EMCON
1921 Ringwood Avenue • San Jose, California 95131-1721 • **(408) 453-7300** • Fax (408) 437-9526

Date March 31, 1998
Project 20805-131.012

To:

Ms. Juliet Shin
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 | Fourth quarter 1997 groundwater monitoring results report, ARCO service station 6002, Oakland, California |
| 1 | Jeffrey Enebly letter |

| | | | | | |
|---|---|---|---|---|---|
| For your: | X | Use | Sent by: | X | Regular Mail |
| | | Approval | | | Standard Air |
| | | Review | | | Courier |
| | | Information | | | Other: Certified 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.

Gary P. Messerotes
Project Manager

cc: Paul Supple, ARCO Products Company
File

ARCO Products Company

Date: March 31, 1998

Re: ARCO Station #

6002 • 6235 Seminary Avenue • Oakland, CA
Fourth 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

EMCON
1921 Ringwood Avenue • San Jose, California 95131-1721 • **(408) 453-7300** • Fax (408) 437-9526

March 12, 1998
Project 20805-131.012

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

Re: Fourth quarter 1997 groundwater monitoring results, ARCO service station 6002, Oakland, California

Dear Mr. Supple:

This letter presents the results of the fourth quarter 1997 groundwater monitoring program at ARCO Products Company (ARCO) service station 6002, 6235 Seminary Avenue, Oakland, California (Figure 1). The quarterly 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, results should not be construed as a guarantee of the absence of such conditions at the site, but rather as the product of the scope and limitations of work performed during the monitoring event.

Please call if you have questions.

Sincerely,

EMCON

Gary P. Messerotes, R.G. 5650
Project Manager

March 12, 1998

# ARCO QUARTERLY REPORT

| | |
|---|---|
| Station No.: 6002 | Address: 6235 Seminary Avenue, Oakland, California |
| EMCON Project No.: | 20805-131.012 |
| ARCO Environmental Engineer/Phone No.: | Paul Supple /(510) 299-8891 |
| EMCON Project Manager/Phone No.: | Gary P. Messerotes /(408) 453-7300 |
| Primary Agency/Regulatory ID No.: | ACHCSA /Juliet Shin |

## WORK PERFORMED THIS QUARTER (Fourth - 1997):

1. Prepared and submitted quarterly groundwater monitoring report for third quarter 1997.
2. Performed quarterly groundwater monitoring and sampling for fourth quarter 1997.

## WORK PROPOSED FOR NEXT QUARTER (First - 1998):

1. Prepare and submit quarterly groundwater monitoring report for fourth quarter 1997.
2. Perform quarterly groundwater monitoring and sampling for first quarter 1998.

## QUARTERLY MONITORING:

| | |
|---|---|
| Current Phase of Project: | Quarterly Groundwater Monitoring |
| Frequency of Sampling: | Quarterly (groundwater) |
| Frequency of Monitoring: | Quarterly (groundwater) |
| Is Floating Product (FP) Present On-site: | ☐ Yes ☒ No |
| Bulk Soil Removed to Date : | approximately 370 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: | 9.35 feet |
| Groundwater Gradient (Average): | 0.036 ft/ft toward west-southwest (consistent with past events) |

## ATTACHED:

- Table 1 - Groundwater Monitoring Data, Fourth Quarter 1997
- Table 2 - Historical Groundwater Elevation and Analytical Data, Petroleum Hydrocarbons and Their Constituents
- Figure 1 - Site Location
- Figure 2 - Groundwater Data, Fourth Quarter 1997
- Appendix A - Analytical Results and Chain of Custody Documentation, Fourth Quarter 1997 Groundwater Monitoring Event

cc: Juliet Shin, ACHCSA

# Table 1
## Groundwater Monitoring Data
## Fourth Quarter 1997

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Date: 03-09-98

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ft-MSL | feet | ft-MSL | feet | MWN | ft/ft | | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| MW-3 | 10-29-97 | 248.35 | 8.58 | 239.77 | ND | WSW | 0.036 | 10-29-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-4 | 10-29-97 | 242.91 | 12.00 | 230.91 | ND | WSW | 0.036 | 10-29-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-5 | 10-29-97 | 244.82 | 13.03 | 231.79 | ND | WSW | 0.036 | 10-29-97 | 19000 | 130 | <20^ | 1400 | 620 | 1700 | -- |
| MW-6 | 10-29-97 | 252.20 | 7.42 | 244.78 | ND | WSW | 0.036 | 10-29-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-7 | 10-29-97 | 235.95 | NR | NR | ND | WSW | 0.036 | 10-29-97 | Not sampled: well is dry | | | | | | |
| MW-8 | 10-29-97 | 240.37 | 9.35 | 231.02 | ND | WSW | 0.036 | 10-29-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| VW-1 | 10-29-97 | NR | 7.53 | NR | ND | WSW | 0.036 | 10-29-97 | 600 | <0.5 | <0.5 | <0.5 | 1.6 | 84 | -- |
| VW-4 | 10-29-97 | NR | 9.35 | NR | ND | WSW | 0.036 | 10-29-97 | 9800 | 200 | 69 | 260 | 360 | 4900 | -- |

ft-MSL: elevation in feet, relative to mean sea level
MWN: groundwater flow direction and gradient apply to the entire monitoring well network
ft/ft: foot per foot
TPHG: total petroleum hydrocarbons as gasoline
µg/L: micrograms per liter
EPA: United States Environmental Protection Agency
MTBE: Methyl tert-butyl ether
NR: not reported; data not available or not measurable
ND: none detected
WSW: west-southwest
^: method reporting limit 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*

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Date: 03-09-98

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ft-MSL | feet | ft-MSL | feet | MWN | ft/ft | | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| MW-1 | 03-15-95 | 247.06 | 7.37 | 239.69 | ND | WSW | 0.08 | 03-15-95 | 13000 | 1200 | 44 | 770 | 1100 | -- | -- |
| MW-1 | 05-30-95 | 247.06 | 8.48 | 238.58 | ND | WSW | 0.08 | 05-30-95 | 19000 | 1600 | 30 | 890 | 1400 | -- | -- |
| MW-1 | 09-01-95 | 247.06 | 9.47 | 237.59 | ND | WSW | 0.09 | 09-01-95 | 14000 | 1300 | 28 | 480 | 780 | 24000 | -- |
| MW-1 | 11-13-95 | 247.06 | 8.78 | ** 238.29 | 0.01 | WSW | 0.08 | 11-13-95 | 11000 | 570 | 17 | 260 | 410 | -- | 25000 |
| MW-1 | 02-23-96 | 247.06 | Well was decommisioned on 2-12-96 | | | | | 03-01-96 | Well was decommisioned on 2-12-96 | | | | | | |
| MW-2 | 03-15-95 | 249.30 | 8.25 | 241.05 | ND | WSW | 0.08 | 03-15-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- |
| MW-2 | 05-30-95 | 249.30 | 9.93 | 239.37 | ND | WSW | 0.08 | 05-30-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- |
| MW-2 | 09-01-95 | 249.30 | 10.69 | 238.61 | ND | WSW | 0.09 | 09-01-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-2 | 11-13-95 | 249.30 | 10.32 | 238.98 | ND | WSW | 0.08 | 11-13-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- |
| MW-2 | 02-23-96 | 249.30 | Well was decommisioned on 2-12-96 | | | | | 03-01-96 | Well was decommisioned on 2-12-96 | | | | | | |
| MW-3 | 03-15-95 | 248.35 | 6.76 | 241.59 | ND | WSW | 0.08 | 03-15-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- |
| MW-3 | 05-30-95 | 248.35 | 7.81 | 240.54 | ND | WSW | 0.08 | 05-30-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- |
| MW-3 | 09-01-95 | 248.35 | 8.65 | 239.70 | ND | WSW | 0.09 | 09-01-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-3 | 11-13-95 | 248.35 | 8.25 | 240.10 | ND | WSW | 0.08 | 11-13-95 | 120 | 45 | 0.7 | <0.5 | 6.2 | -- | -- |
| MW-3 | 02-23-96 | 248.35 | 6.64 | 241.71 | ND | WSW | 0.08 | 03-01-96 | <50 | <0.5 | <0.5 | 0.6 | 1.9 | <3 | -- |
| MW-3 | 05-10-96 | 248.35 | 7.95 | 240.40 | ND | WSW | 0.08 | 05-10-96 | Not sampled: well sampled annually, during the first quarter | | | | | | |
| MW-3 | 08-09-96 | 248.35 | 8.06 | 240.29 | ND | SW | 0.08 | 08-09-96 | Not sampled: well sampled annually, during the first quarter | | | | | | |
| MW-3 | 11-08-96 | 248.35 | Not surveyed: inaccessible | | | SW | 0.055 | 11-11-96 | Not sampled: inaccessible | | | | | | |
| MW-3 | 03-21-97 | 248.35 | 8.21 | 240.14 | ND | WSW | 0.051 | 03-21-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-3 | 05-27-97 | 248.35 | 8.25 | 240.10 | ND | WSW | 0.069 | 05-27-97 | Not sampled: well sampled annually, during the first quarter | | | | | | |
| MW-3 | 08-05-97 | 248.35 | 8.29 | 240.06 | ND | W | 0.076 | 08-05-97 | Not sampled: well sampled annually, during the first quarter | | | | | | |
| MW-3 | 10-29-97 | 248.35 | 8.58 | 239.77 | ND | WSW | 0.036 | 10-29-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |

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

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Date: 03-09-98

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ft-MSL | feet | ft-MSL | feet | MWN | ft/ft | | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| MW-4 | 03-15-95 | 242.91 | 9.37 | 233.54 | ND | WSW | 0.08 | 03-15-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- |
| MW-4 | 05-30-95 | 242.91 | 11.47 | 231.44 | ND | WSW | 0.08 | 05-30-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- |
| MW-4 | 09-01-95 | 242.91 | 12.28 | 230.63 | ND | WSW | 0.09 | 09-01-95 | 78 | <0.5 | 0.7 | <0.5 | <0.5 | <3 | -- |
| MW-4 | 11-13-95 | 242.91 | 11.75 | 231.16 | ND | WSW | 0.08 | 11-13-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- |
| MW-4 | 02-23-96 | 242.91 | 8.51 | 234.40 | ND | WSW | 0.08 | 03-01-96 | 59 | 1.2 | 7.4 | 1.6 | 9.3 | 3 | -- |
| MW-4 | 05-10-96 | 242.91 | 11.35 | 231.56 | ND | WSW | 0.08 | 05-10-96 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-4 | 08-09-96 | 242.91 | 9.70 | 233.21 | ND | SW | 0.08 | 08-09-96 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-4 | 11-08-96 | 242.91 | 11.79 | 231.12 | ND | SW | 0.055 | 11-08-96 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-4 | 03-21-97 | 242.91 | 10.94 | 231.97 | ND | WSW | 0.051 | 03-21-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | 81 | -- |
| MW-4 | 05-27-97 | 242.91 | 11.51 | 231.40 | ND | WSW | 0.069 | 05-27-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-4 | 08-05-97 | 242.91 | 11.90 | 231.01 | ND | W | 0.076 | 08-05-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-4 | 10-29-97 | 242.91 | 12.00 | 230.91 | ND | WSW | 0.036 | 10-29-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-5 | 03-15-95 | 244.82 | 11.99 | 232.83 | ND | WSW | 0.08 | 03-15-95 | 21000 | 870 | 22 | 1600 | 1900 | -- | -- |
| MW-5 | 05-30-95 | 244.82 | 12.97 | 231.85 | ND | WSW | 0.08 | 05-30-95 | 17000 | 2100 | 250 | 1000 | 520 | -- | -- |
| MW-5 | 09-01-95 | 244.82 | 14.03 | 230.79 | ND | WSW | 0.09 | 09-01-95 | 19000 | 1500 | 25 | 1600 | 880 | 8300 | -- |
| MW-5 | 11-13-95 | 244.82 | 13.65 | 231.17 | ND | WSW | 0.08 | 11-13-95 | 21000 | 1300 | 22 | 1400 | 630 | -- | -- |
| MW-5 | 02-23-96 | 244.82 | 11.93 | 232.89 | ND | WSW | 0.08 | 03-01-96 | 27000 | 1300 | <50 | 1600 | 1500 | 730 | -- |
| MW-5 | 05-10-96 | 244.82 | 13.05 | 231.77 | ND | WSW | 0.08 | 05-10-96 | 17000 | 460 | 21 | 760 | 480 | 1000 | -- |
| MW-5 | 08-09-96 | 244.82 | 13.22 | 231.60 | ND | SW | 0.08 | 08-09-96 | 16000 | 420 | 14 | 870 | 390 | 1500 | -- |
| MW-5 | 11-08-96 | 244.82 | Not surveyed: inaccessible | | | SW | 0.055 | 11-11-96 | Not sampled: inaccessible | | | | | | |
| MW-5 | 03-21-97 | 244.82 | 13.24 | 231.58 | ND | WSW | 0.051 | 03-21-97 | 18000 | 110 | <50^ | 730 | 1500 | 1800 | -- |
| MW-5 | 05-27-97 | 244.82 | 13.10 | 231.72 | ND | WSW | 0.069 | 05-27-97 | 21000 | 86 | <20^ | 810 | 610 | 1700 | -- |
| MW-5 | 08-05-97 | 244.82 | 13.14 | 231.68 | ND | W | 0.076 | 08-05-97 | 340 | 2.2 | <0.5 | 15 | 8.8 | 39 | -- |
| MW-5 | 10-29-97 | 244.82 | 13.03 | 231.79 | ND | WSW | 0.036 | 10-29-97 | 19000 | 130 | <20^ | 1400 | 620 | 1700 | -- |

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

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Date: 03-09-98

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ft-MSL | feet | ft-MSL | feet | MWN | ft/ft | | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| MW-6 | 06-29-95 | NR | 6.63 | NR | ND | NR | NR | 06-30-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | -- | -- |
| MW-6 | 09-01-95 | NR | Not surveyed: | | | | | 09-01-95 | Not sampled: | | | | | | |
| MW-6 | 11-13-95 | NR | 7.70 | NR | ND | WSW | 0.08 | 11-13-95 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-6 | 02-23-96 | NR | 9.82 | NR | ND | WSW | 0.08 | 03-01-96 | <50 | <0.5 | 0.8 | <0.5 | 0.6 | <3 | -- |
| MW-6 | 05-10-96 | NR | 15.25 | NR | ND | WSW | 0.08 | 05-10-96 | Not sampled: well sampled annually, during the first quarter | | | | | | |
| MW-6 | 08-09-96 | 252.20 | 11.11 | 241.09 | ND | SW | 0.08 | 08-09-96 | Not sampled: well sampled annually, during the first quarter | | | | | | |
| MW-6 | 11-08-96 | 252.20 | 9.31 | 242.89 | ND | SW | 0.055 | 11-11-96 | Not sampled: well sampled annually, during the first quarter | | | | | | |
| MW-6 | 03-21-97 | 252.20 | 9.40 | 242.80 | ND | WSW | 0.051 | 03-21-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-6 | 05-27-97 | 252.20 | 7.08 | 245.12 | ND | WSW | 0.069 | 05-27-97 | Not sampled: well sampled annually, during the first quarter | | | | | | |
| MW-6 | 08-05-97 | 252.20 | 7.12 | 245.08 | ND | W | 0.076 | 08-05-97 | Not sampled: well sampled annually, during the first quarter | | | | | | |
| MW-6 | 10-29-97 | 252.20 | 7.42 | 244.78 | ND | WSW | 0.036 | 10-29-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-7 | 08-09-96 | 235.95 | Not surveyed: well was dry | | | SW | 0.08 | 08-09-96 | Not sampled: well was dry | | | | | | |
| MW-7 | 11-08-96 | 235.95 | Not surveyed: well was dry | | | SW | 0.055 | 11-11-96 | Not sampled: well was dry | | | | | | |
| MW-7 | 01-27-97 | 235.95 | NR | NR | ND | NR | NR | 01-27-97 | 2900 | 29 | <5^ | <5^ | 580 | 220 | -- |
| MW-7 | 03-21-97 | 235.95 | 7.13 | 228.82 | ND | WSW | 0.051 | 03-21-97 | 590 | 3.5 | <0.5 | <0.5 | 1.3 | 90 | -- |
| MW-7 | 05-27-97 | 235.95 | 9.02 | 226.93 | ND | WSW | 0.069 | 05-27-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-7 | 08-05-97 | 235.95 | 12.33 | 223.62 | ND | W | 0.076 | 08-05-97 | 110 | 0.5 | <0.5 | <0.5 | 0.8 | 81 | -- |
| MW-7 | 10-29-97 | 235.95 | NA | NA | ND | WSW | 0.036 | 10-29-97 | Not sampled: well is dry | | | | | | |
| MW-8 | 08-09-96 | 240.37 | 9.41 | 230.96 | ND | SW | 0.08 | 08-09-96 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-8 | 11-08-96 | 240.37 | 9.19 | 231.18 | ND | SW | 0.055 | 11-11-96 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-8 | 03-21-97 | 240.37 | 8.55 | 231.82 | ND | WSW | 0.051 | 03-21-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-8 | 05-27-97 | 240.37 | 11.06 | 229.31 | ND | WSW | 0.069 | 05-27-97 | 91 | 0.6 | <0.5 | <0.5 | 0.6 | 66 | -- |
| MW-8 | 08-05-97 | 240.37 | 9.32 | 231.05 | ND | W | 0.076 | 08-05-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| MW-8 | 10-29-97 | 240.37 | 9.35 | 231.02 | ND | WSW | 0.036 | 10-29-97 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | <3 | -- |
| AS-1 | 06-29-95 | NR | 9.20 | NR | ND | NR | NR | 06-30-95 | <50 | 1.6 | <0.5 | 0.9 | 0.9 | -- | -- |

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

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Date: 03-09-98

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ft-MSL | feet | ft-MSL | feet | MWN | ft/ft | | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| VW-1 | 02-23-96 | NR | 5.29 | NR | ND | WSW | 0.08 | 03-01-96 | 21000 | 490 | 57 | 520 | 1500 | 240 | - - |
| VW-1 | 05-10-96 | NR | 6.80 | NR | ND | WSW | 0.08 | 05-10-96 | 3700 | 61 | <5 | 100 | 50 | 200 | - - |
| VW-1 | 08-09-96 | NR | 7.03 | NR | ND | SW | 0.08 | 08-09-96 | 970 | 2.7 | <2.5 | 2.7 | 3.7 | 180 | - - |
| VW-1 | 11-08-96 | NR | Not surveyed: inaccessible | | | SW | 0.055 | 11-11-96 | Not sampled: inaccessible | | | | | | |
| VW-1 | 03-21-97 | NR | 7.51 | NR | ND | WSW | 0.051 | 03-21-97 | 640 | <4^ | <1^ | 1 | 3 | 194 | - - |
| VW-1 | 05-27-97 | NR | 7.51 | NR | ND | WSW | 0.069 | 05-27-97 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | |
| VW-1 | 08-05-97 | NR | 7.51 | NR | ND | W | 0.076 | 08-05-97 | 630 | <1^ | <1^ | 3 | 2 | 120 | - - |
| VW-1 | 10-29-97 | NR | 7.53 | NR | ND | WSW | 0.036 | 10-29-97 | 600 | <0.5 | <0.5 | <0.5 | 1.6 | 84 | - - |
| VW-2 | 02-23-96 | NR | 6.92 | NR | ND | WSW | 0.08 | 03-01-96 | Not sampled: not part of sampling program | | | | | | |
| VW-2 | 05-10-96 | NR | Not surveyed: not scheduled for monitoring | | | | | 05-10-96 | Not sampled: not part of sampling program | | | | | | |
| VW-4 | 05-10-96 | NR | 8.58 | NR | ND | WSW | 0.08 | 05-10-96 | 13000 | 2500 | 41 | 420 | 660 | 43000 | - - |
| VW-4 | 08-09-96 | NR | 11.70 | NR | ND | SW | 0.08 | 08-09-96 | <50 | <0.5 | <0.5 | <0.5 | <0.5 | 6200 | - - |
| VW-4 | 11-08-96 | NR | 9.38 | NR | ND | SW | 0.055 | 11-08-96 | 7800 | 510 | 7 | 180 | 370 | 21000 | - - |
| VW-4 | 03-21-97 | NR | 9.11 | NR | ND | WSW | 0.051 | 03-21-97 | 10000 | 290 | 10 | 270 | 230 | 8900 | - - |
| VW-4 | 05-27-97 | NR | 9.34 | NR | ND | WSW | 0.069 | 05-27-97 | Not sampled: well sampled semi-annually, during the first and third quarters | | | | | | |
| VW-4 | 08-05-97 | NR | 9.47 | NR | ND | W | 0.076 | 08-05-97 | <10000^ | 180 | <100^ | <100^ | 110 | 12000 | - - |
| VW-4 | 10-29-97 | NR | 9.35 | NR | ND | WSW | 0.036 | 10-29-97 | 9800 | 200 | 69 | 260 | 360 | 4900 | - - |

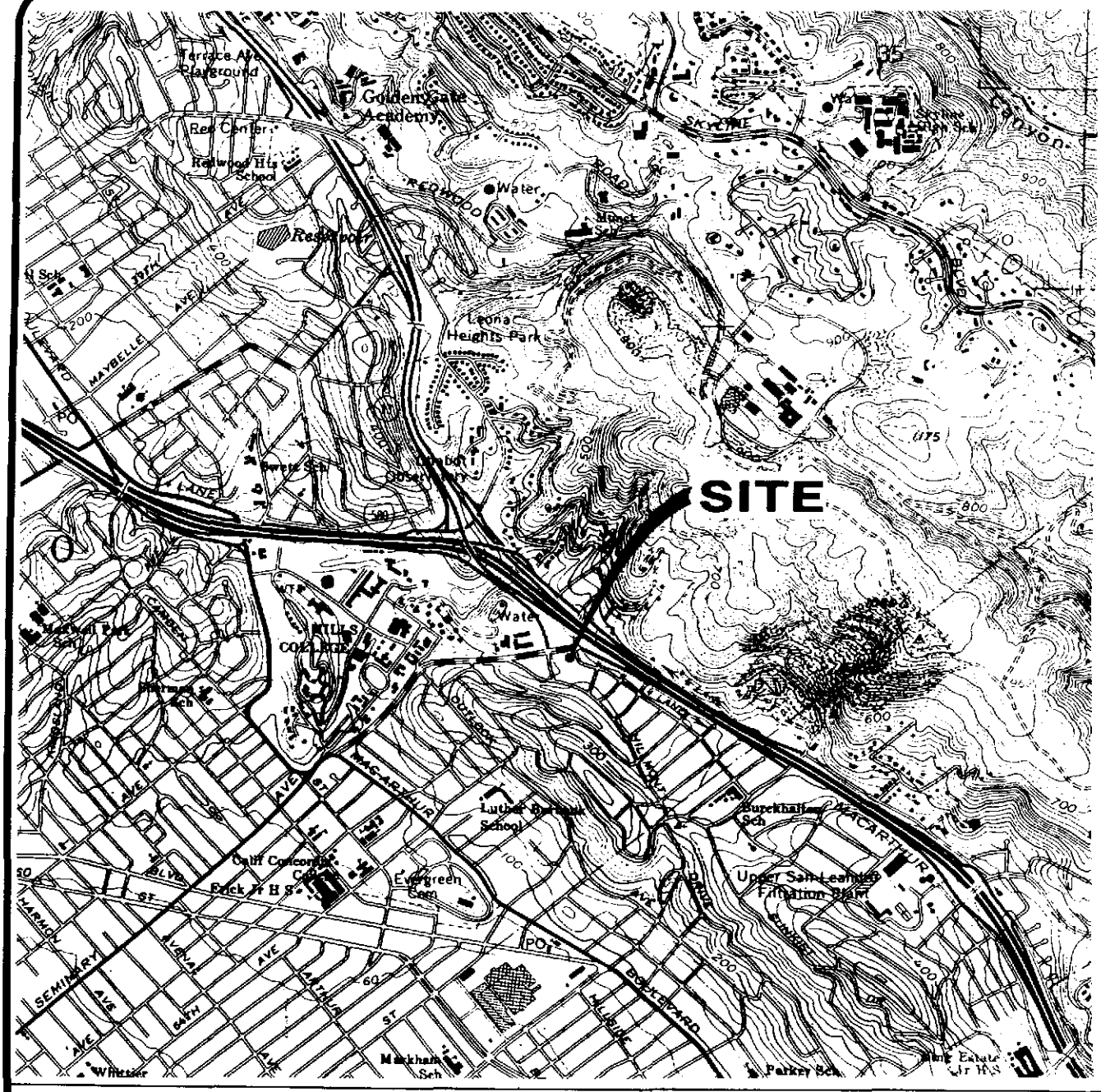
Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1995 - Present*

ARCO Service Station 6002
6235 Seminary Avenue, Oakland, California

Date: 03-09-98

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ft-MSL | feet | ft-MSL | feet | MWN | ft/ft | | 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
µg/L: micrograms per liter
EPA: United States Environmental Protection Agency
MTBE: Methyl-tert-butyl ether
ND: none detected
NR: not reported; data not available or not measurable
WSW: west-southwest
- -: not analyzed or not applicable
*: For previous historical groundwater elevation data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results, ARCO Service Station 6002, Oakland, California,* (EMCON, February 23, 1996).
^: method reporting limit was raised due to: (1) high analyte concentration requiring sample dilution, or (2) matrix interference
** [corrected elevation (Z')] = Z + (h * 0.73) where: Z: measured elevation, h: floating product thickness, 0.73: density ratio of oil to water

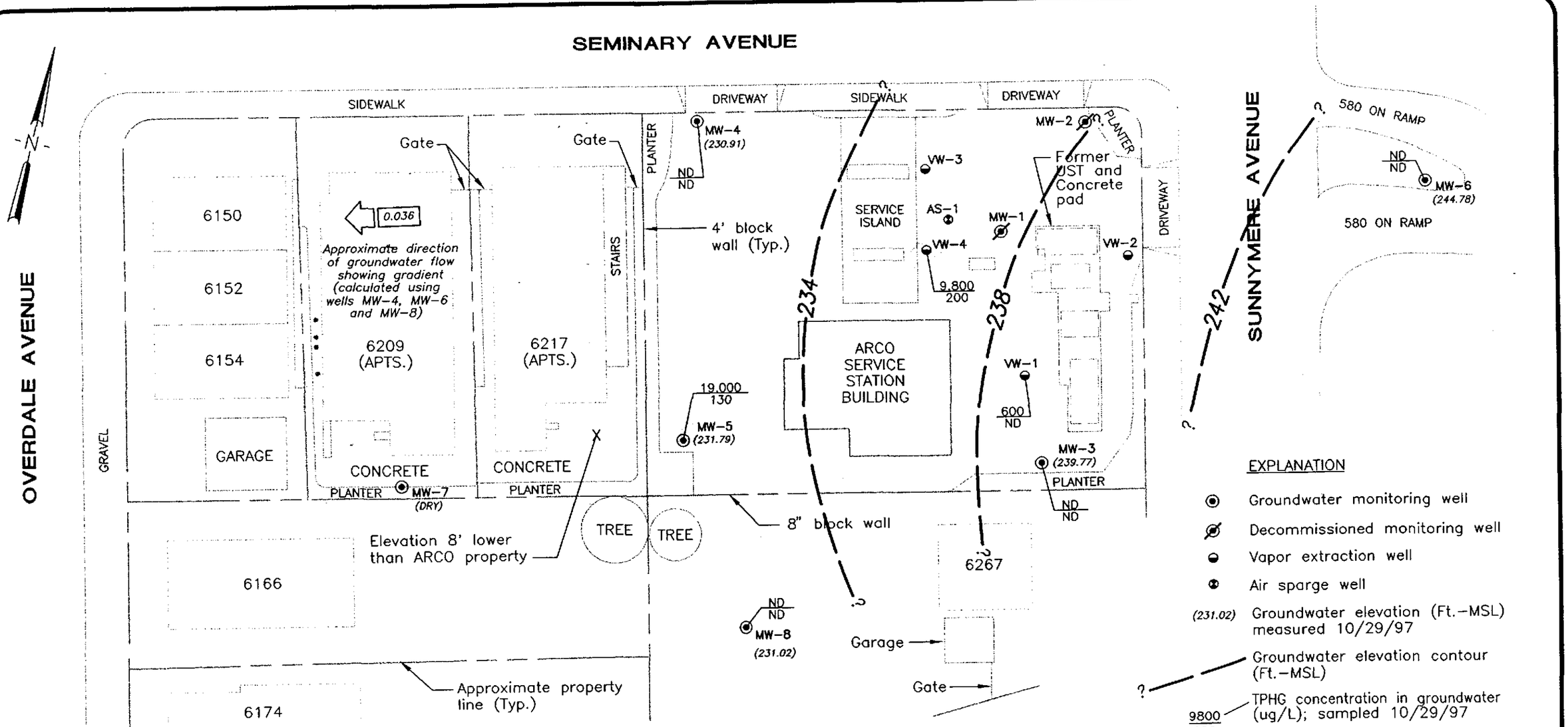



EMCON

DATE NOV. 1997
DWN KAJ
APP
REV
PROJECT NO.
805-131.012

**FIGURE 1**
ARCO PRODUCTS COMPANY
SERVICE STATION 6002, 6235 SEMINARY AVE.
OAKLAND, CALIFORNIA
**QUARTERLY GROUNDWATER MONITORING**
**SITE LOCATION**

EA-SANJOSE-CAD/DRAWINGS: I:\DZ002\SITELOC.dwg Xrefs: <NONE>
Scale: 1 = 1.00 DimScale: 1 = 1.00 Date: 3/12/97 Time: 5:19 PM Operator: KAJ




EXPLANATION

- Groundwater monitoring well
- Decommissioned monitoring well
- Vapor extraction well
- Air sparge well
- (231.02) Groundwater elevation (Ft.–MSL) measured 10/29/97
- Groundwater elevation contour (Ft.–MSL)
- 9800 / 200 — TPHG concentration in groundwater (ug/L); sampled 10/29/97 / Benzene concentration in groundwater (ug/L); sampled 10/29/97
- ND — Not detected at or above method reporting limit for TPHG (50 ug/L) or benzene (0.5 ug/L)

*Base map modified from GSI, 1994.*

emcon

0 30 60
SCALE IN FEET

DATE MAR. 1998
DWN KAJ
APP
REV
PROJECT NO.
805-131.012

**FIGURE 2**
ARCO PRODUCTS COMPANY
SERVICE STATION 6002, 6235 SEMINARY AVE.
OAKLAND, CALIFORNIA
**QUARTERLY GROUNDWATER MONITORING**
**GROUNDWATER DATA - 4TH QUARTER 1997**

EA-SANJOSE-CAD/DRAWINGS: R:\805-131\SJGWELEV.dwg Xrefs: <NONE>
Scale: 1 = 30.00 DimScale: 1 = 30.00 Date: 3/10/98 Time: 10:14 AM Operator: KAJ

Columbia Analytical Services INC.

November 13, 1997 Service Request No.: S9702213

Gary Messerotes
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

**RE: 20805-131.008/TO#21133.00/6002 OAKLAND**

Dear Mr. Messerotes:

The following pages contain analytical results for sample(s) received by the laboratory on October 30, 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 16, 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

Bernadette T. Cox for

Greg Anderson
Regional QA Coordinator

## COLUMBIA ANALYTICAL SERVICES, Inc.
### 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 |
| **NCASI** | 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 rounding. |
| **TRPH** | Total Recoverable Petroleum Hydrocarbons |
| **TSS** | Total Suspended Solids |
| **TTLC** | Total Threshold Limit Concentration |
| **VOA** | Volatile Organic Analyte(s) |

## COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCO Products Company | **Service Request:** | S9702213 |
| **Project:** | 20805-131.008/TO#21133.00/6002 OAKLAND | **Date Collected:** | 10/29/97 |
| **Sample Matrix:** | Water | **Date Received:** | 10/30/97 |

BTEX, MTBE and TPH as Gasoline

| | | | |
|---|---|---|---|
| Sample Name: | MW-3(10') | Units: | ug/L (ppb) |
| Lab Code: | S9702213-001 | Basis: | NA |
| Test Notes: | | | |

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|---|---|---|---|---|---|---|---|---|
| TPH as Gasoline | EPA 5030 | CA/LUFT | 50 | 1 | NA | 10/31/97 | ND | |
| Benzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 10/31/97 | ND | |
| Toluene | EPA 5030 | 8020 | 0.5 | 1 | NA | 10/31/97 | ND | |
| Ethylbenzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 10/31/97 | ND | |
| Xylenes, Total | EPA 5030 | 8020 | 0.5 | 1 | NA | 10/31/97 | ND | |
| Methyl *tert*-Butyl Ether | EPA 5030 | 8020 | 3 | 1 | NA | 10/31/97 | ND | |

1S22/020597p

## COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCO Products Company | **Service Request:** | S9702213 |
| **Project:** | 20805-131.008/TO#21133.00/6002 OAKLAND | **Date Collected:** | 10/29/97 |
| **Sample Matrix:** | Water | **Date Received:** | 10/30/97 |

BTEX, MTBE and TPH as Gasoline

| | | | |
|---|---|---|---|
| Sample Name: | MW-4(14') | Units: | ug/L (ppb) |
| Lab Code: | S9702213-002 | Basis: | NA |
| Test Notes: | | | |

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|---|---|---|---|---|---|---|---|---|
| TPH as Gasoline | EPA 5030 | CA/LUFT | 50 | 1 | NA | 11/1/97 | ND | |
| Benzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Toluene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Ethylbenzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Xylenes, Total | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Methyl *tert*-Butyl Ether | EPA 5030 | 8020 | 3 | 1 | NA | 11/1/97 | ND | |

1S22/020597p

## COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCO Products Company | **Service Request:** | S9702213 |
| **Project:** | 20805-131.008/TO#21133.00/6002 OAKLAND | **Date Collected:** | 10/29/97 |
| **Sample Matrix:** | Water | **Date Received:** | 10/30/97 |

### BTEX, MTBE and TPH as Gasoline

| | | | |
|---|---|---|---|
| Sample Name: | MW-8(11') | Units: | ug/L (ppb) |
| Lab Code: | S9702213-003 | Basis: | NA |
| Test Notes: | | | |

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|---|---|---|---|---|---|---|---|---|
| TPH as Gasoline | EPA 5030 | CA/LUFT | 50 | 1 | NA | 11/1/97 | ND | |
| Benzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Toluene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Ethylbenzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Xylenes, Total | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Methyl *tert*-Butyl Ether | EPA 5030 | 8020 | 3 | 1 | NA | 11/1/97 | ND | |

1S22/020597p

## COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCO Products Company | **Service Request:** | S9702213 |
| **Project:** | 20805-131.008/TO#21133.00/6002 OAKLAND | **Date Collected:** | 10/29/97 |
| **Sample Matrix:** | Water | **Date Received:** | 10/30/97 |

BTEX, MTBE and TPH as Gasoline

| | | | |
|---|---|---|---|
| Sample Name: | VM-1(9') | Units: | ug/L (ppb) |
| Lab Code: | S9702213-004 | Basis: | NA |
| Test Notes: | | | |

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|---|---|---|---|---|---|---|---|---|
| TPH as Gasoline | EPA 5030 | CA/LUFT | 50 | 1 | NA | 11/1/97 | 600 | |
| Benzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Toluene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Ethylbenzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Xylenes, Total | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | 1.6 | |
| Methyl *tert*-Butyl Ether | EPA 5030 | 8020 | 3 | 1 | NA | 11/1/97 | 84 | |

1S22/020597p

## COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCO Products Company | **Service Request:** | S9702213 |
| **Project:** | 20805-131.008/TO#21133.00/6002 OAKLAND | **Date Collected:** | 10/29/97 |
| **Sample Matrix:** | Water | **Date Received:** | 10/30/97 |

BTEX, MTBE and TPH as Gasoline

| | | | |
|---|---|---|---|
| Sample Name: | VM-4(11') | Units: | ug/L (ppb) |
| Lab Code: | S9702213-005 | Basis: | NA |
| Test Notes: | | | |

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|---|---|---|---|---|---|---|---|---|
| TPH as Gasoline | EPA 5030 | CA/LUFT | 50 | 100 | NA | 11/7/97 | 9800 | |
| Benzene | EPA 5030 | 8020 | 0.5 | 100 | NA | 11/7/97 | 200 | |
| Toluene | EPA 5030 | 8020 | 0.5 | 100 | NA | 11/7/97 | 69 | |
| Ethylbenzene | EPA 5030 | 8020 | 0.5 | 100 | NA | 11/7/97 | 260 | |
| Xylenes, Total | EPA 5030 | 8020 | 0.5 | 100 | NA | 11/7/97 | 360 | |
| Methyl *tert*-Butyl Ether | EPA 5030 | 8020 | 3 | 100 | NA | 11/7/97 | 4900 | |

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCO Products Company | **Service Request:** | S9702213 |
| **Project:** | 20805-131.008/TO#21133.00/6002 OAKLAND | **Date Collected:** | 10/29/97 |
| **Sample Matrix:** | Water | **Date Received:** | 10/30/97 |

BTEX, MTBE and TPH as Gasoline

| | | | |
|---|---|---|---|
| Sample Name: | MW-5(15') | Units: | ug/L (ppb) |
| Lab Code: | S9702213-006 | Basis: | NA |
| Test Notes: | | | |

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|---|---|---|---|---|---|---|---|---|
| TPH as Gasoline | EPA 5030 | CA/LUFT | 50 | 40 | NA | 11/1/97 | 19000 | |
| Benzene | EPA 5030 | 8020 | 0.5 | 40 | NA | 11/1/97 | 130 | |
| Toluene | EPA 5030 | 8020 | 0.5 | 40 | NA | 11/1/97 | <20 | C1 |
| Ethylbenzene | EPA 5030 | 8020 | 0.5 | 40 | NA | 11/1/97 | 1400 | |
| Xylenes, Total | EPA 5030 | 8020 | 0.5 | 40 | NA | 11/1/97 | 620 | |
| Methyl *tert*-Butyl Ether | EPA 5030 | 8020 | 3 | 40 | NA | 11/1/97 | 1700 | |

C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

IS22/020597p

## COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCO Products Company | **Service Request:** | S9702213 |
| **Project:** | 20805-131.008/TO#21133.00/6002 OAKLAND | **Date Collected:** | 10/29/97 |
| **Sample Matrix:** | Water | **Date Received:** | 10/30/97 |

BTEX, MTBE and TPH as Gasoline

| | | | |
|---|---|---|---|
| Sample Name: | MW-6(31') | Units: | ug/L (ppb) |
| Lab Code: | S9702213-007 | Basis: | NA |
| Test Notes: | | | |

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|---|---|---|---|---|---|---|---|---|
| TPH as Gasoline | EPA 5030 | CA/LUFT | 50 | 1 | NA | 11/1/97 | ND | |
| Benzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Toluene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Ethylbenzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Xylenes, Total | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Methyl *tert*-Butyl Ether | EPA 5030 | 8020 | 3 | 1 | NA | 11/1/97 | ND | |

1S22/020597p

## COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCO Products Company | **Service Request:** | S9702213 |
| **Project:** | 20805-131.008/TO#21133.00/6002 OAKLAND | **Date Collected:** | NA |
| **Sample Matrix:** | Water | **Date Received:** | NA |

### BTEX, MTBE and TPH as Gasoline

| | | | |
|---|---|---|---|
| Sample Name: | Method Blank | Units: | ug/L (ppb) |
| Lab Code: | S971106-WB1 | Basis: | NA |
| Test Notes: | | | |

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|---|---|---|---|---|---|---|---|---|
| TPH as Gasoline | EPA 5030 | CA/LUFT | 50 | 1 | NA | 11/6/97 | ND | |
| Benzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/6/97 | ND | |
| Toluene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/6/97 | ND | |
| Ethylbenzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/6/97 | ND | |
| Xylenes, Total | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/6/97 | ND | |
| Methyl *tert*-Butyl Ether | EPA 5030 | 8020 | 3 | 1 | NA | 11/6/97 | ND | |

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCO Products Company | **Service Request:** | S9702213 |
| **Project:** | 20805-131.008/TO#21133.00/6002 OAKLAND | **Date Collected:** | NA |
| **Sample Matrix:** | Water | **Date Received:** | NA |

BTEX, MTBE and TPH as Gasoline

| | | | |
|---|---|---|---|
| Sample Name: | Method Blank | Units: | ug/L (ppb) |
| Lab Code: | S971101-WB1 | Basis: | NA |
| Test Notes: | | | |

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|---|---|---|---|---|---|---|---|---|
| TPH as Gasoline | EPA 5030 | CA/LUFT | 50 | 1 | NA | 11/1/97 | ND | |
| Benzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Toluene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Ethylbenzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Xylenes, Total | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Methyl *tert*-Butyl Ether | EPA 5030 | 8020 | 3 | 1 | NA | 11/1/97 | ND | |

1S22/020597p

## COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCO Products Company | **Service Request:** | S9702213 |
| **Project:** | 20805-131.008/TO#21133.00/6002 OAKLAND | **Date Collected:** | NA |
| **Sample Matrix:** | Water | **Date Received:** | NA |

### BTEX, MTBE and TPH as Gasoline

| | | | |
|---|---|---|---|
| Sample Name: | Method Blank | Units: | ug/L (ppb) |
| Lab Code: | S971030-WB1 | Basis: | NA |
| Test Notes: | | | |

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|---|---|---|---|---|---|---|---|---|
| TPH as Gasoline | EPA 5030 | CA/LUFT | 50 | 1 | NA | 10/30/97 | ND | |
| Benzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 10/30/97 | ND | |
| Toluene | EPA 5030 | 8020 | 0.5 | 1 | NA | 10/30/97 | ND | |
| Ethylbenzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 10/30/97 | ND | |
| Xylenes, Total | EPA 5030 | 8020 | 0.5 | 1 | NA | 10/30/97 | ND | |
| Methyl *tert*-Butyl Ether | EPA 5030 | 8020 | 3 | 1 | NA | 10/30/97 | ND | |

1S22/020597p

## COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

**Client:** ARCO Products Company
**Project:** 20805-131.008/TO#21133.00/6002 OAKLAND
**Sample Matrix:** Water

**Service Request:** S9702213
**Date Collected:** NA
**Date Received:** NA
**Date Extracted:** NA
**Date Analyzed:** NA

Surrogate Recovery Summary
BTEX, MTBE and TPH as Gasoline

Prep Method: EPA 5030
Analysis Method: 8020 CA/LUFT

Units: PERCENT
Basis: NA

| Sample Name | Lab Code | Test Notes | Percent Recovery 4-Bromofluorobenzene | Percent Recovery a,a,a-Trifluorotoluene |
|---|---|---|---|---|
| MW-3(10') | S9702213-001 | | 108 | 92 |
| MW-4(14') | S9702213-002 | | 102 | 92 |
| MW-8(11') | S9702213-003 | | 111 | 92 |
| VM-1(9') | S9702213-004 | | 101 | 120 S1 |
| VM-4(11') | S9702213-005 | | 108 | 91 |
| MW-5(15') | S9702213-006 | | 112 | 99 |
| MW-6(31') | S9702213-007 | | 107 | 95 |
| MW-3(10') | S9702213-001MS | | 115 | 90 |
| MW-3(10') | S9702213-001DMS | | 111 | 95 |
| Method Blank | S971030-WB1 | | 110 | 92 |
| Method Blank | S971101-WB1 | | 115 | 87 |
| Method Blank | S971106-WB1 | | 109 | 89 |

CAS Acceptance Limits: 69-116 69-116

S1 Surrogate recovery out of control limits due to matrix interference.

SUR2/020397p

**COLUMBIA ANALYTICAL SERVICES, INC.**

QA/QC Report

| | | | |
|---|---|---|---|
| **Client:** | ARCO Products Company | **Service Request:** | S9702213 |
| **Project:** | 20805-131.008/TO#21133.00/6002 OAKLAND | **Date Collected:** | NA |
| **Sample Matrix:** | Water | **Date Received:** | NA |
| | | **Date Extracted:** | NA |
| | | **Date Analyzed:** | 10/31/97 |

Matrix Spike/Duplicate Matrix Spike Summary
BTE

| | | | |
|---|---|---|---|
| Sample Name: | MW-3(10') | Units: | ug/L (ppb) |
| Lab Code: | S9702213-001MS, S9702213-001DMS | Basis: | NA |
| Test Notes: | | | |

| | | | | Spike Level | | Sample | Spike Result | | Percent Recovery | | CAS Acceptance | Relative Percent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Analyte** | **Prep Method** | **Analysis Method** | **MRL** | MS | DMS | **Result** | MS | DMS | MS | DMS | Limits | **Difference** |
| Benzene | EPA 5030 | 8020 | 0.5 | 25 | 25 | ND | 25 | 25 | 100 | 100 | 75-135 | <1 |
| Toluene | EPA 5030 | 8020 | 0.5 | 25 | 25 | ND | 26 | 25 | 104 | 100 | 73-136 | 4 |
| Ethylbenzene | EPA 5030 | 8020 | 0.5 | 25 | 25 | ND | 26 | 26 | 104 | 104 | 69-142 | <1 |

DMS/020597p

## COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

**Client:** ARCO Products Company
**Project:** 20805-131.008/TO#21133.00/6002 OAKLAND

**Service Request:** S9702213
**Date Analyzed:** 10/30/97

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

Sample Name: ICV
Lab Code: ICV1
Test Notes:

Units: ug/L (ppb)
Basis: NA

ICV Source:

| Analyte | Prep Method | Analysis Method | True Value | Result | CAS Percent Recovery Acceptance Limits | Percent Recovery | Result Notes |
|---|---|---|---|---|---|---|---|
| TPH as Gasoline | EPA 5030 | CA/LUFT | 250 | 240 | 90-110 | 96 | |
| Benzene | EPA 5030 | 8020 | 25 | 25 | 85-115 | 100 | |
| Toluene | EPA 5030 | 8020 | 25 | 25 | 85-115 | 100 | |
| Ethylbenzene | EPA 5030 | 8020 | 25 | 26 | 85-115 | 104 | |
| Xylenes, Total | EPA 5030 | 8020 | 75 | 82 | 85-115 | 109 | |
| Methyl *tert*-Butyl Ether | EPA 5030 | 8020 | 25 | 23 | 85-115 | 92 | |

ICV032196

# ARCO Products Company
Division of Atlantic/Richfield Company

Task Order No. 21133.00

# Chain of Custody

| | | | |
|---|---|---|---|
| ARCO Facility no. 6002 | City (Facility) Oakland | Project manager (Consultant) Gary Messerotes | Laboratory Name CAS |
| ARCO engineer Paul Supple | Telephone no. (ARCO) | Telephone no. (Consultant) (408) 453-7300 | Fax no. (Consultant) (408) 453-0452 |
| Consultant name EMCON | Address (Consultant) 1921 Ringwood Ave San Jose, CA 95131 | | Contract Number |

| 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/SM 503E | 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 ☐ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-3 (10) | 1 | | | X | | X | HCL | 10-29-97 | 10:45 | | X | | | | | | | | | | | | |
| MW-4 (14) | 2 | | | ✓ | | | | | 11:15 | | ✓ | | | | | | | | | | | | |
| MW-7 (=) | | | | | | | | | NO | | ✓ | SAMPLE | Collected | well | dry | | | | | | | | |
| MW-8 (11) | 3 | | | ✓ | | | | | 11:40 | | ✓ | | | | | | | | | | | | |
| MW-1 (9) | 4 | | | ✓ | | | | | 12:05 | | ✓ | | | | | | | | | | | | |
| MW-4 (11) | 5 | | | ✓ | | | | | 12:30 | | ✓ | | | | | | | | | | | | |
| MW-5 (15) | 6 | | | ✓ | | | | | 12:55 | | ✓ | | | | | | | | | | | | |
| MW-6 (31) | 7 | | | ✓ | | ✓ | ✓ | | 13:25 | | ✓ | | | | | | | | | | | | |

Method of shipment: Sampler will deliver

Special Detection Limit/reporting: Lowest Possible

Special QA/QC

Remarks: 2 - 40ml HCL VOAs

Lab Number: 59702213

Turnaround Time:

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

| | | | |
|---|---|---|---|
| Condition of sample: | | Temperature received: | |
| Relinquished by sampler | Date 10-30-97 Time 10:40 | Received by | |
| Relinquished by | Date Time | Received by | |
| Relinquished by | Date Time | Received by laboratory K. Cowles CAS | Date 10/30/97 Time 1040 |

Distribution: White Copy – Laboratory: Canary Copy – ARCO Environmental Engineering: Pink Copy – Consultant

R8

EMCON
1921 Ringwood Avenue • San Jose, California 95131-1721 • **(408) 453-7300** • Fax (408) 437-9526

March 10, 1998
Project 20805-131.012

Mr. Jeffrey Enebly
6267 Sunnymere Avenue
Oakland, California 94605

Re: Fourth quarter 1997 laboratory analytical results, groundwater samples,
6267 Sunnymere Avenue, Oakland, California

Dear Mr. Enebly:

Enclosed please find a copy of the fourth quarter 1997 groundwater monitoring results for ARCO service station 6002, Oakland, California. Included are the laboratory analytical results for the groundwater sample collected from well MW-8 during the fourth quarter of 1997. This well is located at 6267 Sunnymere Avenue, Oakland, California. The groundwater sample was collected on October 29, 1997, during quarterly sampling of the ARCO Products Company service station 6002, 6235 Seminary Avenue, Oakland.

Please call if you have questions.

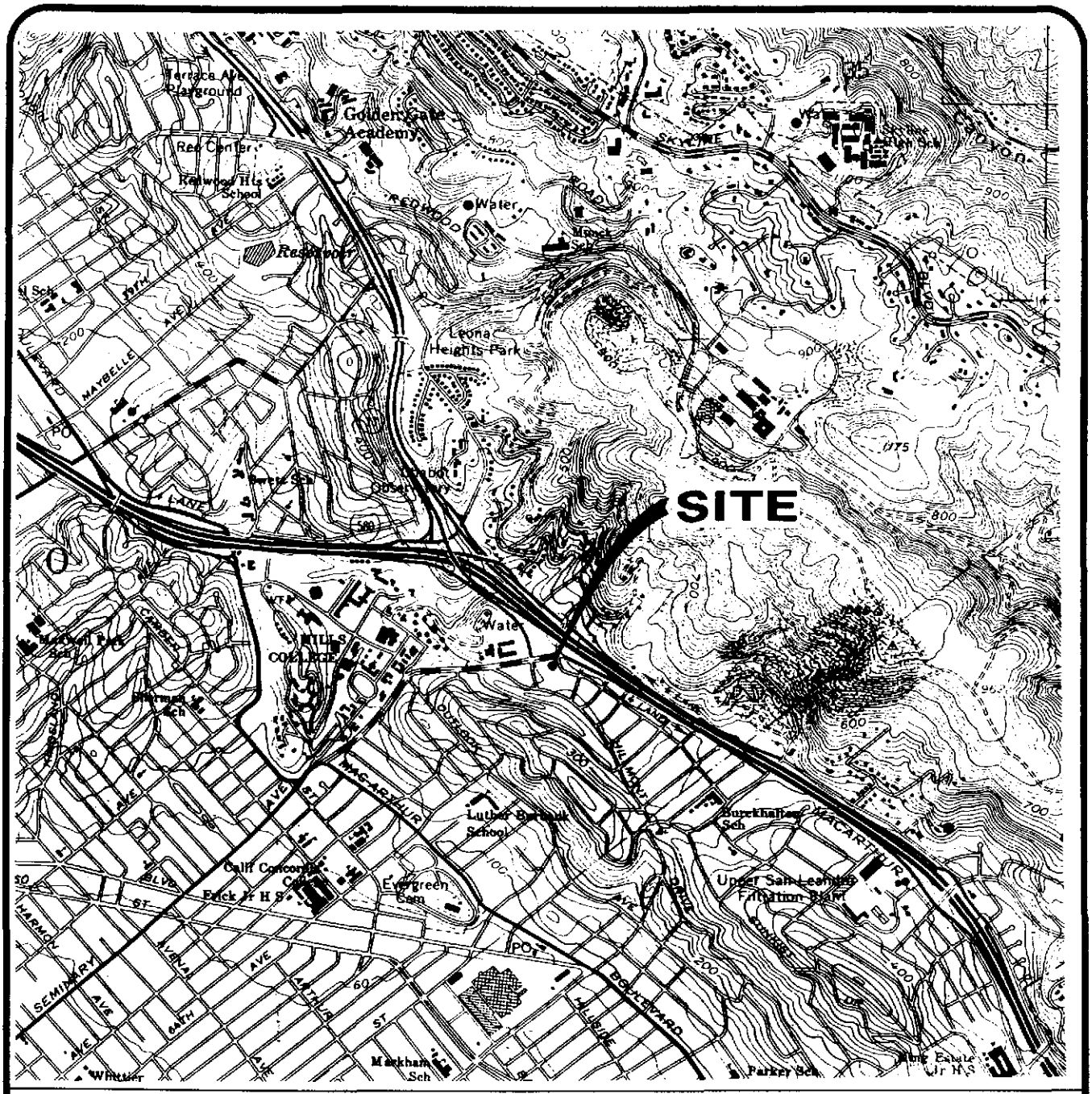
Sincerely,

EMCON

Gary P. Messerotes
Project Manager

Attachments: Figure 1 -Generalized Site Plan
Attachment A - Copy of Analytical Results and Chain-of-Custody Documentation, Well MW-8, Fourth Quarter 1997

cc: Juliet Shin, ACHCSA
Paul Supple, ARCO Products Company
File




EMCON

| | |
|---|---|
| DATE | NOV. 1997 |
| DWN | KAJ |
| APP | |
| REV | |
| PROJECT NO. | 805-131.012 |

**FIGURE 1**
ARCO PRODUCTS COMPANY
SERVICE STATION 6002, 6235 SEMINARY AVE.
OAKLAND, 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

# ATTACHMENT A

# COPY OF ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION, WELL MW-8, FOURTH QUARTER 1997

Columbia Analytical Services INC.

November 13, 1997 Service Request No.: S9702213

Gary Messerotes
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

**RE: 20805-131.008/TO#21133.00/6002 OAKLAND**

Dear Mr. Messerotes:

The following pages contain analytical results for sample(s) received by the laboratory on October 30, 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 16, 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

Bernadette T. Cox for

Greg Anderson
Regional QA Coordinator

## COLUMBIA ANALYTICAL SERVICES, Inc.
### 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 |
| **NCASI** | 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 rounding. |
| **TRPH** | Total Recoverable Petroleum Hydrocarbons |
| **TSS** | Total Suspended Solids |
| **TTLC** | Total Threshold Limit Concentration |
| **VOA** | Volatile Organic Analyte(s) |

ACRONLST.DOC 7/14/95

## COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | ARCO Products Company | **Service Request:** | S9702213 |
| **Project:** | 20805-131.008/TO#21133.00/6002 OAKLAND | **Date Collected:** | 10/29/97 |
| **Sample Matrix:** | Water | **Date Received:** | 10/30/97 |

### BTEX, MTBE and TPH as Gasoline

| | | | |
|---|---|---|---|
| Sample Name: | MW-8(11') | Units: | ug/L (ppb) |
| Lab Code: | S9702213-003 | Basis: | NA |
| Test Notes: | | | |

| Analyte | Prep Method | Analysis Method | MRL | Dilution Factor | Date Extracted | Date Analyzed | Result | Result Notes |
|---|---|---|---|---|---|---|---|---|
| TPH as Gasoline | EPA 5030 | CA/LUFT | 50 | 1 | NA | 11/1/97 | ND | |
| Benzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Toluene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Ethylbenzene | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Xylenes, Total | EPA 5030 | 8020 | 0.5 | 1 | NA | 11/1/97 | ND | |
| Methyl *tert*-Butyl Ether | EPA 5030 | 8020 | 3 | 1 | NA | 11/1/97 | ND | |

1S22/020597p

# ARCO Products Company
Division of Atlantic/Richfield Company

Task Order No. 21133.00

# Chain of Custody

| | | | |
|---|---|---|---|
| ARCO Facility no. 6002 | City (Facility) Oakland | Project manager (Consultant) Gary Messerotes | Laboratory Name CAS |
| ARCO engineer Paul Supple | Telephone no. (ARCO) | Telephone no. (Consultant) (408) 453-7300 | Fax no. (Consultant) (408) 453-0457 |
| Consultant name EMCON | | Address (Consultant) 1921 Ringwood Ave San Jose, CA 95131 | Contract Number |

Method of shipment: Sampler will deliver

Special Detection Limit/reporting: Lowest Possible

Special QA/QC

Remarks: 2 - 40ml HCL VOAs

Lab Number: 5970221 3

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

| 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 incl. MTBE EPA M602/8020/8015 | TPH Modified 8015 Gas ☐ Diesel ☐ | Oil and Grease 413.1 ☐ 413.2 ☐ | TPH EPA 418.1/SM 503E | 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 ☐ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-3 (10') | 1 | | | X | | X | HCL | 10-29-97 | 10:45 | | X | | | | | | | | | | | | |
| MW-4 (14') | 2 | | | ✓ | | | | | 11:15 | | ✓ | | | | | | | | | | | | |
| MW-7 (--) | | | | | | | | | NO | | ✓ | SAMPLE | | Collected | | well | dry | | | | | | |
| MW-8 (11') | 3 | | | ✓ | | | | | 11:40 | | ✓ | | | | | | | | | | | | |
| VM-1 (9') | 4 | | | ✓ | | | | | 12:05 | | ✓ | | | | | | | | | | | | |
| VM-4 (11') | 5 | | | ✓ | | | | | 12:30 | | ✓ | | | | | | | | | | | | |
| MW-5 (15') | 6 | | | ✓ | | | | | 12:55 | | ✓ | | | | | | | | | | | | |
| MW-6 (31') | 7 | | | ✓ | | ↓ | ↓ | | 13:25 | | ✓ | | | | | | | | | | | | |

| | | | |
|---|---|---|---|
| Condition of sample: | | Temperature received: | |
| Relinquished by sampler | Date 10-30-97 Time 13:40 | Received by | |
| Relinquished by | Date Time | Received by | |
| Relinquished by | Date Time | Received by laboratory K. Cowles CAS | Date 10/30/97 Time 1040 |

Distribution: White Copy – Laboratory: Canary Copy – ARCO Environmental Engineering: Pink Copy – Consultant

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