L | Purged/ Not Purged (P/NP) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-11 | 08-23-95 | 448.02 | 30.15 | 0.00 | 417.87 | 08-23-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-11 | 12-04-95 | 448.02 | 31.63 | 0.00 | 416.39 | 12-04-95 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-11 | 02-20-96 | 448.02 | 20.94 | 0.00 | 427.08 | 02-20-96 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-11 | 05-15-96 | 448.02 | 23.03 | 0.00 | 424.99 | 05-15-96 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-11 | 08-13-96 | 448.02 | 29.19 | 0.00 | 418.83 | 08-13-96 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-11 | 11-13-96 | 448.02 | 31.96 | 0.00 | 416.06 | 11-13-96 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-11 | 03-26-97 | 448.02 | 26.61 | 0.00 | 421.41 | 03-26-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-11 | 05-15-97 | 448.02 | 29.39 | 0.00 | 418.63 | 05-15-97 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-11 | 08-26-97 | 448.02 | 33.47 | 0.00 | 414.55 | 08-26-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- | -- |
| MW-11 | 11-05-97 | 448.02 | 35.12 | 0.00 | 412.90 | 11-05-97 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-11 | 02-18-98 | 448.02 | 18.03 | 0.00 | 429.99 | 02-18-98 | <50 | <0.5 | <0.5 | <0.5 | 1 | <3 | -- | -- |
| MW-11 | 05-20-98 | 448.02 | 23.00 | 0.00 | 425.02 | 05-20-98 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-11 | 07-30-98 | 448.02 | 29.30 | 0.00 | 418.72 | 07-30-98 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | 5.6 | P |
| MW-11 | 10-29-98 | 448.02 | 34.47 | 0.00 | 413.55 | 10-29-98 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-11 | 03-16-99 | 448.02 | 27.88 | 0.00 | 420.14 | 03-16-99 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | 1.0 | P |
| MW-11 | 05-05-99 | 448.02 | 26.85 | 0.00 | 421.17 | 05-05-99 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-11 | 08-26-99 | 448.02 | 32.74 | 0.00 | 415.28 | 08-26-99 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | 4.59 | P |
| MW-11 | 12-03-99 | 448.02 | 34.70 | 0.00 | 413.32 | 12-03-99 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | | |
| MW-11 | 03-13-00 | 448.02 | 25.94 | 0.00 | 422.08 | 03-13-00 | <50 | <0.5 | <0.5 | <0.5 | <1 | <3 | 3.21 | P |
| MW-11 | 06-20-00 | 448.02 | 30.40 | 0.00 | 417.62 | 06-20-00 | Not sampled: well sampled semi-annually, during the first and thir | | | | | | 3.30 | |
| **DUP** | **08-31-00** | -- | -- | -- | -- | **08-31-00** | **<50.0** | **<0.500** | **<0.500** | **<0.500** | **<0.500** | **<2.50** | -- | -- |
| **MW-11** | **08-31-00** | **448.02** | **32.68** | **0.00** | **415.34** | **08-31-00** | **<50.0** | **<0.500** | **<0.500** | **<0.500** | **<0.500** | **<2.50** | **0.40** | **NP** |
| RW-1 | 03-20-95 | 451.67 | 23.76 | 0.00 | 427.91 | 03-20-95 | 15,000 | 1,000 | 140 | 310 | 950 | -- | -- | -- |
| RW-1 | 06-02-95 | 451.67 | 25.12 | 0.00 | 426.55 | 06-02-95 | 12,000 | 1,300 | 280 | 420 | 1,100 | -- | -- | -- |
| RW-1 | 08-23-95 | 451.67 | 28.80 | 0.00 | 422.87 | 08-23-95 | 8,200 | 520 | 190 | 240 | 610 | <50 | -- | -- |
| RW-1 | 12-04-95 | 451.67 | 31.15 | 0.00 | 420.52 | 12-04-95 | 2,600 | 140 | 59 | 83 | 210 | -- | -- | -- |

# Table 1
## Groundwater Monitoring Data

## ARCO Service Station 771
## 899 Rincon Avenue, Livermore, California

| Well Designation | Monitoring Date | Top of Casing Elevation ft-MSL | Depth to Water | Free Product Thickness feet | Ground-water Elevation ft-MSL | Sample Date | TPHg µg/L | Benzene µg/L | Toluene µg/L | Ethyl-benzene µg/L | Total Xylenes µg/L | MTBE µg/L | Dissolved Oxygen mg/L | Purged/ Not Purged (P/NP) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RW-1 | 02-20-96 | 451.67 | 21.45 | 0.00 | 430.22 | 02-20-96 | 6,300 | 410 | 160 | 180 | 650 | <40 | -- | -- |
| RW-1 | 05-15-96 | 451.67 | 22.97 | 0.00 | 428.70 | 05-15-96 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| RW-1 | 08-13-96 | 451.67 | 24.74 | 0.00 | 426.93 | 08-13-96 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| RW-1 | 11-13-96 | 451.67 | 30.69 | 0.00 | 420.98 | 11-13-96 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| RW-1 | 03-26-97 | 451.67 | 25.69 | 0.00 | 425.98 | 03-26-97 | 500 | 57 | 3 | 6 | 18 | 54 | -- | -- |
| RW-1 | 05-15-97 | 451.67 | 28.19 | 0.00 | 423.48 | 05-15-97 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| RW-1 | 08-26-97 | 451.67 | 31.21 | 0.00 | 420.46 | 08-26-97 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| RW-1 | 11-05-97 | 451.67 | 33.67 | 0.00 | 418.00 | 11-05-97 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| RW-1 | 02-18-98 | 451.67 | 20.14 | 0.00 | 431.53 | 02-18-98 | 9,400 | 200 | 70 | 190 | 710 | <60 | -- | -- |
| RW-1 | 05-20-98 | 451.67 | 23.43 | 0.00 | 428.24 | 05-20-98 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| RW-1 | 07-30-98 | 451.67 | 27.42 | 0.00 | 424.25 | 07-30-98 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| RW-1 | 10-29-98 | 451.67 | 32.47 | 0.00 | 419.20 | 10-29-98 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| RW-1 | 03-16-99 | 451.67 | 25.45 | 0.00 | 426.22 | 03-16-99 | 1,100 | 140 | 19 | 45 | 83 | 530 | 1.0 | NP |
| RW-1 | 05-05-99 | 451.67 | 27.23 | 0.00 | 424.44 | 05-05-99 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| RW-1 | 08-26-99 | 451.67 | 29.98 | 0.00 | 421.69 | 08-26-99 | Not sampled: well sampled annually, during the first quarter | | | | | | 1.39 | |
| RW-1 | 12-03-99 | 451.67 | 32.38 | 0.00 | 419.29 | 12-03-99 | Not sampled: well sampled annually, during the first quarter | | | | | | | |
| RW-1 | 03-13-00 | 451.67 | 25.53 | 0.00 | 426.14 | 03-13-00 | 1,100 | 130 | 3.5 | 0.7 | 95 | 230 | 4.43 | NP |
| RW-1 | 06-20-00 | 451.67 | 28.31 | 0.00 | 423.36 | 06-20-00 | Not sampled: well sampled annually, during the first quarter | | | | | | 1.90 | |
| **RW-1** | **08-31-00** | **451.67** | **30.61** | **0.00** | **421.06** | **08-31-00** | **<50.0** | **<0.500** | **<0.500** | **<0.500** | **<0.500** | **82.5** | **3.21** | **NP** |
| **VW-1** | **08-31-00** | **NM** | **30.61** | **0.00** | **NM** | **08-31-00** | **<50.0** | **<0.500** | **<0.500** | **<0.500** | **<0.500** | **<2.50** | **10.08** | **P** |

ft-MSL: elevation in feet, relative to mean sea level

TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method

MTBE: Methyl tert-butyl ether

EPA: United States Environmental Protection Agency

*: EPA method 8020 prior to 12/03/99

# Table 1
## Groundwater Monitoring Data

## ARCO Service Station 771
## 899 Rincon Avenue, Livermore, California

| Well Designation | Monitoring Date | Top of Casing Elevation ft-MSL | Depth to Water | Free Product Thickness feet | Ground-water Elevation ft-MSL | Sample Date | TPHg µg/L | Benzene µg/L | Toluene µg/L | Ethyl-benzene µg/L | Total Xylenes µg/L | MTBE µg/L | Dissolved Oxygen mg/L | Purged/ Not Purged (P/NP) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method

TRPH: total recoverable petroleum hydrocarbons

µg/L: micrograms per liter

mg/L: milligrams per liter

NM: not measured

- -: not analyzed or not applicable

<: less than laboratory detection limit stated to the right

**: For previous historical groundwater elevation and analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results and Remediation System Performance Evaluation Report, ARCO Service Station 771, Livermore, California*, (EMCON, March 1, 1996).

# Table 2
## Groundwater Flow Direction and Gradient
## 1995 - Present

## ARCO Service Station 771
## 899 Rincon Avenue, Livermore, California

| Date Measured | Average Flow Direction | Average Hydraulic Gradient |
|---|---|---|
| 03-20-95 | Northwest | 0.03 |
| 06-02-95 | North-Northwest | 0.014 |
| 08-23-95 | North-Northwest | 0.03 |
| 12-04-95 | North-Northwest | 0.03 |
| 02-20-96 | Northwest | 0.016 |
| 05-15-96 | Northwest | 0.024 |
| 08-13-96 | North-Northwest | 0.03 |
| 11-13-96 | North-Northwest | 0.031 |
| 03-26-97 | North-Northwest | 0.044 |
| 05-15-97 | North-Northwest | 0.031 |
| 08-26-97 | North-Northwest | 0.042 |
| 11-05-97 | North-Northwest | 0.03 |
| 02-18-98 | Northwest | 0.01 |
| 05-20-98 | Northwest | 0.03 |
| 07-30-98 | North | 0.04 |
| 10-29-98 | North | 0.005 |
| 03-16-99 | North-Northwest | 0.03 |
| 05-05-99 | North | 0.04 |
| 08-26-99 | North-Northwest | 0.05 |
| 12-03-99 | North-Northeast | 0.06 |
| 03-13-00 | North-Northwest | 0.066 |
| 06/20/00 | North-Northwest | 0.050 |
| **08/31/00** | **North-Northwest** | **0.062** |

# APPENDIX A

# SAMPLING AND ANALYSIS PROCEDURES

# APPENDIX A

# SAMPLING AND ANALYSIS PROCEDURES

The sampling and analysis procedures for water quality monitoring programs are contained in this appendix. The procedures provided for consistent and reproducible sampling methods, proper application of analytical methods, and accurate and precise analytical results. Finally, these procedures provided guidelines so that the overall objectives of the monitoring program were achieved.

The following documents have been used as guidelines for developing these procedures:

- Procedures Manual for Groundwater Monitoring at Solid Waste Disposal Facilities, Environmental Protection Agency (EPA)-530/SW-611, August 1977
- Resource Conservation and Recovery Act (RCRA) Groundwater Monitoring Technical Enforcement Guidance Document, Office of Solid Waste and Emergency Response (OSWER) 9950.1, September 1986
- Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, EPA SW-846, 3rd edition, November 1986
- Methods for Organic Chemical Analysis of Municipal and Industrial Waste Water, EPA-600/4-82-057, July 1982
- Methods for Organic Chemical Analysis of Water and Wastes, EPA-600/4-79-020, revised March 1983
- Leaking Underground Fuel Tank (LUFT) Field Manual, California State Water Resources Control Board, revised October 1989

## Sample Collection

Sample collection procedures include equipment cleaning, water level and total well depth measurements, and well purging and sampling.

## Equipment Cleaning

Before the sampling event was started, equipment that was used to sample groundwater was disassembled and cleaned with detergent water and then rinsed with tap water. During field sampling, equipment surfaces that were placed in the well or came into contact with groundwater during field sampling were washed with detergent and double rinsed with tap water before the next well was purged or sampled.

## Water Level, Floating Hydrocarbon, and Total Well Depth Measurements

Before purging and sampling occurred, the depth to water, floating hydrocarbon thickness and total well depth were measured using an oil/water interface measuring system. The oil/water interface measuring system consists of a probe that emits a continuous audible tone when immersed in a nonconductive fluid, such as oil or gasoline and an intermittent tone when immersed in a conductive fluid, such as water. The floating hydrocarbon thickness and water level were measured by lowering the probe into the well. Liquid levels were recorded relative to the tone emitted at the groundwater surface. The sonic probe was decontaminated after each use. A bottom-filling, clear disposable bailer was used to verify floating hydrocarbon thickness measurements of less than 0.02 foot. Alternatively, an electric sounder and a bottom-filling Teflon bailer may have been used to record floating hydrocarbon thickness and depth to water.

The electric sounder is a transistorized instrument that uses a reel-mounted, two-conductor, coaxial cable that connects the control panel to the sensor. Cable markings are stamped at 1-foot intervals. The water level was measured by lowering the sensor into the monitoring well. A low-current circuit was completed when the sensor contacted the water, which served as an electrolyte. The current was amplified and fed into an indicator light and audible buzzer, signaling when water had been contacted. A sensitivity control compensated for highly saline or conductive water. The electric sounder was decontaminated after each use. The bailer was lowered to a point just below the liquid level, retrieved, and observed for floating hydrocarbon.

Liquid measurements were recorded to the nearest 0.01 foot on the depth to water/floating product survey form. The groundwater elevation at each monitoring well was calculated by subtracting the measured depth to water from the surveyed elevation of the top of the well casing. (Every attempt was made to measure depth to water for all wells on the same day.) Total well depth was then measured by lowering the sensor to the bottom of the well. Total well depth, used to calculate purge volumes and to determine whether the well screen was partially obstructed by silt, was recorded to the nearest 0.1 foot on the depth to water/floating product survey form.

## Well Purging

If the depth to groundwater was above the top of screens of the monitoring wells, then the wells were purged, otherwise non-purge groundwater samples were collected. Before sampling occurred, a polyvinyl chloride (PVC) bailer, centrifugal pump, low-flow submersible pump, or disposable bailer was used to purge standing water in the casing and gravel pack from the monitoring well. In most monitoring wells, the amount of water purged before sampling was greater than or equal to three casing volumes. Some monitoring wells were expected to be evacuated to dryness after removing fewer than three casing volumes. These low-yield monitoring wells were allowed to recharge for up to 24 hours. Samples were obtained as soon as the monitoring wells recharged to a level sufficient for sample collection. If insufficient water recharged after 24 hours, the monitoring well was recorded as dry for the sampling event.

Groundwater purged from the monitoring wells was transported in a 240-gallon truck-mounted tank to Integrated Waste Management's Milpitas storage facility for disposal.

Field measurements of pH, specific conductance, and temperature were recorded in a waterproof field logbook. Field data sheets were reviewed for completeness by the sampling coordinator after the sampling event was completed.

The pH, specific conductance, and temperature meter were calibrated each day before field activities were begun. The calibration was checked once each day to verify meter performance. Field meter calibrations were recorded on the water sample field data sheet.

## Well Sampling

A disposable bailer was the only equipment acceptable for well sampling. When samples for volatile organic analysis were being collected, the flow of groundwater from the bailer was regulated to minimize turbulence and aeration. Glass bottles of at least 40-milliliters volume and fitted with Teflon-lined septa were used in sampling for volatile organics. These bottles were filled completely to prevent air from remaining in the bottle. A positive meniscus formed when the bottle was completely full. A convex Teflon septum was placed over the positive meniscus to eliminate air. After the bottle was capped, it was inverted and tapped to verify that it contained no air bubbles. The sample containers for other parameters were filled, filtered as required, and capped.

When required, dissolved concentrations of metals were determined using appropriate field filtration techniques. The sample was filtered by emptying the contents of the disposable bailer into a pressure transfer vessel. A disposable 0.45-micron acrylic copolymer filter was threaded onto the transfer vessel at the discharge point, and the vessel was sealed. Pressure was applied to the vessel with a hand pump and the filtrate directed into the appropriate containers. Each filter was used once and discarded.

## Sample Preservation and Handling

The following section specifies sample containers, preservation methods, and sample handling procedures.

### Sample Containers and Preservation

Sample containers vary with each type of analytical parameter. Container types and materials were selected to be nonreactive with the particular analytical parameter tested.

### Sample Handling

Sample containers were labeled immediately prior to sample collection. Samples were kept cool with cold packs or ice until received by the laboratory. At the time of sampling, each sample was logged on an ARCO chain-of-custody record that accompanied the sample to the laboratory. Samples that required overnight storage prior to shipping to the laboratory were kept cool (4° C) in a refrigerator.

Samples were transferred from Cambria to an ARCO-approved laboratory by courier or taken directly to the laboratory by the environmental sampler. Sample shipments from Cambria to laboratories performing the selected analyses routinely occurred within 24 hours of sample collection.

## Sample Documentation

The following procedures were used during sampling and analysis to provide chain-of-custody control during sample handling from collection through storage. Sample documentation included the use of the following:

- Water sample field data sheets to document sampling activities in the field
- Labels to identify individual samples
- Chain-of-custody record sheets for documenting possession and transfer of samples
- Laboratory analysis request sheets for documenting analyses to be performed

### Field Logbook

In the field, the sampler recorded the following information on the water sample field data sheet (see Figure A-2) for each sample collected:

- Project number
- Client's name
- Location
- Name of sampler
- Date and time
- Well accessibility and integrity
- Pertinent well data (e.g., casing diameter, depth to water, well depth)
- Calculated and actual purge volumes
- Purging equipment used
- Sampling equipment used
- Appearance of each sample (e.g., color, turbidity, sediment)
- Results of field analyses (temperature, pH, specific conductance)
- General comments

The water sample field data sheet was signed by the sampler and reviewed by the sampling coordinator.

## Labels

Sample labels contained the following information:

- Project number
- Sample number (i.e., well designation)
- Sample depth
- Sampler's initials
- Date and time of collection
- Type of preservation used (if any)

## Sampling and Analysis Chain-of-Custody Record

The ARCO chain-of-custody record initiated at the time of sampling contained, at a minimum, the sample designation (including the depth at which the sample was collected), sample type, analytical request, date of sampling, and the name of the sampler. The record sheet was signed, timed, and dated by the sampler when transferring the samples. The number of custodians in the chain of possession was minimized. A copy of the ARCO chain-of-custody record was returned to Cambria with the analytical results.

## Groundwater Sampling and Analysis Request Form

A groundwater sampling and analysis request form (see Figure A-3) was used to communicate to the environmental sampler the requirements of the monitoring event. At a minimum, the groundwater sampling and analysis request form included the following information:

- Date scheduled
- Site-specific instructions
- Specific analytical parameters
- Well number
- Well specifications (expected total depth, depth of water, and product thickness)

# APPENDIX B

# CERTIFIED ANALYTICAL REPORTS, AND CHAIN-OF-CUSTODY DOCUMENTATION

Sequoia
Analytical

885 Jarvis Drive
Morgan Hill, CA 95037
(408) 776-9600
FAX (408) 782-6308
www.sequoialabs.com

15 September, 2000

Darryk Attaide
Cambria - Oakland
1144 65th St, Suite B
Oakland, CA 94608

RE: Arco 0771
Sequoia Report: MJI0124

Enclosed are the results of analyses for samples received by the laboratory on 09/06/00 18:51. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jeff Smyly
Project Manager

CA ELAP Certificate #1210

Sequoia Analytical

885 Jarvis Drive
Morgan Hill, CA 95037
(408) 776-9600
FAX (408) 782-6308
www.sequoialabs.com

| | | |
|---|---|---|
| Cambria - Oakland | Project: Arco 0771 | |
| 1144 65th St, Suite B | Project Number: Livermore | **Reported:** |
| Oakland CA, 94608 | Project Manager: Darryk Attaide | 09/15/00 18:15 |

## ANALYTICAL REPORT FOR SAMPLES

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| MW-2 | MJI0124-01 | Water | 08/31/00 16:15 | 09/06/00 18:51 |
| MW-4 | MJI0124-02 | Water | 08/31/00 13:45 | 09/06/00 18:51 |
| MW-5 | MJI0124-03 | Water | 08/31/00 13:27 | 09/06/00 18:51 |
| MW-6 | MJI0124-04 | Water | 08/31/00 16:10 | 09/06/00 18:51 |
| MW-7 | MJI0124-05 | Water | 08/31/00 16:02 | 09/06/00 18:51 |
| MW-11 | MJI0124-06 | Water | 08/31/00 12:30 | 09/06/00 18:51 |
| RW-1 | MJI0124-07 | Water | 08/31/00 15:10 | 09/06/00 18:51 |
| VW-1 | MJI0124-08 | Water | 08/31/00 14:10 | 09/06/00 18:51 |
| DUP | MJI0124-09 | Water | 08/31/00 00:00 | 09/06/00 18:51 |

Sequoia Analytical - Morgan Hill

Jeff Smyly, Project Manager

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Sequoia Analytical

885 Jarvis Drive
Morgan Hill, CA 95037
(408) 776-9600
FAX (408) 782-6308
www.sequoialabs.com

| | | |
|---|---|---|
| Cambria - Oakland | Project: Arco 0771 | |
| 1144 65th St, Suite B | Project Number: Livermore | **Reported:** |
| Oakland CA, 94608 | Project Manager: Darryk Attaide | 09/15/00 18:15 |

## Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT

## Sequoia Analytical - Morgan Hill

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **MW-2 (MJI0124-01) Water Sampled: 08/31/00 16:15 Received: 09/06/00 18:51** | | | | | | | | | |
| **Purgeable Hydrocarbons** | **87.1** | 50.0 | ug/l | 1 | 0I12003 | 09/12/00 | 09/12/00 | DHS LUFT | P-01 |
| **Benzene** | **1.78** | 0.500 | " | " | " | " | " | " | |
| Toluene | ND | 0.500 | " | " | " | " | " | " | |
| **Ethylbenzene** | **1.33** | 0.500 | " | " | " | " | " | " | |
| **Xylenes (total)** | **1.15** | 0.500 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 2.50 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *105 %* | *70-130* | | " | " | " | " | |
| **MW-4 (MJI0124-02) Water Sampled: 08/31/00 13:45 Received: 09/06/00 18:51** | | | | | | | | | |
| Purgeable Hydrocarbons | ND | 50.0 | ug/l | 1 | 0I12003 | 09/12/00 | 09/12/00 | DHS LUFT | |
| Benzene | ND | 0.500 | " | " | " | " | " | " | |
| Toluene | ND | 0.500 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.500 | " | " | " | " | " | " | |
| Xylenes (total) | ND | 0.500 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 2.50 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *97.8 %* | *70-130* | | " | " | " | " | |
| **MW-5 (MJI0124-03) Water Sampled: 08/31/00 13:27 Received: 09/06/00 18:51** | | | | | | | | | |
| Purgeable Hydrocarbons | ND | 50.0 | ug/l | 1 | 0I12003 | 09/12/00 | 09/12/00 | DHS LUFT | |
| **Benzene** | **1.18** | 0.500 | " | " | " | " | " | " | |
| Toluene | ND | 0.500 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.500 | " | " | " | " | " | " | |
| Xylenes (total) | ND | 0.500 | " | " | " | " | " | " | |
| **Methyl tert-butyl ether** | **3.83** | 2.50 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *90.6 %* | *70-130* | | " | " | " | " | |

Sequoia Analytical

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| | | |
|---|---|---|
| Cambria - Oakland | Project: Arco 0771 | |
| 1144 65th St, Suite B | Project Number: Livermore | **Reported:** |
| Oakland CA, 94608 | Project Manager: Darryk Attaide | 09/15/00 18:15 |

## Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT

## Sequoia Analytical - Morgan Hill

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **MW-6 (MJI0124-04) Water Sampled: 08/31/00 16:10 Received: 09/06/00 18:51** | | | | | | | | | |
| **Purgeable Hydrocarbons** | **276** | 50.0 | ug/l | 1 | 0I12003 | 09/12/00 | 09/12/00 | DHS LUFT | P-01 |
| **Benzene** | **3.52** | 0.500 | " | " | " | " | " | " | |
| **Toluene** | **0.788** | 0.500 | " | " | " | " | " | " | |
| **Ethylbenzene** | **1.15** | 0.500 | " | " | " | " | " | " | |
| **Xylenes (total)** | **0.621** | 0.500 | " | " | " | " | " | " | |
| **Methyl tert-butyl ether** | **8.73** | 2.50 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *99.1 %* | *70-130* | | " | " | " | " | |
| **MW-7 (MJI0124-05) Water Sampled: 08/31/00 16:02 Received: 09/06/00 18:51** | | | | | | | | | |
| **Purgeable Hydrocarbons** | **8410** | 1000 | ug/l | 20 | 0I12003 | 09/12/00 | 09/12/00 | DHS LUFT | P-01 |
| **Benzene** | **344** | 10.0 | " | " | " | " | " | " | |
| **Toluene** | **58.9** | 10.0 | " | " | " | " | " | " | |
| **Ethylbenzene** | **276** | 10.0 | " | " | " | " | " | " | |
| **Xylenes (total)** | **581** | 10.0 | " | " | " | " | " | " | |
| **Methyl tert-butyl ether** | **202** | 50.0 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *150 %* | *70-130* | | " | " | " | " | *S-02* |
| **MW-11 (MJI0124-06) Water Sampled: 08/31/00 12:30 Received: 09/06/00 18:51** | | | | | | | | | |
| Purgeable Hydrocarbons | ND | 50.0 | ug/l | 1 | 0I12003 | 09/12/00 | 09/12/00 | DHS LUFT | |
| Benzene | ND | 0.500 | " | " | " | " | " | " | |
| Toluene | ND | 0.500 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.500 | " | " | " | " | " | " | |
| Xylenes (total) | ND | 0.500 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 2.50 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *100 %* | *70-130* | | " | " | " | " | |

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| | | |
|---|---|---|
| Cambria - Oakland | Project: Arco 0771 | |
| 1144 65th St, Suite B | Project Number: Livermore | **Reported:** |
| Oakland CA, 94608 | Project Manager: Darryk Attaide | 09/15/00 18:15 |

## Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT

## Sequoia Analytical - Morgan Hill

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **RW-1 (MJI0124-07) Water Sampled: 08/31/00 15:10 Received: 09/06/00 18:51** | | | | | | | | | |
| Purgeable Hydrocarbons | ND | 50.0 | ug/l | 1 | 0112003 | 09/12/00 | 09/12/00 | DHS LUFT | |
| Benzene | ND | 0.500 | " | " | " | " | " | " | |
| Toluene | ND | 0.500 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.500 | " | " | " | " | " | " | |
| Xylenes (total) | ND | 0.500 | " | " | " | " | " | " | |
| **Methyl tert-butyl ether** | **82.5** | 2.50 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *97.8 %* | | *70-130* | | " | " | " | |
| **VW-1 (MJI0124-08) Water Sampled: 08/31/00 14:10 Received: 09/06/00 18:51** | | | | | | | | | |
| Purgeable Hydrocarbons | ND | 50.0 | ug/l | 1 | 0112003 | 09/12/00 | 09/12/00 | DHS LUFT | |
| Benzene | ND | 0.500 | " | " | " | " | " | " | |
| Toluene | ND | 0.500 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.500 | " | " | " | " | " | " | |
| Xylenes (total) | ND | 0.500 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 2.50 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *92.0 %* | | *70-130* | | " | " | " | |
| **DUP (MJI0124-09) Water Sampled: 08/31/00 00:00 Received: 09/06/00 18:51** | | | | | | | | | |
| Purgeable Hydrocarbons | ND | 50.0 | ug/l | 1 | 0112003 | 09/12/00 | 09/12/00 | DHS LUFT | |
| Benzene | ND | 0.500 | " | " | " | " | " | " | |
| Toluene | ND | 0.500 | " | " | " | " | " | " | |
| Ethylbenzene | ND | 0.500 | " | " | " | " | " | " | |
| Xylenes (total) | ND | 0.500 | " | " | " | " | " | " | |
| Methyl tert-butyl ether | ND | 2.50 | " | " | " | " | " | " | |
| *Surrogate: a,a,a-Trifluorotoluene* | | *97.8 %* | | *70-130* | | " | " | " | |

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| | | |
|---|---|---|
| Cambria - Oakland | Project: Arco 0771 | |
| 1144 65th St, Suite B | Project Number: Livermore | **Reported:** |
| Oakland CA, 94608 | Project Manager: Darryk Attaide | 09/15/00 18:15 |

## Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT - Quality Control
## Sequoia Analytical - Morgan Hill

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 0I12003 - EPA 5030B [P/T]** | | | | | | | | | | |
| **Blank (0I12003-BLK1)** | | | | Prepared & Analyzed: 09/12/00 | | | | | | |
| Purgeable Hydrocarbons | ND | 50.0 | ug/l | | | | | | | |
| Benzene | ND | 0.500 | " | | | | | | | |
| Toluene | ND | 0.500 | " | | | | | | | |
| Ethylbenzene | ND | 0.500 | " | | | | | | | |
| Xylenes (total) | ND | 0.500 | " | | | | | | | |
| Methyl tert-butyl ether | ND | 2.50 | " | | | | | | | |
| *Surrogate: a,a,a-Trifluorotoluene* | *9.59* | | " | *10.0* | | *95.9* | *70-130* | | | |
| **LCS (0I12003-BS1)** | | | | Prepared & Analyzed: 09/12/00 | | | | | | |
| Purgeable Hydrocarbons | 251 | 50.0 | ug/l | 250 | | 100 | 70-130 | | | |
| *Surrogate: a,a,a-Trifluorotoluene* | *14.1* | | " | *10.0* | | *141* | *70-130* | | | *S-02* |
| **LCS (0I12003-BS2)** | | | | Prepared & Analyzed: 09/12/00 | | | | | | |
| Benzene | 10.6 | 0.500 | ug/l | 10.0 | | 106 | 70-130 | | | |
| Toluene | 9.81 | 0.500 | " | 10.0 | | 98.1 | 70-130 | | | |
| Ethylbenzene | 10.2 | 0.500 | " | 10.0 | | 102 | 70-130 | | | |
| Xylenes (total) | 29.7 | 0.500 | " | 30.0 | | 99.0 | 70-130 | | | |
| *Surrogate: a,a,a-Trifluorotoluene* | *10.4* | | " | *10.0* | | *104* | *70-130* | | | |
| **Matrix Spike (0I12003-MS1)** | | **Source: MJI0124-02** | | Prepared & Analyzed: 09/12/00 | | | | | | |
| Purgeable Hydrocarbons | 237 | 50.0 | ug/l | 250 | ND | 94.8 | 60-140 | | | |
| *Surrogate: a,a,a-Trifluorotoluene* | *12.8* | | " | *10.0* | | *128* | *70-130* | | | |
| **Matrix Spike Dup (0I12003-MSD1)** | | **Source: MJI0124-02** | | Prepared & Analyzed: 09/12/00 | | | | | | |
| Purgeable Hydrocarbons | 263 | 50.0 | ug/l | 250 | ND | 105 | 60-140 | 10.4 | 25 | |
| *Surrogate: a,a,a-Trifluorotoluene* | *13.3* | | " | *10.0* | | *133* | *70-130* | | | *S-02* |

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| | | |
|---|---|---|
| Cambria - Oakland | Project: Arco 0771 | |
| 1144 65th St, Suite B | Project Number: Livermore | **Reported:** |
| Oakland CA, 94608 | Project Manager: Darryk Attaide | 09/15/00 18:15 |

## Notes and Definitions

| | |
|---|---|
| P-01 | Chromatogram Pattern: Gasoline C6-C12 |
| S-02 | The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample. |
| DET | Analyte DETECTED |
| ND | Analyte NOT DETECTED at or above the reporting limit |
| NR | Not Reported |
| dry | Sample results reported on a dry weight basis |
| RPD | Relative Percent Difference |

**ARCO Products Company**
Division of Atlantic-Richfield Company

Rat # 8 — Task Order No.

**Chain of Custody**

| | | | |
|---|---|---|---|
| ARCO Facility no. 0771 | City (Facility) Livermore | Project manager (Consultant) Dascyk Ataide | Laboratory name Sog |
| ARCO engineer Paul Supple | Telephone no. (ARCO) 925-299-8891 | Telephone no. (Consultant) 510-420-3339 | Fax no. (Consultant) 510-420-9170 |
| Consultant name Cambria | Address (Consultant) 1144 65th St. Oakland Ca 94608 | | Contract number 436-1607 |

Method of shipment: MJI0124

| Sample I.D. | Lab no. | Container no. | Matrix: Soil | Matrix: Water | Matrix: Other | Preservation: Ice | Preservation: Acid | Sampling date | Sampling time | BTEX 602/EPA 8020 | BTEX/TPH EPA M602/8020/8015 | TPH Modified 8015 Gas ☐ Diesel ☐ | Oil and Grease 413.1 ☐ 413.2 ☐ | TPH EPA 418.1/SM503E | EPA 601/8010 | EPA 624/8240 | EPA 625/8270 | TCLP Semi Metals ☐ VOA ☐ VOA ☐ | CAM METALS EPA 6010/7000 TTLC ☐ STLC ☐ | Lead Org./DHS ☐ Lead EPA 7420/7421 ☐ | BTEX, TPHG MTBE EPA 8021B/8240 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-2 | | 4 | | X | | | HCl | 8-31-00 | 4:15 | | | | | | | | | | | | | 01 |
| MW-4 | | | | | | | | | 1:45 | | | | | | | | | | | | | 02 |
| MW-5 | | | | | | | | | 1:27 | | | | | | | | | | | | | 03 |
| MW-6 | | | | | | | | | 4:10 | | | | | | | | | | | | | 04 |
| MW-7 | | | | | | | | | 4:02 | | | | | | | | | | | | | 05 |
| MW-11 | | | | | | | | | 12:30 | | | | | | | | | | | | | 06 |
| RW-1 | | | | | | | | | 3:10 | | | | | | | | | | | | | 07 |
| VW-1 | | | | | | | | | 2:10 | | | | | | | | | | | | | 08 |
| DUP | | | | | | | | | | | | | | | | | | | | | | 09 |

Special detection Limit/reporting: Lowest possible

Special QA/QC

Remarks

Lab number

Turnaround time

- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☒

Condition of sample:

Temperature received:

| | Date | Time | | Date | Time |
|---|---|---|---|---|---|
| Relinquished by sampler | 08-06-00 | 4:45 | Received by | | |
| Relinquished by | 9/6/0 | 17:00 | Received by | | |
| Relinquished by | 9/6/0 | | Received by | 9/6/00 | 1850 |

Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

# APPENDIX C

# FIELD DATA SHEETS

CAMBRIA

# WELL DEPTH MEASUREMENTS

| Well ID | ~~Order~~ Time | ~~Time~~ order | Top of Screen | DTB | DTP | DTW | DOP | Casing Dia | Comment |
|---|---|---|---|---|---|---|---|---|---|
| MW-2 | 11:40 | 10 | 30' | 37.9' | | 26.71 | | 4" | |
| MW-4 | 11:21 | 6 | 26' | 41.1' | | 29.55 | | 4" | |
| MW-5 | 11:18 | 5 | 31.5' | 40.2' | | 30.21 | | 4" | |
| MW-6 | 11:30 | 8 | | 43.3' | | 30.20 | | 4" | |
| MW-7 | 11:45 | 11 | 30' | 39.7' | | 28.40 | | 4" | |
| MW-11 | 11:15 | 4 | 29' | 39' | | 32.68 | | 2" | |
| RW-1 | 11:35 | 9 | 25.5' | 40.5' | | 30.61 | | 6" | |
| VW-1 | 11:25 | 7 | | 28.06 | | 21.20 | | 4" | New to schedule for 3q00 |
| MW-8 | 11:10 | 3 | | | | 33.70 | | 2" | |
| MW-9 | 11:06 | 2 | | | | 27.39 | | 2" | |
| MW-10 | 11:03 | 1 | | | | 27.52 | | 2" | |
| MW-3 | 11:50 | 11 | | | | 28.75 | | 4" | |
| MW-1 | 11:55 | 12 | | | | 30.35 | | 4" | |
| | | | | | | | | | |
| | | | | | | | | | |

Project Name: **ARCO 0771**

Project Number: **436-1607**

Measured By: [signature]

Date: 3/31/00

H:\ARCO\0771\Forms\ARCO1_GW-DEPTH.WPD

CAMBRIA

# WELL SAMPLING FORM

| | | |
|---|---|---|
| Project Name: **ARCO 771** | Cambria Mgr: **Darryk Ataide** | Well ID: **MW-2** |
| Project Number: **436 - 1607** | Date: 08-31-00 | Well Yield: |
| Site Address: **899 Rincon Ave, Livermore** | Sampling Method: **Disposable bailer** | Well Diameter: **" pvc** 4" |
| | | Technician(s): SG |
| Initial Depth to Water: 26.71 | Total Well Depth: 37.90 | Water Column Height: 11.19 |
| Volume/ft: 0.65 | 1 Casing Volume: 7.27 | 3 Casing Volumes: 21.8 |
| Purge/No Purge: Purge | | |
| Purging Device: **Submersible Pump** | Did Well Dewater?: YES | Total Gallons Purged: 7 |
| Start Purge Time: 3:25 | Stop Purge Time: 3:28 | Total Time: 3 |

1 Casing Volume = Water column height x Volume/ ft.

| Well Diam. | Volume/ft (gallons) |
|---|---|
| 2" | 0.16 |
| 4" | 0.65 |
| 6" | 1.47 |

| Time | Casing Volume | Temp. C | pH | Cond. uS | Comments |
|---|---|---|---|---|---|
| 3:28 | 7 | 23.8 | 7.51 | 61.7 | |
| | | | | | |
| | well | dewater! | | | |
| | | | @ 3:28 | | |
| | | | | | |
| | | | | | DO = 1.59 |
| | | | | | |
| | | | | | |
| | | | | | |

| Sample ID | Date | Time | Container Type | Preservative | Analytes | Analytic Method |
|---|---|---|---|---|---|---|
| **MW-2** | 08-31-00 | 4:15 | **4 VOA** | **HCL** | **BTEX, TPHg, MTBE** | **8021B / 8240** |
| | | | | | | |
| | | | | | | |
| | | | | | | |

CAMBRIA

# WELL SAMPLING FORM

| | | |
|---|---|---|
| Project Name: **ARCO 771** | Cambria Mgr: **Darryk Ataide** | Well ID: **MW-4** |
| Project Number: **436 - 1607** | Date: 08-31-00 | Well Yield: |
| Site Address: **899 Rincon Ave, Livermore** | Sampling Method: **Disposable bailer** | Well Diameter: **" pvc** 4" |
| | | Technician(s): SG |
| Initial Depth to Water: 29.55 | Total Well Depth: 41.1 | Water Column Height: |
| Volume/ft: | 1 Casing Volume: | 3 Casing Volumes: |
| Purge/No Purge: | | |
| Purging Device: **Submersible Pump** | Did Well Dewater?: | Total Gallons Purged: |
| Start Purge Time: | Stop Purge Time: | Total Time: |

1 Casing Volume = Water column height x Volume/ ft.

| Well Diam. | Volume/ft (gallons) |
|---|---|
| 2" | 0.16 |
| 4" | 0.65 |
| 6" | 1.47 |

| Time | Casing Volume | Temp. C | pH | Cond. uS | Comments |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | NO PURGE | | | |
| | | | | | DO = 1.04 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Sample ID | Date | Time | Container Type | Preservative | Analytes | Analytic Method |
|---|---|---|---|---|---|---|
| **MW-4** | 08-31-00 | 1:45 | **4 VOA** | **HCL** | **BTEX, TPHg, MTBE** | **8021B / 8240** |
| | | | | | | |
| | | | | | | |
| | | | | | | |

CAMBRIA

# WELL SAMPLING FORM

| | | |
|---|---|---|
| Project Name: **ARCO 771** | Cambria Mgr: **Darryk Ataide** | Well ID: **MW-5** |
| Project Number: **436 - 1607** | Date: 08-31-00 | Well Yield: |
| Site Address: **899 Rincon Ave, Livermore** | Sampling Method: **Disposable bailer** | Well Diameter: **" pvc** 4 " |
| | | Technician(s): SG |
| Initial Depth to Water: 30.21 | Total Well Depth: 40.20 | Water Column Height: 9.99 |
| Volume/ft: 0.65 | 1 Casing Volume: 6.49 | 3 Casing Volumes: 19.4 |
| Purge/No Purge: purge | | |
| Purging Device: **Submersible Pump** | Did Well Dewater?: no | Total Gallons Purged: 20 |
| Start Purge Time: 1:10 | Stop Purge Time: 1:21 | Total Time: 11 |

1 Casing Volume = Water column height x Volume/ ft.

| Well Diam. | Volume/ft (gallons) |
|---|---|
| 2" | 0.16 |
| 4" | 0.65 |
| 6" | 1.47 |

| Time | Casing Volume | Temp. C | pH | Cond. uS | Comments |
|---|---|---|---|---|---|
| 1:13 | 7 | 21.8 | 7.94 | 430 | |
| 1:18 | 14 | 20.5 | 7.75 | 610 | |
| 1:23 | 20 | 20.6 | 7.81 | 615 | |
| | | | | | |
| | | | | | |
| | | | | | DO = 0.97 mg/L |
| | | | | | |
| | | | | | |
| | | | | | |

| Sample ID | Date | Time | Container Type | Preservative | Analytes | Analytic Method |
|---|---|---|---|---|---|---|
| **MW-5** | 08-31-00 | 1:27 | **4 VOA** | **HCL** | **BTEX, TPHg, MTBE** | **8021B / 8240** |
| | | | | | | |
| | | | | | | |
| | | | | | | |

CAMBRIA

# WELL SAMPLING FORM

| | | |
|---|---|---|
| Project Name: **ARCO 771** | Cambria Mgr: **Darryk Ataide** | Well ID: **MW-6** |
| Project Number: **436 - 1607** | Date: 08-31-00 | Well Yield: |
| Site Address: **899 Rincon Ave, Livermore** | Sampling Method: **Disposable bailer** | Well Diameter: **" pvc** 4 " |
| | | Technician(s): SG |
| Initial Depth to Water: 30.20 | Total Well Depth: 43.30 | Water Column Height: 13.1 |
| Volume/ft: 0.65 | 1 Casing Volume: 8.51 | 3 Casing Volumes: 25.5 |
| Purge/No Purge: purge | | |
| Purging Device: **Submersible Pump** | Did Well Dewater?: yes | Total Gallons Purged: 18 |
| Start Purge Time: 2:40 | Stop Purge Time: 2:54 | Total Time: 14 |

1 Casing Volume = Water column height x Volume/ ft.

| Well Diam. | Volume/ft (gallons) |
|---|---|
| 2" | 0.16 |
| 4" | 0.65 |
| 6" | 1.47 |

| Time | Casing Volume | Temp. C | pH | Cond. uS | Comments |
|---|---|---|---|---|---|
| 2:45 | 9 | 23.2 | 7.90 | 625 | |
| 2:50 | 18 | 21.2 | 7.65 | 715 | |
| | | | | | |
| | | | | | |
| | | well dewatered at 2:51 | | | DO=7.00 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Sample ID | Date | Time | Container Type | Preservative | Analytes | Analytic Method |
|---|---|---|---|---|---|---|
| **MW-6** | 08-31-00 | 4:10 | **4 VOA** | **HCL** | **BTEX, TPHg, MTBE** | **8021B / 8240** |
| | | | | | | |
| | | | | | | |
| | | | | | | |

CAMBRIA

# WELL SAMPLING FORM

| | | |
|---|---|---|
| Project Name: **ARCO 771** | Cambria Mgr: **Darryk Ataide** | Well ID: **MW-7** |
| Project Number: **436 - 1607** | Date: 08-31-00 | Well Yield: |
| Site Address: **899 Rincon Ave, Livermore** | Sampling Method: **Disposable bailer** | Well Diameter: **" pvc** 4 " |
| | | Technician(s): SG |
| Initial Depth to Water: 28.40 | Total Well Depth: 39.70 | Water Column Height: 11.3 |
| Volume/ft: 0.65 | 1 Casing Volume: 7.34 | 3 Casing Volumes: 22.02 |
| Purge/No Purge: Purge | | |
| Purging Device: **Submersible Pump** | Did Well Dewater?: NO | Total Gallons Purged: 22 |
| Start Purge Time: 3:45 | Stop Purge Time: 3:56 | Total Time: 11 |

1 Casing Volume = Water column height x Volume/ ft.

| Well Diam. | Volume/ft (gallons) |
|---|---|
| 2" | 0.16 |
| 4" | 0.65 |
| 6" | 1.47 |

| Time | Casing Volume | Temp. C | pH | Cond. uS | Comments |
|---|---|---|---|---|---|
| 3:49 | 7 | 23.1 | 7.80 | 522 | odor |
| 3:53 | 14 | 23.5 | 7.36 | 639 | |
| 3:57 | 22 | 23.9 | 7.51 | 635 | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | DO = 0.09 mg/L |
| | | | | | |
| | | | | | |

| Sample ID | Date | Time | Container Type | Preservative | Analytes | Analytic Method |
|---|---|---|---|---|---|---|
| **MW-7** | 08-31-00 | 4:08 | **4 VOA** | **HCL** | **BTEX, TPHg, MTBE** | **8021B / 8240** |
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# WELL SAMPLING FORM

| | | |
|---|---|---|
| Project Name: **ARCO 771** | Cambria Mgr: **Darryk Ataide** | Well ID: ~~MW-6~~ MW-11 |
| Project Number: **436 - 1607** | Date: 08-31-00 | Well Yield: |
| Site Address: **899 Rincon Ave, Livermore** | Sampling Method: **Disposable bailer** | Well Diameter: **" pvc** 4" |
| | | Technician(s): SG |
| Initial Depth to Water: 32.68 | Total Well Depth: 39.00 | Water Column Height: |
| Volume/ft: | 1 Casing Volume: | 3 Casing Volumes: |
| Purge/No Purge: No Purge | | |
| Purging Device: **Submersible Pump** | Did Well Dewater?: | Total Gallons Purged: |
| Start Purge Time: | Stop Purge Time: | Total Time: |

1 Casing Volume = Water column height x Volume/ ft.

| Well Diam. | Volume/ft (gallons) |
|---|---|
| 2" | 0.16 |
| 4" | 0.65 |
| 6" | 1.47 |

| Time | Casing Volume | Temp. C | pH | Cond. uS | Comments |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | No Purge | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | DO = 0.40 mg/L |
| | | | | | |

| Sample ID | Date | Time | Container Type | Preservative | Analytes | Analytic Method |
|---|---|---|---|---|---|---|
| ~~MW-6~~ MW-11 | 08-31-00 | 12:30 | 4 VOA | HCL | BTEX, TPHg, MTBE | 8021B / 8240 |
| DUP | → | | | | | |
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CAMBRIA

# WELL SAMPLING FORM

| | | |
|---|---|---|
| Project Name: **ARCO 771** | Cambria Mgr: **Darryk Ataide** | Well ID: **RW-1** |
| Project Number: **436 - 1607** | Date: 03-3-00 | Well Yield: |
| Site Address: **899 Rincon Ave, Livermore** | Sampling Method: **Disposable bailer** | Well Diameter: **" pvc** 6" |
| | | Technician(s): SG |
| Initial Depth to Water: 30.61 | Total Well Depth: 40.5 | Water Column Height: |
| Volume/ft: | 1 Casing Volume: | 3 Casing Volumes: |
| Purge/No Purge: No purge | | |
| Purging Device: **Submersible Pump** | Did Well Dewater?: | Total Gallons Purged: |
| Start Purge Time: | Stop Purge Time: | Total Time: |

1 Casing Volume = Water column height x Volume/ ft.

| Well Diam. | Volume/ft (gallons) |
|---|---|
| 2" | 0.16 |
| 4" | 0.65 |
| 6" | 1.47 |

| Time | Casing Volume | Temp. C | pH | Cond. uS | Comments |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | No purge | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | DO = 3.21 |
| | | | | | |
| | | | | | |

| Sample ID | Date | Time | Container Type | Preservative | Analytes | Analytic Method |
|---|---|---|---|---|---|---|
| **RW-1** | 03-31-00 | 3:10 | **4 VOA** | **HCL** | **BTEX, TPHg, MTBE** | **8021B / 8240** |
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# WELL SAMPLING FORM

| | | |
|---|---|---|
| Project Name: **ARCO 771** | Cambria Mgr: **Darryk Ataide** | Well ID: **VW-1** |
| Project Number: **436 - 1607** | Date: 08-31-00 | Well Yield: |
| Site Address: **899 Rincon Ave, Livermore** | Sampling Method: **Disposable bailer** | Well Diameter: **" pvc** 4" |
| | | Technician(s): SG |
| Initial Depth to Water: 21.20 | Total Well Depth: 28.06 | Water Column Height: 6.86 |
| Volume/ft: 0.65 | 1 Casing Volume: 4.45 | 3 Casing Volumes: 13.7 |
| Purge/No Purge: | | |
| Purging Device: **Submersible Pump** | Did Well Dewater?: | Total Gallons Purged: |
| Start Purge Time: 1:55 | Stop Purge Time: 2:05 | Total Time: |

1 Casing Volume = Water column height x Volume/ ft.

| Well Diam. | Volume/ft (gallons) |
|---|---|
| 2" | 0.16 |
| 4" | 0.65 |
| 6" | 1.47 |

| Time | Casing Volume | Temp. C | pH | Cond. uS | Comments |
|---|---|---|---|---|---|
| 1:57 | 5 | 25.9 | 7.66 | 526 | |
| 1:59 | 10 | 25.9 | 7.59 | 594 | |
| 2:04 | 14 | 25.9 | 7.54 | 597 | |
| | | | | | |
| | | | | | |
| | | | | | DO - 10.08 mg/L |
| | | | | | |
| | | | | | |
| | | | | | |

| Sample ID | Date | Time | Container Type | Preservative | Analytes | Analytic Method |
|---|---|---|---|---|---|---|
| **VW-1** | 08-31-00 | 2:10 | **4 VOA** | **HCL** | **BTEX, TPHg, MTBE** | **8021B / 8240** |
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