



Date June 27, 1997
Project 20805-134,004

To:

Ms. Susan Hugo

Alameda County Health Care Services Agency Department of Environmental Health 1131 Harborbay Parkway, Suite 250 Alameda, California 94502-6577

We are enclosing:

| Copies | | Description | | | |
|-----------|---|------------------|------------------|------------|-------------------|
| 1 | | First quarter 19 | 997 groundwate | r monitori | ng results |
| | _ | for ARCO ser | vice station 611 | 3, Livermo | ore, California |
| | _ | | | | |
| For your: | X | Use | Sent by: | <u>X</u> | Regular Mail |
| | | Approval | | | Standard Air |
| | | Review | | | Courier |
| | | Information | | | Other: Cert. Mail |

Comments:

The enclosed groundwater monitoring report is being sent to you per the request of ARCO Products Company. Please call if you have questions or comments.

Valli Voruganti Project Manager

Delli Ough

cc: Sum Arigala, RWQCB - SFBR
Danielle Stefani, LFD
Paul Supple, ARCO Products Company
File



Date:

June 25, 1997

Re: ARCO Station #

6113 • 785 East Stanley Boulevard • Livermore, CA First Quarter 1997 Groundwater Monitoring Results

"I declare, that to the best of my knowledge at the present time, that the information and/or recommendations contained in the attached proposal or report are true and correct."

Submitted by:

Paul Supple

Environmental Engineer





June 27, 1997 Project 20805-134.004

Mr. Paul Supple ARCO Products Company P.O. Box 6549 Moraga, California 94570

Re: First quarter 1997 groundwater monitoring program results, ARCO service

station 6113, Livermore, California

Dear Mr. Supple:

This letter presents the results of the first quarter 1997 groundwater monitoring program at ARCO Products Company (ARCO) service station 6113, 785 East Stanley Boulevard, Livermore, California (Figure 1). The semi-annual monitoring program complies with Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

LIMITATIONS

No monitoring event is thorough enough to describe all geologic and hydrogeologic conditions of interest at a given site. If conditions have not been identified during the monitoring event, such a finding should not therefore be construed as a guarantee of the absence of such conditions at the site, but rather as the result of the scope, limitations, and cost of work performed during the monitoring event.

Please call if you have questions.

Sincerely,

EMCON

L∕ynn Gallagher, R.G. 6090

Project Geologist

-EMCON



ARCO SEMI-ANNUAL REPORT

| Station No.: | 6113 | Address: | 785 East Stanley Boulevard, Livermore, California |
|--------------------|-----------------|---------------|---|
| EMCON Proje | ct No. | | 20805-134.004 |
| ARCO Enviror | imental Enginee | er/Phone No.: | Paul Supple /(510) 299-8891 |
| EMCON Proje | ct Manager/Pho | one No.: | Valli Voruganti /(408) 453-7300 |
| Primary Agenc | y/Regulatory II | O No.: | ACHCSA /Susan Hugo |

WORK PERFORMED THIS QUARTER (First-1997):

- 1. Conducted quarterly groundwater monitoring and sampling for first quarter 1997.
- 2. Prepared and submitted quarterly groundwater monitoring report for fourth quarter 1996.

WORK PROPOSED FOR NEXT QUARTER (Second- 1997):

- 1. Perform semi-annual groundwater monitoring and sampling for second quarter 1997.
- 2. Prepare and submit quarterly groundwater monitoring report for first quarter 1997.

WORK PROJECTED FOR 1997:

- 1. Prepare and submit semi-annual groundwater monitoring report for second quarter 1997.
- 2. Prepare and submit status report for third quarter 1997.
- 3. Perform semi-annual groundwater monitoring and sampling for fourth quarter 1997.

SEMI-ANNUAL MONITORING:

| Current Phase of Project: | Semi-Annual Groundwater Monitoring |
|---|--|
| Frequency of Sampling: | Semi-Annual (groundwater) |
| Frequency of Monitoring: | Semi-Annual (groundwater) |
| Is Floating Product (FP) Present On-site: | ☐ Yes ☒ No |
| Bulk Soil Removed to Date : | 288 cubic yards of TPH impacted soil |
| Bulk Soil Removed This Quarter : | None |
| Water Wells or Surface Waters, | |
| within 2000 ft., impacted by site: | None |
| Current Remediation Techniques: | None |
| Average Depth to Groundwater: | 14.85 feet |
| Groundwater Gradient (Average): | 0.021 ft/ft toward north-northwest (consistent with past events) |

ATTACHED:

- Table 1 Groundwater Monitoring Data, First Quarter 1997
- Table 2 Historical Groundwater Elevation and Analytical Data,

Petroleum Hydrocarbons and Their Constituents

- Figure 1 Site Location
- Figure 2 Groundwater Data, First Quarter 1997
- Appendix A Analytical Results and Chain of Custody Documentation, First Quarter 1997
 Groundwater Monitoring Event

cc: Susan Hugo, ACHCSA Sum Arigala, RWQCB-SFBR Danielle Stefani, LFD

Table 1 Groundwater Monitoring Data First Quarter 1997

Date: 06-12-97

| Well Designation | Water Level Field Dute | -7- Top of Casing S Elevation | ag Depth to Water | Groundwater | Floating Product | Groundwater Flow Direction | Hydraelic Ed Gradient | Water Sample Field Date | 자 TPHG 를 LUFT Method | Benzene 7 EPA 8020 | Toluene | Ethylbenzene | Total Xylenes | MTBE | ਜ਼ MTBE ਨੌਂ EPA 8240 | ат ТКР Н Зд ЕРА 418.1 | 표 TPHD 지 LUFT Method |
|------------------|---------------------------|----------------------------------|-------------------|-------------|------------------|----------------------------|--------------------------|----------------------------|-------------------------|-----------------------|-------------|---------------|---------------|-------------|-------------------------|---------------------------------|-------------------------|
| MW-1 | 03-27-97 | 457.04 | 14.91 | 442.13 | ND | NNW | 0.021 | 03-28-97 | Not sampled | l: well samp | oled annual | ly, during t | he fourth q | uarter | | | |
| MW-2 | 03-27-97 | 457.74 | 15.32 | 442.42 | ND | NNW | 0.021 | 03-28-97 | Not sampled | f: well samj | oled annual | ly, during t | he fourth q | uarter | | | |
| MW-3 | 03-27-97 | 456.97 | 14.85 | 442.12 | ND | NNW | 0.021 | 03-28-97 | Not sampled | f: well samp | oled annual | ly, during t | the fourth q | uarter | | | |
| MW-4 | 03-27-97 | 456.55 | 15.22 | 441,33 | ND | NNW | 0.021 | 03-28-97 | <50 | 1.1 | < 0.5 | < 0.5 | 1.6 | <3 | | | |
| MW-5 | 03-27-97 | 455,84 | 15.95 | 439,89 | ND | NNW | 0.021 | 03-28-97 | Not sampled | i: well sam | oled semi-a | nnually, du | iring the sec | cond and fo | urth quarter | :5 | |
| MW-6 | 03-27-97 | 454.93 | 14.25 | 440.68 | ND | NNW | 0.021 | 03-28-97 | < 50 | 2.3 | <0.5 | 0.9 | 3.5 | 4 | | | |
| MW-7 | 03-27-97 | 454.92 | 14.22 | 440.70 | ND | NNW | 0.021 | 03-28-97 | <50 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | <3 | | | |
| MW-8 | 03-27-97 | 456.97 | 12.96 | 444.01 | ND | NNW | 0.021 | 03-28-97 | Not sampled | l: well samp | pled annual | ly, during t | he fourth q | uarter | | | |
| MW-9 | 03-27-97 | 456.18 | 13.01 | 443.17 | ND | NNW | 0.021 | 03-28-97 | Not sampled | l: well samp | oled annual | ly, during t | the fourth q | uarter | | | |
| MW-10 | 03-27-97 | 456.85 | 15.77 | 441.08 | ND | NNW | 0.021 | 03-28-97 | Not sampled | i: well samp | pled annual | lly, during t | the fourth q | uarter | | | |
| MW-11 | 03-27-97 | 455.07 | 15.77 | 439.30 | ND | NNW | 0.021 | 03-28-97 | Not sampled | d: well samj | pled semi-a | nnually, du | aring the sec | cond and fo | urth quarte | rs | |
| MW-12 | 03-27-97 | 455.04 | 15.69 | 439.35 | ND | NNW | 0.021 | 03-28-97 | Not sampled | i: well samp | pled semi-a | nnually, du | iring the sec | cond and fo | ourth quarte | rs | |

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

MWN: ground-water flow direction and gradient apply to the entire monitoring well network

ft/ft: foot per foot

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

µg/L: micrograms per liter

EPA: United States Environmental Protection Agency

MTBE: Methyl tert-butyl ether

TRPH: total recoverable petroleum hydrocarbons

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

ND: none detected NNW: north-northwest

[^] method reporting fimit was raised due to: (1) high analyte concentration requiring sample dilution, or (2) matrix interference

^{- -;} not analyzed or not applicable

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present*

| Well Designation | Water Level Field Date | Top of Caxing Devation | ee Depth to Water | up-if TSM-if TS Elevation | Floating Product | G Groundwater Flow Direction | Hydraulic ty Gradient | Water Sample Field Date | TPHG LUFT Method | EPA 8020 | Toluene | Ethylbenzene | ਜ Total Xylenes ਨ੍ਹੇ EPA 8020 | # MTBE | 五 MTBE 內 EPA 8240 | के TRPH % EPA 418.1 | TPHD |
|------------------|---------------------------|------------------------|-------------------|---------------------------------|------------------|------------------------------|--------------------------|----------------------------|------------------|--------------------|--------------------|-------------------|----------------------------------|--------------|----------------------|-------------------------------|------|
| MW-1 | 03-23-95 | 457.04 | 14,12 | 442.92 | ND | NW | 0.035 | 03-23-95 | Not sampled | l: well samp | oled annual | ly, during (| the fourth q | uarter | | | |
| MW-1 | 05-31-95 | 457.04 | 14.45 | 442.59 | ND | NNW | 0.028 | 05-31-95 | Not sampled | i: well samp | oled annuali | ly, during t | the fourth q | иалег | | | |
| MW-1 | 08-31-95 | 457.04 | 17.12 | 439.92 | ND | NNW | 0.03 | 08-31-95 | Not sampled | i: well samp | oled annual | ly, during t | the fourth q | uarter | | | |
| MW-1 | 11-28-95 | 457.04 | 16.34 | 440.70 | ND | NNW | 0.025 | 11-28-95 | <50 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | <3 | | | |
| MW-1 | 02-22-96 | 457.04 | 13.23 | 443,81 | ND | NNW | 0.031 | 02-22-96 | Not sampled | i; weli samp | oled annual | ly, during 1 | the fourth q | uarter | | | |
| MW-1 | 05-23-96 | 457.04 | 14.02 | 443.02 | ND | NNW | 0.025 | 05-23-96 | Not sampled | | | | - | | | | |
| MW-1 | 08-08-96 | 457.04 | 16.13 | 440.91 | ND | N | 0.019 | 08-08-96 | Not sampled | | | - | - | | | | |
| MW-1 | 11-07-96 | 457.04 | 17.28 | 439.76 | ND | NNE | 0.019 | 11-08-96 | < 50 | < 0.5 | <0.5 | < 0.5 | < 0.5 | <3 | | | |
| MW-1 | 03-27-97 | 457.04 | 14.91 | 442.13 | ND | WNN | 0.021 | 03-28-97 | Not sampled | l: well samp | pled annual | ly, during | the fourth g | uarter | | | |
| | | | | | | | | | . | | | | | | | | |
| MW-2 | 03-23-95 | 457.74 | 14.15 | 443.59 | ND | NW | 0.035 | 03-23-95 | Not sample | | | | | | | | |
| MW-2 | 05-31-95 | 457.74 | 14.67 | 443.07 | ND | NNW | 0.028 | 05-31-95 | Not sample | | | | | | | | |
| MW-2 | 08-31-95 | 457.74 | 17.24 | 440.50 | ND | NNW | 0.03 | 08-31-95 | Not sample | | • | | | | | | |
| MW-2 | 11-28-95 | 457.74 | 16.40 | 441.34 | ND | NNW | 0.025 | 11-29-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | | | |
| MW-2 | 02-22-96 | 457.74 | 13.55 | 444.19 | ND | NNW | 0.031 | 02-22-96 | Not sample: | | - | | - | | | | |
| MW-2 | 05-23-96 | 457.74 | 14.29 | 443.45 | ND | NNW | 0.025 | 05-23-96 | Not sample | | • | | | | | | |
| MW-2 | 08-08-96 | 457.74 | 16.19 | 441.55 | ND | N | 0.019 | 08-08-96 | Not sample 65 | : well sam; 0.6 | рлео аппиал 7.4 | ıy, aurıng 2.1 | ine iourin q 12 | juarter 5 | | | |
| MW-2 | 11-07-96 | 457.74 | 17.50 | 440.24 | ND | NNE | 0.019 | 11-07-96 | | | | | | | | | |
| MW-2 | 03-27-97 | 457.74 | 15.32 | 442.42 | ND | NNW | 0.021 | 03-28-97 | Not sample | ii. weii sam | pied annuai | ty. during | me roumn q | Juanter | | | |

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present*

| Well Designation | Water Level Field Date | Top of Casing | and Depth to Water | Groundwater Se Elevation | Floating Product নী Thickness | Groundwater Relow Direction | Hydraulic Gradien | Water Sample Field Date | TPHG CLUFT Method | Benzene | ਸ Toluene ਲੁੱਖ EPA 8020 | Ethylbenzene | Total Xylenes | تا MTBE تا EPA 8020 | m MTBE | TRPH 7 EPA 418.1 | TPHD |
|------------------|---------------------------|---------------|--------------------|--------------------------|----------------------------------|-----------------------------|----------------------|----------------------------|-------------------|--------------|----------------------------|--------------|---------------|-------------------------------|--------|---------------------|------|
| | | TE-WISE | | 11-101017 | | | | | | | | ,,,, | | | | | |
| MW-3 | 03-23-95 | 456.97 | 14,13 | 442.84 | ND | NW | 0.035 | 03-23-95 | Not sample | d: well samp | oled annual | ly, during t | the fourth q | uarter | | | |
| MW-3 | 05-31-95 | 456.97 | 14.46 | 442.51 | ND | NNW | 0.028 | 05-31-95 | Not sample | d: well samp | iled annual | ly, during t | the fourth q | uarter | | | |
| MW-3 | 08-31-95 | 456.97 | 17.06 | 439.91 | ND | NNW | 0.03 | 08-31-95 | Not sampled | d; well samp | iled annual | ly, during t | the fourth q | uarter | | | |
| MW-3 | 11-28-95 | 456.97 | 16.27 | 440.70 | ND | NNW | 0.025 | 11-28-95 | <50 | < 0.5 | < 0.5 | < 0.5 | <0.5 | <3 | | | |
| MW-3 | 02-22-96 | 456.97 | 13.14 | 443.83 | ND | NNW | 0.031 | 02-22-96 | Not sampled | d: well samp | iled annual | ly, during t | the fourth q | uarter | | | |
| MW-3 | 05-23-96 | 456.97 | 13.95 | 443.02 | ND | NNW | 0.025 | 05-23-96 | Not sample | d: well samp | eled annual | ly, during t | lhe fourth q | uarter | | | |
| MW-3 | 08-08-96 | 456.97 | 16.03 | 440.94 | ND | N | 0.019 | 08-08-96 | Not sample | d: well samp | oled annual | ly, during t | lhe fourth q | uarter | | | |
| MW-3 | 11-07-96 | 456.97 | 17.26 | 439,71 | ND | NNE | 0.019 | 11-07-96 | <50 | < 0.5 | 0.9 | < 0.5 | 1.5 | <3 | | | |
| MW-3 | 03-27-97 | 456.97 | 14.85 | 442.12 | ND | NNW | 0.021 | 03-28-97 | Not sampled | d: well samp | oled annual | ly, during (| lhe fourth q | uarter | | | |
| | | | | | | | | | | | | | | | | | |
| MW-4 | 03-23-95 | 456.55 | 15.39 | 441.16 | ND | NW | 0.035 | 03-23-95 | 210 | 2.1 | 0.6 | 0.8 | 2.1 | | | | |
| MW-4 | 05-31-95 | 456.55 | 15.32 | 441.23 | ND | NNW | 0.028 | 05-31-95 | 190 | 1.6 | < 0.5 | 0.7 | 0.9 | | | | |
| MW-4 | 08-31-95 | 456.55 | 17.86 | 438.69 | ND | NNW | 0.03 | 08-31-95 | 160 | 1.2 | 0.7 | < 0.5 | <2 | <3 | | | |
| MW-4 | 11-28-95 | 456.55 | 17.18 | 439.37 | ND | NNW | 0.025 | 11-29-95 | 150 | 0.7 | < 0.5 | 0.7 | 1.4 | <3 | | | |
| MW-4 | 02-22-96 | 456.55 | 14.80 | 441.75 | ND | NNW | 0.031 | 02-22-96 | 100 | < 0.5 | <0.5 | < 0.6 | 0.8 | <3 | | | |
| MW-4 | 05-23-96 | 456.55 | 14.43 | 442.12 | ND | NNW | 0.025 | 05-23-96 | 86 | < 0.5 | <0.5 | < 0.5 | < 0.7 | <3 | | | |
| MW-4 | 08-08-96 | 456.55 | 16.80 | 439.75 | ND | N | 0.019 | 08-08-96 | 98 | < 0.5 | < 0.5 | < 0.5 | 1.3 | <3 | | | |
| MW-4 | 11-07-96 | 456.55 | 17.90 | 438.65 | ND | NNE | 0.019 | 11-13-96 | 140 | < 0.5 | < 0.5 | <0.9^ | 1.3 | <3 | • - | | |
| MW-4 | 03-27-97 | 456.55 | 15.22 | 441.33 | ND | NNW | 0.021 | 03-28-97 | <50 | 1.1 | < 0.5 | < 0.5 | 1.6 | <3 | | | |

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present*

| Well Designation | Water Level Field Date | Top of Casing Elevation | . Depth to Water | Groundwater | Floating Product | Groundwater Se Flow Direction | Hydraulic Fradient | Water Sample Field Date | TPHC | Benzene | E Toluene ∰ EPA 8020 | EPA 8020 | Total Xylenes ਨੂੰ EPA 8020 | ⊭ MTBE ק EPA 8020 | MTBE T EPA 8240 | ਸ TRPH ੍ਰੋ EPA 418.1 | TPHD |
|------------------|---------------------------|----------------------------|------------------|--------------|------------------|-------------------------------|-----------------------|----------------------------|-------------|--------------|-------------------------|-------------|-------------------------------|-----------------------------|--------------------|-------------------------|-------|
| | | ft-MSL | feet | ft-MSI. | ieet | MWN | TVIC | | µg/15 | рул. | µg/L | hRic | hR.r. | μg/С | µg/L | <u> д</u> ду.с. | нв, с |
| MW-5 | 03-23-95 | 455.84 | 13.97 | 441.87 | ND | NW | 0.035 | 03-23-95 | 68 | 4.2 | 3.4 | 2.3 | 12 | | | | |
| MW-5 | 05-23-95 | | | ed: well was | | | | 05-31-95 | Not sampled | | | | | | | | |
| MW-5 | 08-31-95 | | • | ed: well was | | | | 08-31-95 | Not sampled | | | | | | | | |
| MW-5 | 11-28-95 | 455.84 | 16.46 | 439.38 | ND | NNW | 0.025 | 11-29-95 | 960 | 41 | 24 | 38 | 210 | <5 | | | |
| MW-5 | 02-22-96 | 455.84 | 13.34 | 442.50 | ND | NNW | 0.031 | 02-22-96 | Not sampled | l: well samp | pled semi-a | nnually, du | ring the sec | cond and fo | urth quarter | 'S | |
| MW-5 | 05-23-96 | 455.84 | 14.36 | 441.48 | ND | NNW | 0.025 | 05-23-96 | 7100 | 440 | 180 | 270 | 1700 | <50 | | | |
| MW-5 | 08-08-96 | 455.84 | 16.38 | 439.46 | ND | N | 0.019 | 08-08-96 | Not sampled | i: well samp | pled semi-a | nnually, du | ring the sec | ond and fo | urth quarter | 's | |
| MW-5 | 11-07-96 | 455.84 | 17.26 | 438.58 | ND | NNE | 0.019 | 11-13-96 | 5600 | 230 | 86 | 210 | 1100 | <80^ | | | |
| MW-5 | 03-27-97 | 455.84 | 15.95 | 439.89 | ND | NNW | 0.021 | 03-28-97 | Not sampled | i: well samp | pled semi-a | nnually, du | iring the sec | cond and fo | urth quarter | S | |
| | | | | | | | | | | | | | | | | | |
| MW-6 | 03-23-95 | 454,93 | 13.38 | 441.55 | ND | NW | 0.035 | 03-23-95 | <50 | 1.5 | <0.5 | <0.5 | 0.9 | | | | |
| MW-6 | 05-31-95 | 454.93 | 13.96 | 440.97 | ND | NNW | 0.028 | 05-31-95 | <50 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | | | | |
| MW-6 | 08-31-95 | 454.93 | 16.71 | 438.22 | ND | NNW | 0.03 | 08-31-95 | 150 | 9 | 1.8 | 4 | 12 | <3 | | | |
| MW-6 | 11-28-95 | 454.93 | 15.65 | 439.28 | ND | NNW | 0.025 | 11-29-95 | <50 | 0.6 | <0.5 | < 0.5 | 0.8 | <3 | | | |
| MW-6 | 02-22-96 | 454.93 | 12.53 | 442.40 | ND | NNW | 0.031 | 02-22-96 | <50 | 1.9 | < 0.5 | 0.8 | 2.1 | <3 | | | |
| MW-6 | 05-23-96 | 454.93 | 13.24 | 441.69 | ND | NNW | 0.025 | 05-23-96 | <50 | < 0.5 | <0.5 | < 0.5 | < 0.5 | <3 | | | |
| MW-6 | 08-08-96 | 454.93 | 16.65 | 438.28 | ND | N | 0.019 | 08-08-96 | < 50 | 0.5 | < 0.5 | <0.5 | 0.5 | <3 | | | |
| MW-6 | 11-07-96 | 454.93 | 16.65 | 438.28 | ND | NNE | 0.019 | 11-08-96 | 110 | 5,3 | 1.3 | 3.1 | 6.6 | <3 | | | |
| MW-6 | 03-27-97 | 454.93 | 14.25 | 440.68 | ND | NNW | 0.021 | 03-28-97 | <50 | 2.3 | <0.5 | 0.9 | 3.5 | 4 | | | |
| | | | | | | | | | | | | | | | | | |

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present*

| Well Designation | Water Level Field Date | F. Top of Casing | and Depth to Water | TS Elevation | Floating Product | Groundwater Flow Direction | Hydraulic Gradient | Wuter Sample Field Date | TPHG | Benzene | Toluene | Ethylbenzene Se EPA 8020 | Total Xylenes | т МТВЕ УМ ЕРА 8020 | MTBE >> EPA 8240 | # TRPH | TPHD CLUFT Method |
|------------------|---------------------------|------------------|--------------------|------------------|------------------|----------------------------|-----------------------|----------------------------|-------------|--------------|-------------|-----------------------------|---------------|-----------------------|---------------------|-------------------|-------------------|
| | 00.00 | 151.00 | 12.00 | 441.62 | ND | NW | 0.035 | 03-23-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <u></u> | | | |
| MW-7 | 03-23-95 | 454.92 | 13.29 13.72 | 441.63 441.20 | ND ND | NNW | 0.033 | 05-23-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | | | | |
| MW-7 | 05-31-95 08-31-95 | 454.92 454.92 | 16.53 | 438.39 | ND ND | NNW | 0.028 | 08-31-95 | <50 | <0.5 | <0.5 | <0.5 | 1.2 | <3 | | | |
| MW-7 MW-7 | 11-28-95 | 454.92 454.92 | 15.50 | 439.42 | ND ND | NNW | 0.025 | 11-29-95 | <50 | <0.5 | <0.5 | <0.5 | < 0.5 | <3 | | | |
| MW-7 | 02-22-96 | 454.92 | 12.30 | 442.62 | ND | NNW | 0.031 | 02-22-96 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | | | |
| MW-7 | 05-23-96 | 454.92 | 13.02 | 441.90 | ND | NNW | 0.025 | 05-23-96 | <50 | < 0.5 | <0.5 | <0.5 | <0.5 | <3 | | | |
| MW-7 | 08-08-96 | | | ed: unable t | | | 0.025 | 08-08-96 | Not sampled | | | 40.5 | 40.5 | • | | | |
| MW-7 | 11-07-96 | 454.92 | 16.50 | 438.42 | ND | NNE | 0.019 | 11-08-96 | <50 | <0.5 | <0.5 | <0.5 | 0.8 | <3 | | | |
| MW-7 | 03-27-97 | 454.92 | 14.22 | 440.70 | ND | NNW | 0.021 | 03-28-97 | <50 | < 0.5 | < 0.5 | <0.5 | <0.5 | <3 | | | |
| | | | | | | | | | | | | | | | | | |
| MW-8 | 03-23-95 | 456.97 | 11.55 | 445.42 | ND | NW | 0.035 | 03-23-95 | Not sampled | l: well samp | oled annual | ly, during t | he fourth q | uarter | | | |
| MW-8 | 05-31-95 | 456.97 | 12.37 | 444.60 | ND | NNW | 0.028 | 05-31-95 | Not sampled | i: well sam | oled annual | ly, during t | he fourth g | uarter | | | |
| MW-8 | 08-31-95 | 456.97 | 15.68 | 441.29 | ND | NNW | 0.03 | 08-31-95 | Not sampled | i; well sam | oled annual | ly, during 1 | he fourth q | uarter | | | |
| MW-8 | 11-28-95 | 456.97 | 14.15 | 442.82 | ND | NNW | 0.025 | 11-28-95 | < 50 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | <3 | • • | | |
| MW-8 | 02-22-96 | 456.97 | 10.97 | 446.00 | ND | NNW | 0.031 | 02-22-96 | Not sampled | l: well samp | oled annual | ly, during 1 | he fourth q | µa rte т | | | |
| MW-8 | 05-23-96 | 456.97 | 11.90 | 445.07 | ND | NNW | 0.025 | 05-23-96 | Not sampled | l: well sam | oled annual | ly, during 1 | he fourth q | uarter | | | |
| MW-8 | 08-08-96 | 456.97 | 13.85 | 443.12 | ND | N | 0.019 | 08-08-96 | Not sampled | i: well sam | oled annual | ly, during (| the fourth q | uarter | | | |
| MW-8 | 11-07-96 | 456.97 | 15.08 | 441.89 | ND | NNE | 0.019 | 11-08-96 | <50 | <0.5 | < 0.5 | < 0.5 | < 0.5 | <3 | | | |
| MW-8 | 03-27-97 | 456.97 | 12.96 | 444.01 | ND | NNW | 0.021 | 03-28-97 | Not sampled | i: well sam | oled annual | ly. during (| the fourth q | uarter | | | |

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present*

| Well Designation | Water Level Field Date | Top of Casing F Elevation | 39 Depth to Water | Groundwater Elevation | Floating Product | Groundwater Flow Direction | Hydraulic Gradient | Water Sample Field Date | TPHG | т Веплене очения в 1020 | Toluene | Ethylbenzene | ਜ Total Xylenes ਲੋ EPA 8020 | ਜ MTB E ਕੋ EPA 8020 | TRE | ੂਲ TRPH ਪ੍ਰੇਤ EPA 418.1 | TPHD GB LUFT Method |
|------------------|---------------------------|---------------------------|-------------------|-----------------------|------------------|----------------------------|-----------------------|----------------------------|-------------------|-----------------------------------|---------------------|--------------------|--------------------------------|-------------------------------|------------|-----------------------------------|---------------------|
| MW-9 | 03-23-95 | 456.18 | 13.18 | 443.00 | ND | ŊW | 0.035 | 03-23-95 | Not sample | d: well sam | pled annual | ly, during | the fourth q | uarter | | | |
| MW-9 | 05-31-95 | 456.18 | 12.66 | 443.52 | ND | NNW | 0.028 | 05-31-95 | Not sample | d; well sam | pled annual | ly, during t | the fourth q | uarter | | | |
| MW-9 | 08-31-95 | 456.18 | 14.40 | 441.78 | ND | NNW | 0.03 | 08-31-95 | Not sample | d: well sam | pled annual | ly, during | the fourth q | uarter | | | |
| MW-9 | 11-28-95 | 456.18 | 14.26 | 441.92 | ND | NNW | 0.025 | 11-29-95 | <50 | < 0.5 | <0.5 | <0.5 | < 0.5 | <3 | | | |
| MW-9 | 02-22-96 | 456.18 | 12.05 | 444.13 | ND | NNW | 0.031 | 02-22-96 | Not sample | | | | | | | | |
| MW-9 | 05-23-96 | 456.18 | 12.07 | 444.11 | ND | NNW | 0.025 | 05-23-96 | Not sample | | | | - | | | | |
| MW-9 | 08-08-96 | 456.18 | 14.12 | 442.06 | ND | N | 0.019 | 08-08-96 | Not sample | | | | • | | | | |
| MW-9 | 11-07-96 | 456.18 | 15.42 | 440.76 | ND | NNE | 0.019 | 11-08-96 | <50 | < 0.5 | <0.5 | <0.5 | < 0.5 | <3 | | | |
| MW-9 | 03-27-97 | 456.18 | 13.01 | 443.17 | ND | NNW | 0.021 | 03-28-97 | Not sample | d: well sam | pled annual | ly, during | the fourth q | uarter | | | |
| | | | | | | | | | | | | | | | | | |
| MW-10 | 03-23-95 | 456.85 | 14.86 | 441.99 | ND | NW | 0.035 | 03-23-95 | Not sample | | • | | - | | | | |
| MW-10 | 05-31-95 | 456.85 | 15.63 | 441.22 | ND | NNW | 0.028 | 05-31-95 | Not sample | | • | | | | | | |
| MW-10 | 08-31-95 | 456.85 | 14.40 | 442.45 | ND | NNW | 0.03 | 08-31-95 | Not sample | | • | | | | | | |
| MW-10 | 11-28-95 | 456.85 | 17.24 | 439.61 | ND | NNW | 0.025 | 11-29-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | | | |
| MW-10 | 02-22-96 | 456.85 | 14.30 | 442.55 | ND | NNW | 0.031 | 02-22-96 | Not sample | | • | - | | | | | |
| MW-10 | 05-23-96 | 456.85 | 14.93 | 441.92 | ND | NNW | 0.025 | 05-23-96 | Not sample | | • | | - | - | | | |
| MW-10 | 08-08-96 | 456.85 | 17.20 | 439.65 | ND | N | 0.019 | 08-08-96 | Not sample <50 | a: well sam | pied annuai <0.5 | ay, during <0.5 | the fourth q <0.5 | juarter <3 | | | |
| MW-10 | 11-07-96 | 456.85 | 18.25 | 438.60 | ND | NNE | 0.019 | 11-08-96 | | | | | | | • • • | | |
| MW-10 | 03-27-97 | 456.85 | 15.77 | 441.08 | ND | NNW | 0.021 | 03-28-97 | Not sample | a: well sam | ipieo annua. | ity, ouring | the fourth (| warter | | | |

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present*

| Well Designation | Water Level Field Date | Top of Casing Elevation | Depth to Water | Groundwater Elevation | Floating Product Thickness | Groundwater Flow Direction | Hydraulic Gradient | Water Sample Field Date | TPHG LUFT Method | Benzene EPA 8020 | Toluene EPA 8020 | Ethylbenzene EPA 8020 | Total Xylenes EPA 8020 | MTBE EPA 8020 | MTBE EPA 8240 | TRPH EPA 418.1 | TPHD LUFT Method |
|------------------|---------------------------|----------------------------|----------------|--------------------------|-------------------------------|-------------------------------|-----------------------|----------------------------|---------------------|---------------------|---------------------|--------------------------|---------------------------|-------------------------|------------------|--------------------------|----------------------------|
| | | ft-MS1. | feet | ft-MSL | feet | MWN | ft/ft | | μg/L | μg/L | μg/L | μg/L | µg/L | μg/L | μg/L | μg/L | µg/L_ |
| MW-11 | 03-23-95 | 455.07 | 17.34 | 437.73 | ND | NW | 0.035 | 03-23-95 | Not sampled | d: well samp | oled semi-a | nnually, du | ring the sec | ond and fo | urth quarter | s | |
| MW-11 | 05-31-95 | 455.07 | 16.68 | 438.39 | ND | NNW | 0.028 | 05-31-95 | <50 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | | * - | | |
| MW-11 | 08-31-95 | 455.07 | 20.20 | 434.87 | ND | NNW | 0.03 | 08-31-95 | Not sampled | d: well samp | oled semi-a | nnually, du | ring the sec | ond and fo | urth quarter | s | |
| MW-11 | 11-28-95 | 455.07 | 17.80 | 437.27 | ND | NNW | 0.025 | 11-28-95 | <50 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | <3 | | | |
| MW-11 | 02-22-96 | 455.07 | 15.97 | 439.10 | ND | NNW | 0.031 | 02-22-96 | Not sampled | d: well samp | oled semi-a | nnually, du | ring the sec | ond and fo | ourth quarter | s | |
| MW-11 | 05-23-96 | 455.07 | 15.50 | 439.57 | ND | NNW | 0.025 | 05-23-96 | <50 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | <3 | | | |
| MW-11 | 08-08-96 | 455.07 | 17.77 | 437.30 | ND | N | 0.019 | 08-08-96 | Not sample | d: well samp | oled semi-a | nnually, du | ring the sec | ond and fo | urth quarter | S | |
| MW-11 | 11-07-96 | 455.07 | 17.45 | 437.62 | ND | NNE | 0.019 | 11-13-96 | <50 | < 0.5 | < 0.5 | <0.5 | < 0.5 | <3 | | | |
| MW-11 | 03-27-97 | 455.07 | 15.77 | 439.30 | ND | NNW | 0.021 | 03-28-97 | Not sample | d: well samp | oled semi-a | nnually, du | ring the sec | ond and fo | urth quarter | s | |
| | | | | | | | | | | | | | | | | | |
| MW-12 | 03-23-95 | 455.04 | 15.54 | 439.50 | ND | NW | 0.035 | 03-23-95 | Not sample | d: well samp | oled semi-a | nnoally, du | ring the sec | ond and fo | iurth quarter | s | |
| MW-12 | 05-31-95 | 455.04 | 15.66 | 439.38 | ND | NNW | 0.028 | 05-31-95 | <50 | <0.5 | <0.5 | < 0.5 | <0,5 | | | | |
| MW-12 | 08-31-95 | 455.04 | 18.23 | 436.81 | ND | NNW | 0.03 | 08-31-95 | Not sample | d: well samp | oled semi-a | nnually, du | ring the sec | ond and fo | earth quarter | S | |
| MW-12 | 11-28-95 | 455.04 | 17.53 | 437.51 | ND | NNW | 0.025 | 11-28-95 | <50 | <0.5 | <0.5 | <0.5 | < 0.5 | <3 | | | |
| MW-12 | 02-22-96 | 455.04 | 14.45 | 440.59 | ND | NNW | 0.031 | 02-22-96 | Not sample | d: well samp | oleđ semi-a | nnually, du | ging the sec | ond and fo | ourth quarter | S | |
| MW-12 | 05-23-96 | 455.04 | 14.88 | 440.16 | ND | NNW | 0.025 | 05-23-96 | <50 | < 0.5 | <0.5 | <0.5 | < 0.5 | <3 | | | |
| MW-12 | 08-08-96 | 455.04 | 17.30 | 437.74 | ND | N | 0.019 | 08-08-96 | Not sample | d: well samp | oled semi-a | nnually, du | iring the sec | cond and fo | ourth quarter | .8 | |
| MW-12 | 11-07-96 | 455.04 | 18.30 | 436.74 | ND | NNE | 0.019 | 11-13-96 | <50 | < 0.5 | <0.5 | <0.5 | < 0.5 | <3 | | | |
| MW-12 | 03-27-97 | 455.04 | 15.69 | 439.35 | ND | NNW | 0.021 | 03-28-97 | Not sample | d: well samp | oled semi-a | nnually, du | iring the sec | cond and fo | ourth quarter | S | |

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present*

Date: 06-12-97

| Well Designation | Water Level Field Date | Top of Casing Elevation | Depth to Water | Groundwater Elevation | Floating Product Thickness | Groundwater Flow Direction | Hydraulic Gradient | Water Sample Field Date | TPHG LUFT Method | Benzene EPA 8020 | Toluene EPA 8020 | Ethylbenzene EPA 8020 | Total Xylenes EPA 8020 | MTBE EPA 8020 | MTBE EPA 8240 | TRPH EPA 418.1 | TPHD LUFT Method |
|------------------|---------------------------|----------------------------|----------------|--------------------------|-------------------------------|-------------------------------|-----------------------|----------------------------|---------------------|---------------------|---------------------|--------------------------|---------------------------|-------------------------|------------------|--------------------------|----------------------------|
| | | ft-MSL | feet | ft-MSL | feet | MWN | ft/ft | | μg/I. | μg/L | μg/L | μg/L | μg/L | μg/L | μg/L | μg/L | μg/l. |

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

MWN: ground-water flow direction and gradient apply to the entire monitoring well network

ft/ft: foot per foot

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

µg/L: micrograms per liter

EPA: United States Environmental Protection Agency

MTBE: Methyl tert-butyl ether

TRPH: total recoverable petroleum hydrocarbons

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

ND: none detected

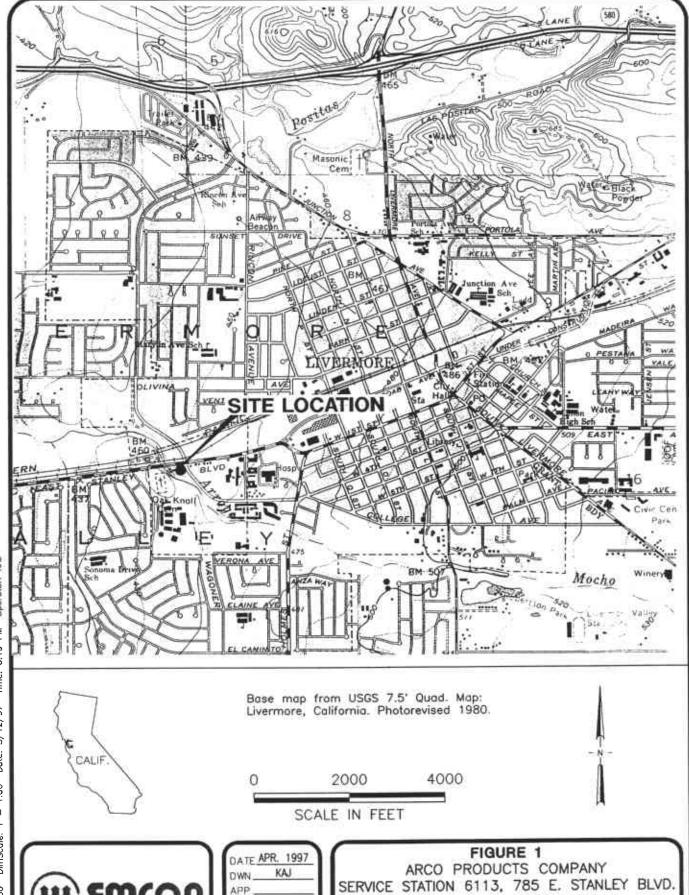
N: north

NW northwest

NNW: north-northwest

NNE: porth-northeast

- -: not analyzed or not applicable
- A method reporting limit was raised due to: (1) high analyte concentration requiring sample dilution, or (2) matrix interference
- *: For previous historical groundwater elevation and analytical data please refer to Fourth Quarter 1995 Groundwater Monitoring Program Results, ARCO Service Station 6113, Livermore, California. (EMCON, February 26, 1996).



REV .

PROJECT NO.

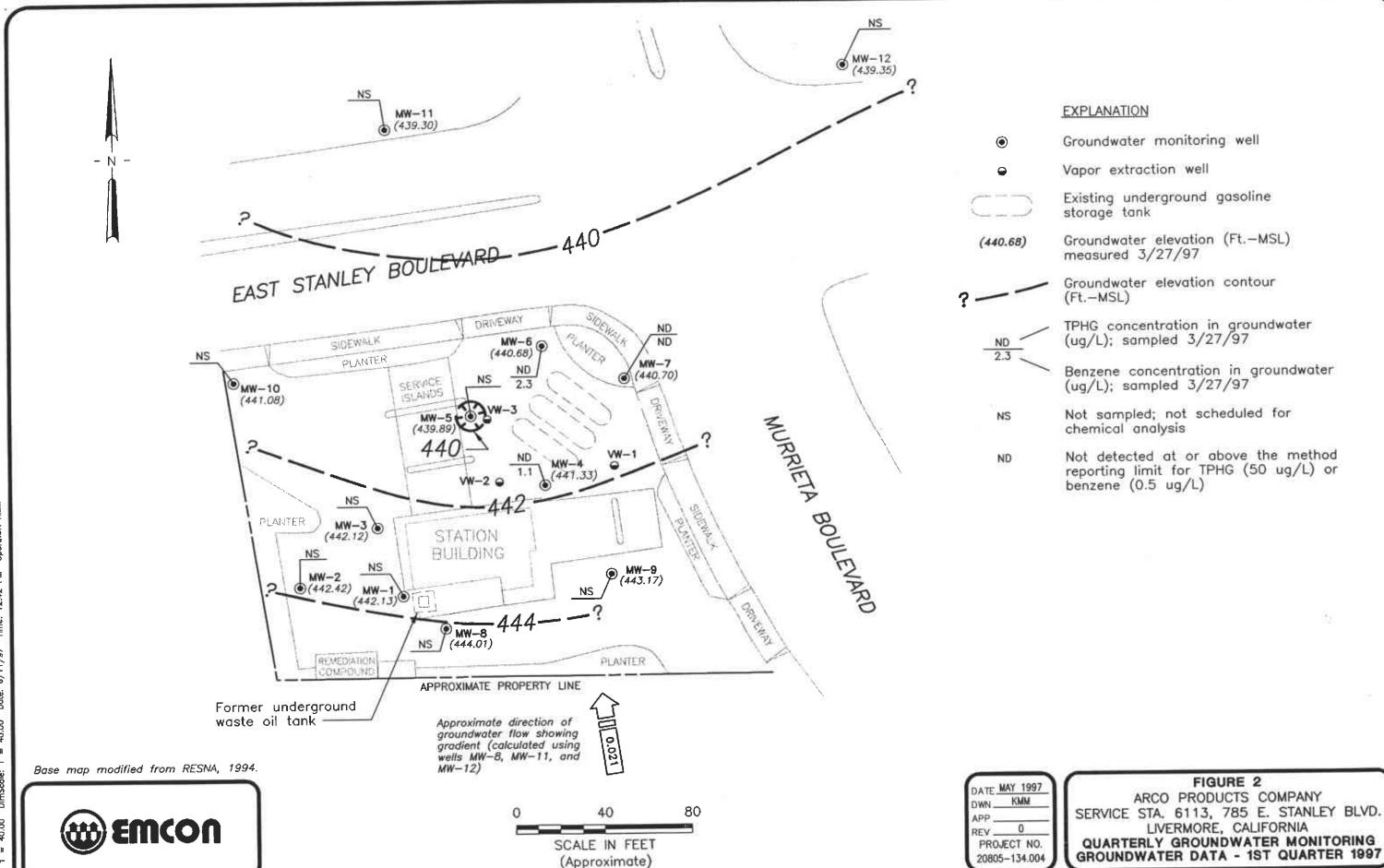
805-134.004

LIVERMORE, CALIFORNIA

QUARTERLY GROUNDWATER MONITORING

SITE LOCATION

EA-SANJOSE-CAD/DRAWINGS I:\02002\SITELOC.dwg Xrefs: <NONE> Scale: 1 = 1.00 DimScale: 1 = 1.00 Date: 3/12/97 Time: 5:19 PM Operator: KAJ



JUOSE-CAD/DRAWINGS: G:\BD5--134\SJGWELEY.dwg Xrefs: <NONE> 1 = 40.00 DimScole: 1 = 40.00 Date: 6/11/97 Time: 12:42 PM Operator: K



April 14, 1997

Service Request No.: <u>S9700588</u>

Mr. John Young **EMCON** 1921 Ringwood Avenue San Jose, CA 95131

6113 LIVERMORE/20805-134.002/TO#19350.00 RE:

Dear Mr. Young:

The following pages contain analytical results for sample(s) received by the laboratory on April 1, 1997. Results of sample analyses are followed by Appendix A which contains sample custody documentation and quality assurance deliverables requested for this project. The work requested has been assigned the Service Request No. listed above. To help expedite our service, please refer to this number when contacting the laboratory.

Analytical results were produced by procedures consistent with Columbia Analytical Services' (CAS) Quality Assurance Manual (with any deviations noted). Signature of this CAS Analytical Report below confirms that pages 2 through 11, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

Please feel welcome to contact me should you have questions or further needs.

Sincerely

Steven L. Green **Project Chemist**

Acronyms

A2LA American Association for Laboratory Accreditation

ASTM American Society for Testing and Materials

BOD Biochemical Oxygen Demand

BTEX Benzene, Toluene, Ethylbenzene, Xylenes

CAM California Assessment Metals
CARB California Air Resources Board

CAS Number Chemical Abstract Service registry Number

CFC Chlorofluorocarbon
CFU Colony-Forming Unit
COD Chemical Oxygen Demand

DEC Department of Environmental Conservation
DEQ Department of Environmental Quality
DHS Department of Health Services
DLCS Duplicate Laboratory Control Sample

DMS Duplicate Matrix Spike
DOE Department of Ecology
DOH Department of Health

EPA U. S. Environmental Protection Agency

ELAP Environmental Laboratory Accreditation Program

GC Gas Chromatography

GC/MS Gas Chromatography/Mass Spectrometry

IC Ion Chromatography

ICB Initial Calibration Blank sample

ICP Inductively Coupled Plasma atomic emission spectrometry

ICV Initial Calibration Verification sample

J Estimated concentration. The value is less than the MRL, but greater than or equal to

the MDL. If the value is equal to the MRL, the result is actually <MRL before rounding.

LCS Laboratory Control Sample
LUFT Leaking Underground Fuel Tank

M Modified

MBAS Methylene Blue Active Substances

MCL Maximum Contaminant Level. The highest permissible concentration of a

substance allowed in drinking water as established by the U. S. EPA.

MDL Method Detection Limit
MPN Most Probable Number
MRL Method Reporting Limit

MS Matrix Spike

MTBE Methyl tert-Butyl Ether

NA Not Applicable
NAN Not Analyzed
NC Not Calculated

NCAS! National Council of the paper industry for Air and Stream Improvement

ND Not Detected at or above the method reporting/detection limit (MRL/MDL)

NIOSH National Institute for Occupational Safety and Health

NTU Nephelometric Turbidity Units

ppb Parts Per Billion ppm Parts Per Million

PQL Practical Quantitation Limit
QA/QC Quality Assurance/Quality Control
RCRA Resource Conservation and Recovery Act

RPD Relative Percent Difference SIM Selected Ion Monitoring

SM Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992

STLC Solubility Threshold Limit Concentration

SW Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846,

3rd Ed., 1986 and as amended by Updates I, II, IIA, and IIB.

TCLP Toxicity Characteristic Leaching Procedure

TDS Total Dissolved Solids

TPH Total Petroleum Hydrocarbons

tr Trace level. The concentration of an analyte that is less than the PQL but greater than or equal

to the MDL. If the value is equal to the PQL, the result is actually <PQL before sounding.

TRPH Total Recoverable Petroleum Hydrocarbons

TSS Total Suspended Solids

TTLC Total Threshold Limit Concentration

VOA Volatile Organic Analyte(s) ACRONLST.DOC 7/14/95

Analytical Report

Client:

ARCO Products Company

Project:

20805-134.002/TO#19350.00/6113 LIVERMORE

Sample Matrix:

Water

Service Request: S9700588

Date Collected: 3/28/97

Date Received: 4/1/97

BTEX, MTBE and TPH as Gasoline

Sample Name:

MW-4 (25)

Lab Code:

S9700588-001

Test Notes:

Units: ug/L (ppb)
Basis: NA

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|--------------------------|----------------|--------------------|-----|--------------------|-------------------|------------------|--------|-----------------|
| TPH as Gasoline | NONE | CA/LUFT | 50 | 1 | NA | 4/11/97 | ND | |
| Benzene | NONE | 8020 | 0.5 | 1 | NA | 4/11/97 | 1.1 | |
| Toluene | NONE | 8020 | 0.5 | 1 | NA | 4/11/97 | ND | |
| Ethylbenzene | NONE | 8020 | 0.5 | 1 | NA | 4/11/97 | ND | |
| Xylenes, Total | NONE | 8020 | 0.5 | 1 | NA | 4/11/97 | 1.6 | |
| Methyl tert -Butyl Ether | NONE | 8020 | 3 | 1 | NA | 4/11/97 | ND | |

Analytical Report

Client:

ARCO Products Company

Project:

20805-134.002/TO#19350.00/6113 LIVERMORE

Service Request: \$9700588 Date Collected: 3/28/97

Sample Matrix:

Water

Date Received: 4/1/97

BTEX, MTBE and TPH as Gasoline

Sample Name:

MW-6 (65)

Lab Code:

S9700588-002

Units: ug/L (ppb) Basis: NA

Test Notes:

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|-------------------------|----------------|--------------------|-----|--------------------|-------------------|------------------|--------|-----------------|
| TPH as Gasoline | NONE | CA/LUFT | 50 | 1 | NA | 4/11/97 | ND | |
| Benzene | NONE | 8020 | 0.5 | 1 | NA | 4/11/97 | 2.3 | |
| Toluene | NONE | 8020 | 0.5 | 1 | NA | 4/11/97 | ND | |
| Ethylbenzene | NONE | 8020 | 0.5 | 1 | NA | 4/11/97 | 0.9 | |
| Xylenes, Total | NONE | 8020 | 0.5 | 1 | NA | 4/11/97 | 3.5 | |
| Methyl tert-Butyl Ether | NONE | 8020 | 3 | 1 | NA | 4/11/97 | 4 | |

Analytical Report

Client:

ARCO Products Company

Project:

20805-134.002/TO#19350.00/6113 LIVERMORE

Service Request: S9700588 Date Collected: 3/28/97

Sample Matrix:

Water

Date Received: 4/1/97

BTEX, MTBE and TPH as Gasoline

Sample Name:

MW-7 (66)

Units: ug/L (ppb)

Lab Code:

S9700588-003

Basis: NA

Test Notes:

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|-------------------------|----------------|--------------------|-----|--------------------|-------------------|------------------|--------|-----------------|
| TPH as Gasoline | NONE | CA/LUFT | 50 | 1 | NA | 4/11/97 | ND | |
| Benzene | NONE | 8020 | 0.5 | 1 | NA | 4/11/97 | ND | |
| Toluene | NONE | 8020 | 0.5 | 1 | NA | 4/11/97 | ND | |
| Ethylbenzene | NONE | 8020 | 0.5 | 1 | NA | 4/11/97 | ND | |
| Xylenes, Total | NONE | 8020 | 0.5 | 1 | NA | 4/11/97 | ND | |
| Methyl tert-Butyl Ether | NONE | 8020 | 3 | 1 | NA | 4/11/97 | ND | |

Analytical Report

Client:

ARCO Products Company

Project:

20805-134.002/TO#19350.00/6113 LIVERMORE

Date Collected: NA

Service Request: S9700588

Sample Matrix:

Water

Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name:

Method Blank

Units: ug/L (ppb)

Lab Code:

S970409-MB

Basis: NA

Test Notes:

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|--------------------------|----------------|--------------------|-----|--------------------|-------------------|------------------|--------|-----------------|
| TPH as Gasoline | NONE | CA/LUFT | 50 | 1 | NA | 4/9/97 | ND | |
| Benzene | NONE | 8020 | 0.5 | 1 | NA | 4/9/97 | ND | |
| Toluene | NONE | 8020 | 0.5 | 1 | NA | 4/9/97 | ND | |
| Ethylbenzene | NONE | 8020 | 0.5 | 1 | NA | 4/9/97 | ND | |
| Xylenes, Total | NONE | 8020 | 0.5 | 1 | NA | 4/9/97 | ND | |
| Methyl tert -Butyl Ether | NONE | 8020 | 3 | 1 | NA | 4/9/97 | ND | |

Analytical Report

Client:

ARCO Products Company

Project:

Sample Matrix:

20805-134.002/TO#19350.00/6113 LIVERMORE

Water

Service Request: S9700588

Date Collected: NA Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name:

Method Blank

Lab Code: Test Notes:

S970410-MB

Units: ug/L (ppb)

Basis: NA

| | Prep | Analysis | | Dilution | Date | Date | | Result |
|-------------------------|--------|----------|-----|----------|-----------|----------|--------|--------|
| Analyte | Method | Method | MRL | Factor | Extracted | Analyzed | Result | Notes |
| TPH as Gasoline | NONE | CA/LUFT | 50 | 1 | NA | 4/10/97 | ND | |
| Benzene | NONE | 8020 | 0.5 | 1 | NA | 4/10/97 | ND | |
| Toluene | NONE | 8020 | 0.5 | 1 | NA | 4/10/97 | ND | |
| Ethylbenzene | NONE | 8020 | 0.5 | 1 | NA | 4/10/97 | ND | |
| Xylenes, Total | NONE | 8020 | 0.5 | 1 | NA | 4/10/97 | ND | |
| Methyl tert-Butyl Ether | NONE | 8020 | 3 | 1 | NA | 4/10/97 | ND | |

QA/QC Report

Client:

ARCO Products Company

Project:

20805-134.002/TO#19350.00/6113 LIVERMORE

Service Request: S9700588 Date Collected: 3/28/97

Date Received: 4/1/97

Date Extracted: NA Date Analyzed: NA

Surrogate Recovery Summary BTEX and TPH as Gasoline

Prep Method: Analysis Method: 8020

Sample Matrix:

NONE

Water

Units: PERCENT

Basis: NA

| Sample Name | Lab Code | Test Notes | Percent 4-Bromofluorobenzene | Recovery a,a,a-Trifluorotoluene |
|--------------|----------------|---------------|---------------------------------|---------------------------------|
| MW-4 (25) | S9700588-001 | 5 | 96 | 91 |
| MW-6 (65) | S9700588-002 | | 90 | 94 |
| MW-7 (66) | S9700588-003 | | 98 | 90 |
| BATCH QC | S970489-001MS | | 112 | 108 |
| BATCH OC | S970489-001DMS | | 116 | 108 |
| Method Blank | S970409-MB | | 89 | 96 |
| Method Blank | S970410-MB | | 95 | 96 |

CAS Acceptance Limits:

69-116

69-116

QA/QC Report

Client:

ARCO Products Company

Project:

20805-134.002/TO#19350.00/6113 LIVERMORE

Sample Matrix:

Water

Service Request: S9700588

Date Collected: 3/28/97

Date Received: 4/1/97
Date Extracted: NA

Date Analyzed: 4/9/97

Matrix Spike/Duplicate Matrix Spike Summary

BTE

Sample Name:

BATCH QC

Units: ug/L (ppb)

Lab Code:

S970489-001MS,

S970489-001DMS

Basis: NA

Test Notes:

Percent Recovery

| Analyte | Prep Method | Analysis Method | MRL | • | e Level DMS | Sample Result | Spike MS | Result DMS | MS | DMS | CAS Acceptance Limits | Relative Percent Difference |
|--------------|----------------|--------------------|-----|-----|----------------|------------------|-------------|---------------|----|-----|-----------------------|-----------------------------------|
| Benzene | NONE | 8020 | 0.5 | 250 | 250 | 45 | 290 | 290 | 98 | 98 | 75-135 | <1 |
| Toluene | NONE | 8020 | 0.5 | 250 | 250 | 15 | 260 | 270 | 98 | 102 | 73-136 | 4 |
| Ethylbenzene | NONE | 8020 | 0.5 | 250 | 250 | 52 | 300 | 310 | 99 | 103 | 69-142 | 3 |

QA/QC Report

Client:

ARCO Products Company

Project:

20805-134.002/TO#19350.00/6113 LIVERMORE

Service Request: S9700588

Date Analyzed: 4/9/97

Initial Calibration Verification (ICV) Summary BTEX, MTBE and TPH as Gasoline

Sample Name:

ICV

Units: ug/L (ppb)

Basis: NA

Lab Code:

ICV1

Test Notes:

I est Motes.

ICV Source:

| Analyte | Analysis Method | True Value | Result | Percent Recovery | Result Notes |
|--------------------------|--------------------|---------------|--------|---------------------|-----------------|
| TPH as Gasoline | CA/LUFT | 250 | 250 | 100 | |
| Benzene | 8020 | 25 | 24 | 96 | |
| Toluene | 8020 | 25 | 25 | 100 | |
| Ethylbenzene | 8020 | 25 | 25 | 100 | |
| Xylenes, Total | 8020 | 75 | 72 | 96 | |
| Methyl tert -Butyl Ether | 8020 | 25 | 24 | 96 | |

| ARCO | Produ | ICTS of Atlantic | Com | pany Company | \ | | | Task O | rder No. | | 193 | 350 | j. o | 0 | Pho | 4/1/4 | 7 pu | 54 | 7 | | 9526 | Chain of Cuştody |
|---|---------|------------------|----------|--------------|---------------|----------|--------------------|----------------------|---------------|----------------------|-------------------|---------------------------------|--------------------------------|-------------------------|--------------|--------------|-------------------|-----------|----------------------------|-----------------------------------|--------|-----------------------------------|
| ARCO Facili | y no. | 113 | , | Cit (Fe | y acility) | LIVE | nemî | 2 | | Project (Consul | manag tant) | jer J | ohn | Ya | w | 1 | | | | | | Laboratory name |
| ARCO engin | eer / | On v | / 3 | 500 | de | A | Telephor (ARCO) | ne no. | | Telepho (Consul | one no. itant) | 408 | 145 | 37 | 30C | Fau (Co | c no. Insultar | 11) 4£ | 64 | 37 | 9526 | Contract number |
| Consultant r | ame E | Mu | كالم | / / | · - | | | Address (Consults | ant) 192 | 12 | 191 | אטטכ | JA | JL . , | Sa | n Je |)K | 0, | 4-6 | 7.SI | 31 | |
| ARCO Products Company Division of AtlanticRichfieldCompany ARCO Facility no. U. 3 City (Facility) UV M. S. ARCO engineer Paul Supple Arco (ARC) Consultant name UV M. Matrix Preservation | | | | | rvation | | <u> </u> | | Wales | % □ | | , 병 | | | | Semi VOA | 00077000 | | (12) | Method of shipment | | |
| Sample I.D. | Lab no. | Container no | Soil | Water | Other | lce | Acid | Sempling date | Sampling time | BTEX 802/EPA 8020 | BTEXTPH G | 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 | CAM Metals EPA TTLC STL | Lead Org./DHS Lead EPA 7420/7421 | 7000 C | |
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APPC-3292 (2-91)