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

ENVIRONMENTAL PROTECTION
95 MAR 21 PM 12:05

Date March 17, 1995
Project 0805-122.01

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	Fourth quarter 1994 groundwater monitoring and SVE remediation system performance evaluation report for ARCO service station 771, Livermore, California

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

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

David Larsen
Project Coordinator

cc: Sum Arigala, RWQCB - SFBR
Danielle Stefani, LFD
Michael Whelan, ARCO Products Company
David Larsen, EMCON
File

ARCO Products Company
2000 Alameda de las Pulgas
Mailing Address: Box 5811
San Mateo, California 94402
Telephone 415 571 2400

Date: March 17, 1995

Re: ARCO Station # 771 • 899 Rincon Avenue • Livermore, CA
Fourth Quarter 1994 Groundwater Monitoring Report

" 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:

Michael R. Whelan

Michael R. Whelan
Environmental Engineer

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

March 17, 1995
Project 0805-122.01

Mr. Michael Whelan
ARCO Products Company
2155 South Bascom Avenue, Suite 202
Campbell, California 95008

Re: Fourth quarter 1994 groundwater monitoring program results, ARCO service station 771, Livermore, California

Dear Mr. Whelan:

This letter presents the results of the fourth quarter 1994 groundwater monitoring program at ARCO Products Company (ARCO) service station 771, 899 Rincon Avenue, Livermore, California (Figure 1). Operation and performance data for the sites interim soil-vapor extraction (SVE) system are also presented. The quarterly monitoring program complies with Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

BACKGROUND

In August 1987, Crosby and Overton removed a waste-oil tank from the site. In February 1990, RESNA Industries (RESNA, formerly Applied Geosystems, Inc.) conducted a preliminary subsurface environmental investigation before the removal of gasoline underground storage tanks (USTs) at the site. This investigation included drilling three borings in the vicinity of the USTs. In December 1990, an initial phase of investigation was conducted by RESNA, which included installing groundwater monitoring wells MW-1, MW-2, and MW-3 to characterize the lateral and vertical extent of gasoline hydrocarbons near the USTs.

In June and July 1991, RESNA performed a second phase of investigation, which included installing four groundwater monitoring wells, MW-4 through MW-7, to further characterize the lateral and vertical extent of gasoline-hydrocarbon-impacted soil and groundwater beneath the site. In December 1991, RESNA performed an SVE test at the site and concluded that SVE would be a viable soil remediation alternative at the site, provided that water levels at the site did not rise sufficiently to flood the SVE well screens.

Between December 1991 and March 1992, Roux Associates (Roux) observed the removal of four gasoline USTs and the installation of new USTs at the site. During the tank removal and replacement, eight soil samples were collected from beneath the former USTs and six soil samples from the base of the new UST pit.

In December 1992, RESNA began constructing an SVE remediation system using existing groundwater monitoring wells and vapor extraction wells at the site. Construction of the system was completed in March 1993. Startup of the remediation system was postponed due to rising water levels which flooded the screen in the SVE wells.

Between August 1992 and January 1993, RESNA performed additional on-site and off-site investigations, which included installing four off-site monitoring wells (MW-8 through MW-11), one on-site vapor extraction well (VW-1), and one on-site recovery well (RW-1).

Groundwater monitoring and sampling at the site was initiated in January 1991. For additional background information, please refer to *Additional On Site and Initial Off Site Subsurface Investigation* (RESNA, February 26, 1993). EMCON performed startup of the SVE system on December 20, 1994. For additional information on the SVE system startup, please refer to *Soil-Vapor Extraction System Performance Test Results* (EMCON, January 3, 1995).

Wells MW-1 through MW-11 and RW-1 are monitored quarterly.

MONITORING PROGRAM FIELD PROCEDURES AND RESULTS

The fourth quarter 1994 groundwater monitoring event was performed by Integrated Wastestream Management (IWM) on November 25, 1994. Field work performed by IWM during this quarter included (1) measuring depths to groundwater and subjectively analyzing groundwater for the presence of floating product in wells MW-1 through MW-11 and RW-1, (2) purging and subsequently sampling groundwater monitoring wells MW-1 through MW-11 and RW-1 for laboratory analysis, and (3) directing a state-certified laboratory to analyze the groundwater samples. The results of IWM's field work were transmitted to EMCON in a report dated December 16, 1994. These data are presented in Appendix A.

ANALYTICAL PROCEDURES

Groundwater samples collected during fourth quarter 1994 monitoring were analyzed for total petroleum hydrocarbons as gasoline (TPHG) and benzene, toluene, ethylbenzene, and total xylenes (BTEX). Groundwater samples were prepared for analysis by U.S. Environmental Protection Agency (USEPA) method 5030 (purge and trap). Groundwater was analyzed for TPHG by the methods accepted by the Department of Toxic Substances Control, California Environmental Protection Agency (Cal-EPA), and referenced in the *Leaking Underground Fuel Tank* (LUFT) *Field Manual* (State Water Resources Control Board, October 1989). Samples were analyzed for BTEX by USEPA method 8020, as described in *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods* (USEPA, SW-846, November 1986, Third Edition). Groundwater samples collected from well MW-6 were also analyzed for total petroleum hydrocarbons as diesel (TPHD) by USEPA method 3510/Cal-EPA LUFT method, and total oil and grease (TOG) by standard method 5520F. These methods are recommended for samples from petroleum-hydrocarbon-impacted sites in the *Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites* (August 10, 1990).

MONITORING PROGRAM RESULTS

Results of the fourth quarter 1994 groundwater monitoring event are summarized in Table 1 and illustrated in Figure 2. Historical groundwater elevation data, including top-of-casing elevations, depth-to-water measurements, calculated groundwater elevations, floating-product thickness measurements, and groundwater flow direction and gradient data, are summarized in Table 2. Table 3 summarizes historical laboratory data for TPHG, BTEX, TPHD, and TOG analyses. Table 4 summarizes historical floating product recovery data for wells MW-1, MW-2, and MW-5. Copies of the fourth quarter 1994 analytical results and chain-of-custody documentation are included in Appendix B.

MONITORING PROGRAM EVALUATION

Groundwater elevation data collected on November 25, 1994, illustrate that groundwater beneath the site flows north at an approximate hydraulic gradient of 0.06 foot per foot. Figure 2 illustrates groundwater contours and analytical data for the fourth quarter of 1994.

Groundwater samples collected from off-site wells MW-8 through MW-11 did not contain detectable concentrations of TPHG or BTEX. Groundwater samples collected from

well MW-6 did not contain detectable concentrations of TPHD or TOG. Groundwater samples collected from well MW-3 contained 54 parts per billion (ppb) TPHG, but did not contain detectable concentrations of BTEX. Groundwater samples collected from wells MW-1, MW-2, MW-4 through MW-7, and RW-1 contained TPHG concentrations of 1,100 to 170,000 ppb and benzene concentrations of 78 to 3,900 ppb. Similar analytical results were reported for these wells during previous monitoring events.

REMEDIATION SYSTEM PERFORMANCE EVALUATION

Floating Product Recovery

Floating product was measured and recovered monthly by RESNA using skimmers installed in MW-1, MW-2, and MW-5. Approximately 2.77 and 0.29 gallons of floating product were recovered in 1991 and 1992, respectively. Floating product has not been observed in any of the monitoring wells since January 1993. Cumulative floating product recovery from wells MW-1, MW-2, and MW-5 is summarized in Table 4.

Soil-Vapor Extraction System

System Description. RESNA completed construction of the SVE system in March 1993. Initial startup of the remediation system was postponed due to heavy rain during March and April 1993, which caused water levels at the site to rise approximately 20 feet and flood the screen in the SVE wells. The on-site SVE system extracts hydrocarbon vapor from subsurface soils by applying a vacuum to vapor extraction wells VW-1, MW-1, MW-2, MW-4, MW-5, and MW-7. Extracted hydrocarbon vapor from the wells is directed via subgrade remediation piping to an off-gas abatement unit in the treatment compound (Figure 2). The trailer-mounted off-gas abatement unit used to treat the influent extracted vapor is a King/Buck Associates, MMC-6A/E model catalytic oxidizer with a nominal operating capacity of 200 standard cubic feet per minute (scfm). Treated off-gas from the unit is discharged to the atmosphere via a 24-inch-diameter stack, 15 feet above grade.

System Monitoring. In accordance with site-specific air permit requirements stipulated by the Bay Area Air Quality Management District (BAAQMD), the operating temperature of the oxidation unit is measured and recorded continuously during system operation. Once a month, air samples are collected at three sample ports, located (1) effluent from the well field and before air dilution (sample port I-1), (2) influent to the oxidizer, after fresh

air dilution (sample port I-2), and (3) effluent from the unit (sample port E-1). Air samples collected from sample ports I-1, I-2, and E-1 are submitted to a state-certified laboratory for chemical analysis. The samples are analyzed for total volatile hydrocarbons as gasoline (TVHG) and BTEX by USEPA methods 8015 and 8020, respectively.

In addition to the above parameters, the SVE system is generally monitored once a month for (1) TVHG concentrations in extracted vapor (samples from each extraction well are evaluated using a flame ionization detector [FID]), (2) applied and induced vacuum on vapor extraction wells, (3) depths to water in extraction wells, and (4) measured vapor flow rate from individual wells and from the combined well field. Site visits are also conducted once a month for routine operation and maintenance of the treatment system.

System Operation. The SVE system was initially activated on December 20, 1994, after observing that there was at least 3 to 5 feet of exposed screen above the water table in wells VW-1 and MW-4. As stipulated in the Authority to Construct issued by the BAAQMD, results of system startup were submitted to the BAAQMD in a letter report dated January 3, 1995, before issuing a Permit to Operate. Table 5 summarizes SVE system operation and performance data from initial startup on December 20, 1994, to January 17, 1995. The SVE system operated for a total of 22.7 days during the 28.1-day reporting period (80.8 percent operational). The SVE system was off-line from January 2 to January 9, 1995, because an electric meter was stolen from the site. The electric meter was replaced on January 8, 1995, and the system restarted on January 9, 1995.

Rising water levels at the site caused by heavy precipitation in December 1994 and January 1995 caused resubmergence of the screen in SVE wells VW-1 and MW-4, resulting in minimal flow from these wells. Screened intervals in all other SVE wells remained submerged, as they have been since late 1992 and early 1993, when water levels in these wells rose approximately 20 feet. The submergence of the SVE well screens reduced air flow from the well field to minimal levels. Therefore, the system was manually shut down on January 17, 1995, because of insufficient air flow from the well field. EMCON is currently evaluating the option of in-well air bubbling in conjunction with SVE, to enhance volatilization of dissolved-phase hydrocarbons in groundwater and possibly promote biodegradation of hydrocarbons in saturated soils and groundwater as well .

Copies of the analytical results for air samples collected from the system during this reporting period are shown in Appendix C. Copies of the field data sheets for all operation and maintenance visits conducted during fourth quarter 1994 are shown in Appendix D.

Operational Status of SVE Wells. Table 6 summarizes the operating status of the individual vapor extraction wells during fourth quarter 1994. To maximize hydrocarbon

removal rates, vapor extraction wells were brought on-line or closed based on TVHG concentrations of extracted vapor, and on the length of unsubmerged screened interval available.

SVE System Air Sample Results. Analytical results of air samples collected during startup of the SVE system on December 20, 1994, indicated that TPHG and benzene concentrations influent to the unit were below laboratory detection limits (Table 5). This was caused by the addition of a substantial volume of dilution air to the hydrocarbons extracted from the subsurface. The dilution air was added to provide sufficient air flow to the unit since the submerged SVE well screens were allowed only minimal air flow from the wells. A low air flow rate would cause the unit to shut down automatically. TPHG and benzene were also nondetectable in the sample collected from the effluent stream of the unit.

Figure 3 depicts historical TVHG and benzene concentrations of the system influent. Copies of the analytical results for all vapor samples collected during fourth quarter 1994 are provided in Appendix C.

SVE System Destruction Efficiency and Emission Rates. The destruction efficiency of the SVE system during startup on December 20, 1994, was not calculated because TPHG and benzene concentrations influent to the unit were below laboratory detection limits.

Hydrocarbon Removal Rates. Table 5 summarizes hydrocarbon removal rates, and the total amount of hydrocarbons removed from startup on December 20, 1994 to the end of this reporting period. Figure 4 depicts hydrocarbon removal rates since system startup. The calculations and assumptions made for estimating hydrocarbon removal rates for the SVE system are explained in the footnotes for Table 5.

Approximately 23 pounds (or 4 gallons) of hydrocarbons were recovered by the SVE system operation during this 28.1-day reporting period.

PERFORMANCE IMPROVEMENTS

To improve system performance (maximize hydrocarbon removal rates), different combinations of vapor extraction wells were brought on-line or closed based on observations made during routine site visits. The operational status of the wells was based on observed vacuum at each well, and TVHG concentrations in extracted vapor at each well. EMCON is currently evaluating the option of in-well air bubbling in conjunction with

SVE, to enhance volatilization of dissolved-phase hydrocarbons in groundwater. Bubbling of air may also promote biodegradation in saturated-zone soils and groundwater via introduction of oxygen.

LIMITATIONS

Field procedures were performed by, and field data were acquired from, IWM. EMCON does not warrant the accuracy of data supplied by IWM. EMCON's scope of work was limited to interpreting field data, which included evaluating trends in the groundwater gradient, groundwater flow direction, and dissolved-petroleum-hydrocarbon concentrations beneath the site.

No monitoring event is thorough enough to describe all geologic/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.

SITE STATUS UPDATE

This update reports site activities performed during the fourth quarter of 1994 and the anticipated site activities for the first quarter of 1995.

Fourth Quarter 1994 Activities

- Prepared and submitted quarterly groundwater monitoring report for third quarter 1994.
- Performed quarterly groundwater monitoring for fourth quarter 1994.
- Performed startup of the SVE system.

Work Anticipated First Quarter 1995

- Prepare and submit quarterly groundwater monitoring report for fourth quarter 1994.

- Perform quarterly groundwater monitoring for first quarter 1995.
- Evaluate in-well air bubbling in conjunction with SVE to determine whether it will enhance remediation of soil and groundwater. Bubbling of air may also help increase oxygen levels in the subsurface, which may in turn promote biodegradation of hydrocarbons in soil and groundwater.

Please call if you have questions.

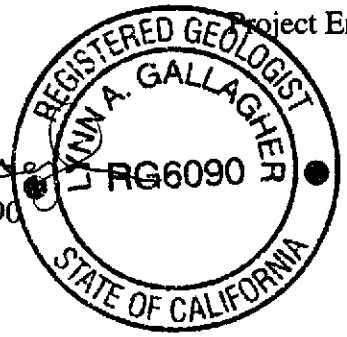
Sincerely,

EMCON

David Larsen
Project Coordinator

Valli Voruganti
Project Engineer

Lynn A. Gallagher, R.G. 6090
Project Geologist



Attachments:

Table 1 -	Groundwater Monitoring Data, Fourth Quarter 1994
Table 2 -	Historical Groundwater Elevation Data
Table 3 -	Historical Groundwater Analytical Data (TPHG, BTEX, TPHD, and TOG)
Table 4 -	Approximate Cumulative Floating Product Recovered (Wells MW-1, MW-2, and MW-5)
Table 5 -	Soil-Vapor Extraction System, Operation and Performance Data
Table 6 -	Soil-Vapor Extraction Well Data
Figure 1 -	Site Location
Figure 2 -	Groundwater Data, Fourth Quarter 1994
Figure 3 -	Historical System Influent TVHG and Benzene Concentrations
Figure 4 -	Historical Hydrocarbon Removal Rates
Appendix A -	Field Data Report, Integrated Wastestream Management, December 16, 1994
Appendix B -	Analytical Results and Chain-of-Custody Documentation, Groundwater Monitoring, Fourth Quarter 1994
Appendix C -	Analytical Results and Chain-of-Custody Documentation, SVE System Air Samples, Fourth Quarter 1994
Appendix D -	Operation and Maintenance Field Data Sheets, SVE System, Fourth Quarter 1994

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

Table 1
Groundwater Monitoring Data
Fourth Quarter 1994
Summary Report

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 03-14-95
Project Number: 0805-122.01

Well Designation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Ground-Water Elevation ft-MSL	Floating Product Thickness feet	Ground-Water Flow Direction MWN	Hydraulic Gradient foot/foot	Water Sample Field Date	TPHG ppb	Benzene ppb	Toluene ppb	Ethyl-benzene ppb	Total Xylenes ppb	TPHD ppb	TOG ppm
MW-1	11-25-94	451.73	29.76	421.97	ND	N	0.06	11-25-94	170000	990	1000	1700	9400	NA	NA
MW-2	11-25-94	449.49	27.85	421.64	ND	N	0.06	11-25-94	60000	3900	4100	1400	7400	NA	NA
MW-3	11-25-94	450.28	30.76	419.52	ND	N	0.06	11-25-94	54	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-4	11-25-94	451.09	29.08	422.01	ND	N	0.06	11-25-94	13000	1400	250	490	1200	NA	NA
MW-5	11-25-94	451.40	29.76	421.64	ND	N	0.06	11-25-94	31000	2400	1100	1100	4400	NA	NA
MW-6	11-25-94	451.37	29.88	421.49	ND	N	0.06	11-25-94	1100	78	<2.5	46	17	<50	<0.5(d)
MW-7	11-25-94	450.33	28.30	422.03	ND	N	0.06	11-25-94	29000	2600	380	640	3300	NA	NA
MW-8	11-25-94	449.43	36.46	412.97	ND	N	0.06	11-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-9	11-25-94	449.21	29.84	419.37	ND	N	0.06	11-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-10	11-25-94	449.22	30.30	418.92	ND	N	0.06	11-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-11	11-25-94	448.02	33.84	414.18	ND	N	0.06	11-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
RW-1	11-25-94	451.67	30.89	420.78	ND	N	0.06	11-25-94	4900	550	68	200	230	NA	NA

TOC = Top of casing
ft-MSL = Elevation in feet, relative to mean sea level
MWN = Ground-water flow direction and gradient apply to the entire monitoring well network
TPHG = Total petroleum hydrocarbons as gasoline
TPHD = Total petroleum hydrocarbons as diesel
TOG = Total oil and grease/petroleum hydrocarbons using method: (a) 5520F-IR, (b) 5520C, (c) 413.2, or (d) 418.1
ppb = Parts per billion or micrograms per liter (µg/l)
ppm = Parts per million or milligrams per liter (mg/l); TOG only
ND = None detected
N = North
NA = Not analyzed

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Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 03-07-95
Project Number: 0805-122.01

Well Designation	Water Level Field Date	TOC Elevation	Depth to Water	Ground-Water Elevation	Floating Product Thickness	Ground-Water Flow Direction	Hydraulic Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-1	01-15-91	451.80	32.77	419.03	Sheen	NR	NR
MW-1	02-27-91	451.80	32.23	419.57	ND	NR	NR
MW-1	03-20-91	451.80	27.38	424.42	Sheen	NR	NR
MW-1	04-10-91	451.80	26.49	425.31	ND	NR	NR
MW-1	05-20-91	451.80	Not surveyed: interface probe failure				
MW-1	06-20-91	451.80	33.95	417.85	Sheen	NR	NR
MW-1	07-25-91	451.80	^36.59	^415.21	0.10	NR	NR
MW-1	08-13-91	451.80	^37.72	^414.08	0.20	NR	NR
MW-1	09-12-91	451.80	^39.25	^412.55	0.23	NR	NR
MW-1	10-30-91	451.80	^39.14	^412.66	0.20	NR	NR
MW-1	11-13-91	451.80	DRY	DRY	ND	NR	NR
MW-1	12-26-91	451.80	^39.30	^412.50	0.01	NR	NR
MW-1	01-18-92	NR	37.81	NR	Skimmer	NR	NR
MW-1	02-21-92	NR	Not surveyed: well inaccessible due to construction				
MW-1	03-31-92	NR	31.90	NR	Skimmer	NR	NR
MW-1	04-24-92	451.42	Not surveyed: well inaccessible due to construction				
MW-1	05-20-92	451.42	33.00	418.42	Skimmer	NR	NR
MW-1	06-12-92	451.42	33.25	418.17	0.02	NR	NR
MW-1	07-28-92	451.42	32.31	419.11	ND	NR	NR
MW-1	08-24-92	451.42	30.87	420.55	ND	NR	NR
MW-1	09-15-92	451.42	^32.24	^419.18	0.01	NR	NR
MW-1	10-29-92	451.42	32.29	419.13	ND	NR	NR
MW-1	11-25-92	451.73	32.15	419.58	ND*	NR	NR
MW-1	12-14-92	451.73	30.54	421.19	ND	NR	NR
MW-1	01-29-93	451.73	23.49	428.24	ND	NR	NR
MW-1	02-26-93	451.73	25.23	426.50	ND	NR	NR
MW-1	03-29-93	451.73	25.66	426.07	ND	NR	NR
MW-1	04-27-93	451.73	28.02	423.71	ND	NR	NR
MW-1	05-10-93	451.73	30.38	421.35	ND	NR	NR
MW-1	06-17-93	451.73	30.81	420.92	ND	NR	NR
MW-1	07-27-93	451.73	Not surveyed: vehicle parked on well				
MW-1	08-26-93	451.73	31.23	420.50	ND	NR	NR
MW-1	09-14-93	451.73	32.59	419.14	ND	NR	NR
MW-1	11-05-93	451.73	32.13	419.60	ND	NR	NR
MW-1	03-26-94	451.73	28.22	423.51	ND	NR	NR
MW-1	06-13-94	451.73	29.86	421.87	ND	NR	NR
MW-1	09-22-94	451.73	31.61	420.12	ND	NNE	0.056
MW-1	11-25-94	451.73	29.76	421.97	ND	N	0.06

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 03-07-95
Project Number: 0805-122.01

Well Designation	Water Level Field Date	TOC Elevation	Depth to Water	Ground-Water Elevation	Floating Product Thickness	Ground-Water Flow Direction	Hydraulic Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-2	01-15-91	449.52	^30.89	^418.63	0.16	NR	NR
MW-2	02-27-91	449.52	^29.11	^420.41	0.02	NR	NR
MW-2	03-20-91	449.52	^24.57	^424.95	0.02	NR	NR
MW-2	04-10-91	449.52	^22.85	^426.67	0.05	NR	NR
MW-2	05-20-91	449.51	Not surveyed:				
MW-2	06-20-91	449.51	^31.42	^418.09	0.15	NR	NR
MW-2	07-25-91	449.51	^33.69	^415.82	0.49	NR	NR
MW-2	08-13-91	449.51	^34.80	^414.71	0.47	NR	NR
MW-2	09-12-91	449.51	^36.39	^413.12	0.45	NR	NR
MW-2	10-30-91	449.51	DRY	DRY	ND	NR	NR
MW-2	11-13-91	449.51	DRY	DRY	ND	NR	NR
MW-2	12-26-91	449.51	36.45	413.06	Sheen	NR	NR
MW-2	01-18-92	449.51	Not surveyed: well inaccessible due to construction				
MW-2	02-21-92	449.51	26.27	NR	Skimmer	NR	NR
MW-2	03-31-92	449.51	28.85	NR	Skimmer	NR	NR
MW-2	04-24-92	449.51	30.95	418.56	Skimmer	NR	NR
MW-2	05-20-92	449.51	30.69	418.82	Skimmer	NR	NR
MW-2	06-12-92	449.51	31.25	418.26	ND	NR	NR
MW-2	07-28-92	449.51	30.31	419.20	ND	NR	NR
MW-2	08-24-92	449.51	29.83	419.68	ND	NR	NR
MW-2	09-15-92	449.51	30.06	419.45	Sheen	NR	NR
MW-2	10-29-92	449.51	30.90	418.61	ND	NR	NR
MW-2	11-25-92	449.49	31.13	418.36	ND*	NR	NR
MW-2	12-14-92	449.49	29.24	420.25	ND	NR	NR
MW-2	01-29-93	449.49	20.12	429.37	ND	NR	NR
MW-2	02-26-93	449.49	22.59	426.90	ND	NR	NR
MW-2	03-29-93	449.49	22.83	426.66	ND	NR	NR
MW-2	04-27-93	449.49	25.10	424.39	ND	NR	NR
MW-2	05-10-93	449.49	27.23	422.26	ND	NR	NR
MW-2	06-17-93	449.49	28.26	421.23	ND	NR	NR
MW-2	07-27-93	449.49	29.50	419.99	ND	NR	NR
MW-2	08-26-93	449.49	29.85	419.64	ND	NR	NR
MW-2	09-14-93	449.49	30.43	419.06	ND	NR	NR
MW-2	11-05-93	449.49	30.20	419.29	ND	NR	NR
MW-2	03-26-94	449.49	25.30	424.19	ND	NR	NR
MW-2	06-13-94	449.49	27.28	422.21	ND	NR	NR
MW-2	09-22-94	449.49	29.54	419.95	ND	NNE	0.056
MW-2	11-25-94	449.49	27.85	421.64	ND	N	0.06

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 03-07-95
Project Number: 0805-122.01

Well Designation	Water Level Field Date	TOC Elevation	Depth to Water	Ground-Water Elevation	Floating Product Thickness	Ground-Water Flow Direction	Hydraulic Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-3	01-15-91	450.29	32.34	417.95	ND	NR	NR
MW-3	02-27-91	450.29	31.78	418.51	ND	NR	NR
MW-3	03-20-91	450.29	27.74	422.55	ND	NR	NR
MW-3	04-10-91	450.29	25.05	425.24	ND	NR	NR
MW-3	05-20-91	450.28	27.06	423.22	ND	NR	NR
MW-3	06-20-91	450.28	32.35	417.93	ND	NR	NR
MW-3	07-25-91	450.28	35.02	415.26	ND	NR	NR
MW-3	08-13-91	450.28	36.50	413.78	ND	NR	NR
MW-3	09-12-91	450.28	38.47	411.81	ND	NR	NR
MW-3	10-30-91	450.28	DRY	DRY	ND	NR	NR
MW-3	11-13-91	450.28	DRY	DRY	ND	NR	NR
MW-3	12-26-91	450.28	38.53	411.75	ND	NR	NR
MW-3	01-18-92	450.28	Not surveyed: well inaccessible due to construction				
MW-3	02-21-92	450.28	Not surveyed: well inaccessible due to construction				
MW-3	03-31-92	450.28	30.61	NR	ND	NR	NR
MW-3	04-24-92	450.28	32.83	417.45	ND	NR	NR
MW-3	05-20-92	450.28	33.85	416.43	ND	NR	NR
MW-3	06-12-92	450.28	34.51	415.77	ND	NR	NR
MW-3	07-28-92	450.28	34.42	415.86	ND	NR	NR
MW-3	08-24-92	450.28	32.46	417.82	ND	NR	NR
MW-3	09-15-92	450.28	34.29	415.99	ND	NR	NR
MW-3	10-29-92	450.28	33.40	416.88	ND	NR	NR
MW-3	11-25-92	450.28	33.67	416.61	ND	NR	NR
MW-3	12-14-92	450.28	34.26	416.02	ND	NR	NR
MW-3	01-29-93	450.28	21.88	428.40	ND	NR	NR
MW-3	02-26-93	450.28	24.71	425.57	ND	NR	NR
MW-3	03-29-93	450.28	24.74	425.54	ND	NR	NR
MW-3	04-27-93	450.28	25.96	424.32	ND	NR	NR
MW-3	05-10-93	450.28	27.61	422.67	ND	NR	NR
MW-3	06-17-93	450.28	28.73	421.55	ND	NR	NR
MW-3	07-27-93	450.28	30.37	419.91	ND	NR	NR
MW-3	08-26-93	450.28	30.94	419.34	ND	NR	NR
MW-3	09-14-93	450.28	31.84	418.44	ND	NR	NR
MW-3	11-05-93	450.28	33.22	417.06	ND	NR	NR
MW-3	03-26-94	450.28	26.97	423.31	ND	NR	NR
MW-3	06-13-94	450.28	28.71	421.57	ND	NR	NR
MW-3	09-22-94	450.28	32.34	417.94	ND	NNE	0.056
MW-3	11-25-94	450.28	30.76	419.52	ND	N	0.06

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 03-07-95
Project Number: 0805-122.01

Well Designation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Ground-Water Elevation ft-MSL	Floating Product Thickness feet	Ground-Water Flow Direction MWN	Hydraulic Gradient foot/foot
MW-4	07-25-91	451.56	36.07	415.49	ND	NR	NR
MW-4	08-13-91	451.56	37.54	414.02	ND	NR	NR
MW-4	09-12-91	451.56	38.73	412.83	ND	NR	NR
MW-4	10-30-91	451.56	39.90	411.66	ND	NR	NR
MW-4	11-13-91	451.56	40.56	411.00	ND	NR	NR
MW-4	12-26-91	450.99	38.78	412.21	ND	NR	NR
MW-4	01-18-92	450.99	38.71	NR	ND	NR	NR
MW-4	02-21-92	450.99	31.91	NR	ND	NR	NR
MW-4	03-31-92	450.99	30.36	NR	ND	NR	NR
MW-4	04-24-92	450.99	32.65	418.34	ND	NR	NR
MW-4	05-20-92	450.99	32.62	418.37	ND	NR	NR
MW-4	06-12-92	450.99	32.73	418.26	ND	NR	NR
MW-4	07-28-92	450.99	31.48	419.51	ND	NR	NR
MW-4	08-24-92	450.99	32.84	418.15	ND	NR	NR
MW-4	09-15-92	450.99	31.37	419.62	ND	NR	NR
MW-4	10-29-92	450.99	32.58	418.41	ND	NR	NR
MW-4	11-25-92	451.09	32.37	418.72	ND	NR	NR
MW-4	12-14-92	451.09	30.99	420.10	ND	NR	NR
MW-4	01-29-93	451.09	22.30	428.79	ND	NR	NR
MW-4	02-26-93	451.09	24.47	426.62	ND	NR	NR
MW-4	03-29-93	451.09	24.67	426.42	ND	NR	NR
MW-4	04-27-93	451.09	26.68	424.41	ND	NR	NR
MW-4	05-10-93	451.09	28.64	422.45	ND	NR	NR
MW-4	06-17-93	451.09	29.28	421.81	ND	NR	NR
MW-4	07-27-93	451.09	31.14	419.95	ND	NR	NR
MW-4	08-26-93	451.09	31.38	419.71	ND	NR	NR
MW-4	09-14-93	451.09	32.00	419.09	ND	NR	NR
MW-4	11-05-93	451.09	31.16	419.93	ND	NR	NR
MW-4	03-26-94	451.09	26.94	424.15	ND	NR	NR
MW-4	06-13-94	451.09	28.88	422.21	ND	NR	NR
MW-4	09-22-94	451.09	30.98	420.11	ND	NNE	0.056
MW-4	11-25-94	451.09	29.08	422.01	ND	N	0.06

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 03-07-95
Project Number: 0805-122.01

Well Designation	Water Level Field Date	TOC Elevation	Depth to Water	Ground-Water Elevation	Floating Product Thickness	Ground-Water Flow Direction	Hydraulic Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-5	07-25-91	451.41	36.67	414.74	Sheen	NR	NR
MW-5	08-13-91	451.41	^37.98	^413.43	0.01	NR	NR
MW-5	09-12-91	451.41	^39.01	^412.40	0.05	NR	NR
MW-5	10-30-91	451.41	38.28	413.13	Sheen	NR	NR
MW-5	11-13-91	451.41	39.24	412.17	Sheen	NR	NR
MW-5	12-26-91	451.41	39.11	412.30	Sheen	NR	NR
MW-5	01-18-92	451.41	38.15	NR	Skimmer	NR	NR
MW-5	02-21-92	451.41	30.59	NR	Skimmer	NR	NR
MW-5	03-18-92	451.41	30.84	NR	Skimmer	NR	NR
MW-5	04-24-92	451.40	33.00	418.40	Skimmer	NR	NR
MW-5	05-20-92	451.40	32.86	418.54	Skimmer	NR	NR
MW-5	06-12-92	451.40	33.03	418.37	ND	NR	NR
MW-5	07-28-92	451.40	31.92	419.48	ND	NR	NR
MW-5	08-24-92	451.40	32.17	419.23	ND	NR	NR
MW-5	09-15-92	451.40	31.90	419.50	ND	NR	NR
MW-5	10-29-92	451.40	32.94	418.46	ND	NR	NR
MW-5	11-25-92	451.40 Not surveyed: new wellhead prevented measurement					
MW-5	12-14-92	451.40	30.90	NR	ND	NR	NR
MW-5	01-29-93	451.40	23.25	NR	ND	NR	NR
MW-5	02-26-93	451.40	25.02	NR	ND	NR	NR
MW-5	03-29-93	451.40	24.72	NR	ND	NR	NR
MW-5	04-27-93	451.40	27.11	NR	ND	NR	NR
MW-5	05-10-93	451.40	29.04	NR	ND	NR	NR
MW-5	06-17-93	451.40	29.33	NR	ND	NR	NR
MW-5	07-27-93	451.40	31.12	420.28	ND	NR	NR
MW-5	08-26-93	451.40	31.37	420.03	ND	NR	NR
MW-5	09-14-93	451.40	31.96	419.44	ND	NR	NR
MW-5	11-05-93	451.40	31.03	420.37	ND	NR	NR
MW-5	03-26-94	451.40	27.41	423.99	ND	NR	NR
MW-5	06-13-94	451.40	29.29	422.11	ND	NR	NR
MW-5	09-22-94	451.40 Not surveyed: vehicle was parked on well					
MW-5	11-25-94	451.40	29.76	421.64	ND	N	0.06

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 03-07-95
Project Number: 0805-122.01

Well Designation	Water Level Field Date	TOC Elevation	Depth to Water	Ground-Water Elevation	Floating Product Thickness	Ground-Water Flow Direction	Hydraulic Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-6	07-25-91	451.38	37.68	413.70	ND	NR	NR
MW-6	08-13-91	451.38	39.17	412.21	ND	NR	NR
MW-6	09-12-91	451.38	41.14	410.24	ND	NR	NR
MW-6	10-30-91	451.38	42.10	409.28	ND	NR	NR
MW-6	11-13-91	451.38	41.45	409.93	ND	NR	NR
MW-6	12-26-91	451.38	41.23	410.15	ND	NR	NR
MW-6	01-18-92	451.38	38.23	NR	ND	NR	NR
MW-6	02-21-92	451.37	35.21	NR	ND	NR	NR
MW-6	03-31-92	451.37	32.26	NR	ND	NR	NR
MW-6	04-24-92	451.37	33.24	418.13	ND	NR	NR
MW-6	05-20-92	451.37	33.14	418.23	ND	NR	NR
MW-6	06-12-92	451.37	33.43	417.94	ND	NR	NR
MW-6	07-28-92	451.37	32.52	418.85	ND	NR	NR
MW-6	08-24-92	451.37	32.57	418.80	ND	NR	NR
MW-6	09-15-92	451.37	32.58	418.79	ND	NR	NR
MW-6	10-29-92	451.37	32.33	419.04	ND	NR	NR
MW-6	11-25-92	451.37	32.43	418.94	ND	NR	NR
MW-6	12-14-92	451.37	31.52	419.85	ND	NR	NR
MW-6	01-29-93	451.37	23.70	427.67	ND	NR	NR
MW-6	02-26-93	451.37	26.22	425.15	ND	NR	NR
MW-6	03-29-93	451.37	26.13	425.24	ND	NR	NR
MW-6	04-27-93	451.37	27.27	424.10	ND	NR	NR
MW-6	05-10-93	451.37	29.74	421.63	ND	NR	NR
MW-6	06-17-93	451.37	30.92	420.45	ND	NR	NR
MW-6	07-27-93	451.37	30.90	420.47	ND	NR	NR
MW-6	08-26-93	451.37	31.18	420.19	ND	NR	NR
MW-6	09-14-93	451.37	31.70	419.67	ND	NR	NR
MW-6	11-05-93	451.37	31.83	419.54	ND	NR	NR
MW-6	03-26-94	451.37	28.24	423.13	ND	NR	NR
MW-6	06-13-94	451.37	29.20	422.17	ND	NR	NR
MW-6	09-22-94	451.37	30.37	421.00	ND	NNE	0.056
MW-6	11-25-94	451.37	29.88	421.49	ND	N	0.06

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 03-07-95
Project Number: 0805-122.01

Well Designation	Water Level Field Date	TOC Elevation	Depth to Water	Ground-Water Elevation	Floating Product Thickness	Ground-Water Flow Direction	Hydraulic Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-7	07-25-91	450.65	34.88	415.77	Sheen	NR	NR
MW-7	08-13-91	450.65	36.17	414.48	ND	NR	NR
MW-7	09-12-91	450.65	37.81	412.84	ND	NR	NR
MW-7	10-30-91	450.65	38.50	412.15	ND	NR	NR
MW-7	11-13-91	450.65	38.31	412.34	ND	NR	NR
MW-7	12-26-91	450.65	37.90	412.75	ND	NR	NR
MW-7	01-18-92	450.65	Not surveyed: well inaccessible due to construction				
MW-7	02-21-92	450.65	31.50	NR	ND	NR	NR
MW-7	03-31-92	450.65	29.40	NR	ND	NR	NR
MW-7	04-24-92	450.63	32.14	418.49	ND	NR	NR
MW-7	05-20-92	450.63	32.51	418.12	ND	NR	NR
MW-7	06-12-92	450.63	32.45	418.18	ND	NR	NR
MW-7	07-28-92	450.63	32.08	418.55	ND	NR	NR
MW-7	08-24-92	450.63	32.29	418.34	ND	NR	NR
MW-7	09-15-92	450.63	31.93	418.70	ND	NR	NR
MW-7	10-29-92	450.63	32.37	418.26	ND	NR	NR
MW-7	11-25-92	450.33	31.80	418.53	ND	NR	NR
MW-7	12-14-92	450.33	30.44	419.89	ND	NR	NR
MW-7	01-29-93	450.33	21.76	428.57	ND	NR	NR
MW-7	02-26-93	450.33	24.16	426.17	ND	NR	NR
MW-7	03-29-93	450.33	24.32	426.01	ND	NR	NR
MW-7	04-27-93	450.33	25.44	424.89	ND	NR	NR
MW-7	05-10-93	450.33	27.40	422.93	ND	NR	NR
MW-7	06-17-93	450.33	28.80	421.53	ND	NR	NR
MW-7	07-27-93	450.33	29.89	420.44	ND	NR	NR
MW-7	08-26-93	450.33	30.52	419.81	ND	NR	NR
MW-7	09-14-93	450.33	31.09	419.24	ND	NR	NR
MW-7	11-05-93	450.33	31.42	418.91	ND	NR	NR
MW-7	03-26-94	450.33	26.03	424.30	ND	NR	NR
MW-7	06-13-94	450.33	27.94	422.39	ND	NR	NR
MW-7	09-22-94	450.33	30.46	419.87	ND	NNE	0.056
MW-7	11-25-94	450.33	28.30	422.03	ND	N	0.06

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 03-07-95
Project Number: 0805-122.01

Well Desig-nation	Water Level Field Date	TOC Elevation	Depth to Water	Ground-Water Elevation	Floating Product Thickness	Ground-Water Flow Direction	Hydraulic Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-8	01-29-93	449.43	23.23	426.20	ND	NR	NR
MW-8	02-26-93	449.43	29.20	420.23	ND	NR	NR
MW-8	03-29-93	449.43	29.77	419.66	ND	NR	NR
MW-8	04-27-93	449.43	31.52	417.91	ND	NR	NR
MW-8	05-10-93	449.43	33.88	415.55	ND	NR	NR
MW-8	06-17-93	449.43	35.25	414.18	ND	NR	NR
MW-8	07-27-93	449.43	36.61	412.82	ND	NR	NR
MW-8	08-26-93	449.43	37.71	411.72	ND	NR	NR
MW-8	09-14-93	449.43	38.78	410.65	ND	NR	NR
MW-8	11-05-93	449.43	39.01	410.42	ND	NR	NR
MW-8	03-26-94	449.43	31.40	418.03	ND	NR	NR
MW-8	06-13-94	449.43	35.10	414.33	ND	NR	NR
MW-8	09-22-94	449.43	38.77	410.66	ND	NNE	0.056
MW-8	11-25-94	449.43	36.46	412.97	ND	N	0.06
MW-9	01-29-93	449.21	18.91	430.30	ND	NR	NR
MW-9	02-26-93	449.21	21.35	427.86	ND	NR	NR
MW-9	03-29-93	449.21	21.78	427.43	ND	NR	NR
MW-9	04-27-93	449.21	24.70	424.51	ND	NR	NR
MW-9	05-10-93	449.21	26.19	423.02	ND	NR	NR
MW-9	06-17-93	449.21	27.50	421.71	ND	NR	NR
MW-9	07-27-93	449.21	29.11	420.10	ND	NR	NR
MW-9	08-26-93	449.21	29.55	419.66	ND	NR	NR
MW-9	09-14-93	449.21	30.65	418.56	ND	NR	NR
MW-9	11-05-93	449.21	32.24	416.97	ND	NR	NR
MW-9	03-26-94	449.21	25.68	423.53	ND	NR	NR
MW-9	06-13-94	449.21	27.69	421.52	ND	NR	NR
MW-9	09-22-94	449.21	31.36	417.85	ND	NNE	0.056
MW-9	11-25-94	449.21	29.84	419.37	ND	N	0.06

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 03-07-95
Project Number: 0805-122.01

Well Designation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Ground-Water Elevation ft-MSL	Floating Product Thickness feet	Ground-Water Flow Direction MWN	Hydraulic Gradient foot/foot
MW-10	01-29-93	449.22	19.27	429.95	ND	NR	NR
MW-10	02-26-93	449.22	21.34	427.88	ND	NR	NR
MW-10	03-29-93	449.22	20.89	428.33	ND	NR	NR
MW-10	04-27-93	449.22	25.40	423.82	ND	NR	NR
MW-10	05-10-93	449.22	26.77	422.45	ND	NR	NR
MW-10	06-17-93	449.22	26.80	422.42	ND	NR	NR
MW-10	07-27-93	449.22	29.87	419.35	ND	NR	NR
MW-10	08-26-93	449.22	29.67	419.55	ND	NR	NR
MW-10	09-14-93	449.22	31.07	418.15	ND	NR	NR
MW-10	11-05-93	449.22	30.42	418.80	ND	NR	NR
MW-10	03-26-94	449.22	26.20	423.02	ND	NR	NR
MW-10	06-13-94	449.22	28.23	420.99	ND	NR	NR
MW-10	09-22-94	449.22	31.79	417.43	ND	NNE	0.056
MW-10	11-25-94	449.22	30.30	418.92	ND	N	0.06
MW-11	04-24-92	448.02	35.06	412.96	ND	NR	NR
MW-11	05-20-92	448.02	34.10	413.92	ND	NR	NR
MW-11	06-12-92	448.02	34.48	413.54	ND	NR	NR
MW-11	07-28-92	448.02	35.13	412.89	ND	NR	NR
MW-11	08-24-92	448.02	33.32	414.70	ND	NR	NR
MW-11	09-15-92	448.02	35.72	412.30	ND	NR	NR
MW-11	10-29-92	448.02	35.26	412.76	ND	NR	NR
MW-11	11-25-92	448.02	36.44	411.58	ND	NR	NR
MW-11	12-14-92	448.02	33.18	414.84	ND	NR	NR
MW-11	01-29-93	448.02	23.89	424.13	ND	NR	NR
MW-11	02-26-93	448.02	27.31	420.71	ND	NR	NR
MW-11	03-29-93	448.02	27.27	420.75	ND	NR	NR
MW-11	04-27-93	448.02	30.61	417.41	ND	NR	NR
MW-11	05-10-93	448.02	32.78	415.24	ND	NR	NR
MW-11	06-17-93	448.02	33.25	414.77	ND	NR	NR
MW-11	07-27-93	448.02	34.49	413.53	ND	NR	NR
MW-11	08-26-93	448.02	35.44	412.58	ND	NR	NR
MW-11	09-14-93	448.02	36.62	411.40	ND	NR	NR
MW-11	11-05-93	448.02	36.68	411.34	ND	NR	NR
MW-11	03-26-94	448.02	30.20	417.82	ND	NR	NR
MW-11	06-13-94	448.02	33.39	414.63	ND	NR	NR
MW-11	09-22-94	448.02	34.75	413.27	ND	NNE	0.056
MW-11	11-25-94	448.02	33.84	414.18	ND	N	0.06

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 03-07-95
Project Number: 0805-122.01

Well Designation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Ground-Water Elevation ft-MSL	Floating Product Thickness feet	Ground-Water Flow Direction MWN	Hydraulic Gradient foot/foot
RW-1	04-24-92	451.44	32.85	418.59	ND	NR	NR
RW-1	05-20-92	451.44	32.60	418.84	ND	NR	NR
RW-1	06-12-92	451.44	32.72	418.72	ND	NR	NR
RW-1	07-28-92	451.44	31.94	419.50	ND	NR	NR
RW-1	08-24-92	451.44	31.73	419.71	ND	NR	NR
RW-1	09-15-92	451.44	31.94	419.50	ND	NR	NR
RW-1	10-29-92	451.44	32.15	419.29	ND	NR	NR
RW-1	11-25-92	451.67	32.21	419.46	ND	NR	NR
RW-1	12-14-92	451.67	30.58	421.09	ND	NR	NR
RW-1	01-29-93	451.67	22.89	428.78	ND	NR	NR
RW-1	02-26-93	451.67	23.97	427.70	ND	NR	NR
RW-1	03-29-93	451.67	23.98	427.69	ND	NR	NR
RW-1	04-27-93	451.67	27.26	424.41	ND	NR	NR
RW-1	05-10-93	451.67	29.64	422.03	ND	NR	NR
RW-1	06-17-93	451.67	30.18	421.49	ND	NR	NR
RW-1	07-27-93	451.67	31.55	420.12	ND	NR	NR
RW-1	08-26-93	451.67	31.82	419.85	ND	NR	NR
RW-1	09-14-93	451.67	32.32	419.35	ND	NR	NR
RW-1	11-05-93	451.67	31.91	419.76	ND	NR	NR
RW-1	03-26-94	451.67	27.78	423.89	ND	NR	NR
RW-1	06-13-94	451.67	29.48	422.19	ND	NR	NR
RW-1	09-22-94	451.67	30.52	421.15	ND	NNE	0.056
RW-1	11-25-94	451.67	30.89	420.78	ND	N	0.06

TOC = Top of casing
ft-MSL = Elevation in feet, relative to mean sea level
MWN = Ground-water flow direction and gradient apply to the entire monitoring well network
NR = Not reported; data not available
ND = None detected
^ = Groundwater elevation (GWE) and depth to water (DTW) adjusted to include 80 percent of the floating product thickness (FPT):
[GWE = (TOC - DTW) + (FPT x 0.8)]
* = Floating product was not initially detected, but entered the well during purging
NNE = North-northeast
N = North

Table 3
Historical Groundwater Analytical Data
Summary Report

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 03-07-95
Project Number: 0805-122.01

Well Designation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHD	TOG
		ppb	ppb	ppb	ppb	ppb	ppb	ppm
MW-1	01-15-91	Not sampled: well contained floating product						
MW-1	04-10-91	98000	11000	18000	2800	20000	NA	NA
MW-1	07-25-91	Not sampled: well contained floating product						
MW-1	10-30-91	Not sampled: well contained floating product						
MW-1	03-31-92	Not sampled: well contained floating product						
MW-1	06-12-92	Not sampled: well contained floating product						
MW-1	09-16-92	Not sampled: well contained floating product						
MW-1	11-25-92	Not sampled: well contained floating product						
MW-1	01-29-93	360000	2500	9300	5100	41000	NA	NA
MW-1	05-10-93	1900000	4100	15000	21000	140000	NA	NA
MW-1	09-16-93	1800000	6400	21000	19000	140000	NA	NA
MW-1	11-05-93	700000	3000	7600	8600	65000	NA	NA
MW-1	03-26-94	29000	1000	290	610	3300	NA	NA
MW-1	06-13-94	25000	600	160	500	2500	NA	NA
MW-1	09-22-94	51000	1400	280	570	2800	NA	NA
MW-1	11-25-94	170000	990	1000	1700	9400	NA	NA
MW-2	01-15-91	Not sampled: well contained floating product						
MW-2	04-10-91	Not sampled: well contained floating product						
MW-2	07-25-91	Not sampled: well contained floating product						
MW-2	10-30-91	Not sampled: well contained floating product						
MW-2	03-31-92	270000	7000	12000	4400	40000	NA	NA
MW-2	06-12-92	110000	8900	13000	2800	16000	NA	NA
MW-2	09-16-92	Not sampled: well contained floating product						
MW-2	11-25-92	Not sampled: well contained floating product						
MW-2	01-29-93	89000	4600	5700	1800	15000	NA	NA
MW-2	05-10-93	440000	3900	4300	4400	36000	NA	NA
MW-2	09-16-93	200000	5500	4300	2300	19000	NA	NA
MW-2	11-05-93	250000	7800	8400	3100	24000	NA	NA
MW-2	03-26-94	22000	1100	1400	190	3700	NA	NA
MW-2	06-13-94	71000	4100	4600	1700	9900	NA	NA
MW-2	09-22-94	42000	1200	620	710	2000	NA	NA
MW-2	11-25-94	60000	3900	4100	1400	7400	NA	NA

Table 3
Historical Groundwater Analytical Data
Summary Report

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 03-07-95
Project Number: 0805-122.01

Well Desig-nation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHD	TOG
		ppb	ppb	ppb	ppb	ppb	ppb	ppm
MW-3	01-15-91	230	<0.5	<0.5	2.2	2.1	NA	NA
MW-3	04-10-91	530	12	8.4	4	7	NA	NA
MW-3	07-25-91	110	0.32	0.75	1.2	1	NA	NA
MW-3	10-30-91	Not sampled: dry well						
MW-3	03-31-92	670	12	1.1	7.4	27	NA	NA
MW-3	06-12-92	280	<0.5	<0.5	2.1	2	NA	NA
MW-3	09-15-92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-3	11-25-92	220	1	<0.5	4.9	1.2	NA	NA
MW-3	01-29-93	380*	0.8	0.6	2.1	2	NA	NA
MW-3	05-10-93	170	<0.5	<0.5	2	0.6	NA	NA
MW-3	09-15-93	120	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-3	11-05-93	110	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-3	03-26-94	54	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-3	06-13-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-3	09-22-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-3	11-25-94	54	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-4	07-25-91	23000	590	730	360	3500	NA	NA
MW-4	10-30-91	19000	320	340	230	180	NA	NA
MW-4	03-31-92	30000	1300	740	770	4800	NA	NA
MW-4	06-12-92	28000	990	440	550	3200	NA	NA
MW-4	09-16-92	21000	740	240	350	1300	NA	NA
MW-4	11-25-92	26000	1200	300	350	730	NA	NA
MW-4	01-29-93	23000	2000	580	770	2500	NA	NA
MW-4	05-10-93	74000	2200	890	1400	4000	NA	NA
MW-4	09-16-93	43000	640	90	360	690	NA	NA
MW-4	11-05-93	30000	1000	240	390	1300	NA	NA
MW-4	03-26-94	27000	1800	830	1300	2900	NA	NA
MW-4	06-13-94	17000	1300	620	670	1600	NA	NA
MW-4	09-22-94	10000	700	61	420	570	NA	NA
MW-4	11-25-94	13000	1400	250	490	1200	NA	NA

Table 3
Historical Groundwater Analytical Data
Summary Report

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 03-07-95
Project Number: 0805-122.01

Well Designation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHD	TOG
		ppb	ppb	ppb	ppb	ppb	ppb	ppm
MW-5	07-25-91	57000	2300	4200	77	14000	NA	NA
MW-5	10-30-91	Not sampled: well contained floating product						
MW-5	03-31-92	80000	7100	9100	2000	16000	NA	NA
MW-5	06-12-92	69000	4000	5300	2200	12000	NA	NA
MW-5	09-16-92	65000	2300	2600	1700	9900	NA	NA
MW-5	11-25-92	Not sampled: new wellhead made casing inaccessible for sampling						
MW-5	01-29-93	Not sampled: new wellhead made casing inaccessible for sampling						
MW-5	05-10-93	220000	3900	3700	3400	15000	NA	NA
MW-5	09-16-93	180000	3500	3300	2700	10000	NA	NA
MW-5	11-05-93	66000	3000	2300	1700	6200	NA	NA
MW-5	03-26-94	39000	4000	2300	1600	6200	NA	NA
MW-5	06-13-94	28000	2500	1700	1100	3900	NA	NA
MW-5	09-22-94	Not sampled: vehicle was parked on well						
MW-5	11-25-94	31000	2400	1100	1100	4400	NA	NA
MW-6	07-25-91	10000	3000	200	340	1000	NA	NA
MW-6	10-30-91	970	150	4.4	4.9	6.6	NA	NA
MW-6	03-31-92	16000	3600	1500	660	1700	2400*	2.5(a), 4.0(b)
MW-6	06-12-92	2900	480	17	190	170	1100*	1.2(c)
MW-6	09-16-92	2300	220	<5	92	43	810*	1.5(d)
MW-6	11-25-92	2700	240	11	103	32	720*	1.6(a), 1.8(b)
MW-6	01-29-93	20000	1800	1700	490	2600	2300*	3.6(a), 4.0(b)
MW-6	05-10-93	43000	3000	1700	1100	4800	3900*	16(a), 110(b)
MW-6	09-15-93	3500	300	10	100	180	1100*	1.0(a), 1.0(b)
MW-6	11-05-93	1100	140	<5	35	23	290	1.0(a), 1.0(b)
MW-6	03-26-94	3100	350	99	130	340	880	1.5(d)
MW-6	06-13-94	2300	250	12	130	31	350*	0.80(d)
MW-6	09-22-94	73	2.6	<0.5	1.7	0.7	<50	<0.5(a)
MW-6	11-25-94	1100	78	<2.5	46	17	<50	<0.5(d)

Table 3
Historical Groundwater Analytical Data
Summary Report

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 03-07-95
Project Number: 0805-122.01

Well Desig-nation	Water Sample Field Date	TPHG ppb	Benzene ppb	Toluene ppb	Ethyl-benzene ppb	Total Xylenes ppb	TPHD ppb	TOG ppm
MW-7	07-25-91	45000	1500	2700	1200	9200	NA	NA
MW-7	10-30-91	93000	1800	770	780	6700	NA	NA
MW-7	03-31-92	35000	960	350	300	5900	NA	NA
MW-7	06-12-92	27000	900	270	340	4800	NA	NA
MW-7	09-16-92	39000	1900	410	470	5000	NA	NA
MW-7	11-25-92	49000	2900	810	750	5300	NA	NA
MW-7	01-29-93	38000	3200	1100	740	4300	NA	NA
MW-7	05-10-93	54000	1600	160	560	3100	NA	NA
MW-7	09-16-93	37000	1400	170	560	2700	NA	NA
MW-7	11-05-93	40000	1900	210	570	2900	NA	NA
MW-7	03-26-94	22000	2700	280	500	2600	NA	NA
MW-7	06-13-94	21000	1500	180	360	1900	NA	NA
MW-7	09-22-94	22000	1800	240	430	1900	NA	NA
MW-7	11-25-94	29000	2600	380	640	3300	NA	NA
MW-8	01-29-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-8	05-10-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-8	09-15-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-8	11-05-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-8	03-26-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-8	06-13-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-8	09-22-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-8	11-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-9	01-29-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-9	05-10-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-9	09-15-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-9	11-05-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-9	03-26-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-9	06-13-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-9	09-22-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-9	11-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA

Table 3
Historical Groundwater Analytical Data
Summary Report

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 03-07-95
Project Number: 0805-122.01

Well Designation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHD	TOG
		ppb	ppb	ppb	ppb	ppb	ppb	ppm
MW-10	01-29-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-10	05-10-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-10	09-15-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-10	11-05-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-10	03-26-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-10	06-13-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-10	09-22-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-10	11-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-11	06-12-92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-11	09-15-92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-11	11-25-92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-11	01-29-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-11	05-10-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-11	09-15-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-11	11-05-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-11	03-26-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-11	06-13-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-11	09-22-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-11	11-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
RW-1	06-12-92	54000	2300	4400	1200	12000	NA	NA
RW-1	09-15-92	49000	1500	2200	870	6900	NA	NA
RW-1	11-25-92	32000	1500	2500	1000	5500	NA	NA
RW-1	01-29-93	43000	3100	2500	990	7400	NA	NA
RW-1	05-10-93	30000	2900	1100	690	4300	NA	NA
RW-1	09-16-93	20000	1800	580	620	2300	NA	NA
RW-1	11-05-93	25000	1800	250	740	1300	NA	NA
RW-1	03-26-94	8100	780	100	360	340	NA	NA
RW-1	06-13-94	4900	510	32	150	170	NA	NA
RW-1	09-22-94	4900	390	30	190	210	NA	NA
RW-1	11-25-94	4900	550	68	200	230	NA	NA

TPHG = Total petroleum hydrocarbons as gasoline
TPHD = Total petroleum hydrocarbons as diesel
TOG = Total oil and grease/petroleum hydrocarbons using method: (a) 5520F-IR, (b) 5520C, (c) 413.2, or (d) 418.1
ppb = Parts per billion or micrograms per liter (µg/l)
ppm = Parts per million or milligrams per liter (mg/l); TOG only
NA = Not analyzed
* = Chromatogram does not match the typical fingerprint for gasoline or diesel

Table 4
Approximate Cumulative Floating Product Recovered
Summary Report

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-09-95
Project Number: 0805-122.01

Well Designation	Date	Floating Product Recovered gallons
MW-1, MW-2, and MW-5	1991	2.77
MW-1, MW-2, and MW-5	1992	0.29
MW-1, MW-2, and MW-5	1993	0.00
	1994 to Date:	
MW-1	11-25-94	0.00
MW-2	11-25-94	0.00
MW-5	11-25-94	0.00
	1994 Total:	0.00
	1991 to 1994 Total:	3.06

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 771
Location: 899 Rincon Avenue
Livermore, California

Consultant: EMCON
1921 Ringwood Avenue
San Jose, California

Vapor Treatment Unit: King Buck / 200 cfm
Model MMC-6A/E
catalytic oxidizer

Start-Up Date: 12-20-94
Reporting Period From: 12-20-94
To: 01-17-95

Date Begin:		12-20-94
Date End:		01-17-95
Mode of Oxidation:		Catalytic
Days of Operation:		22.7
Days of Downtime:		5.4
Vapor Monitoring Concentrations		
Well Field Influent, as gasoline:	mg/m3(1)	300
	ppmv(2)(3)	83
System Influent, as gasoline:	mg/m3	<60
	ppmv	<17
System Effluent, as gasoline:	mg/m3	<60
	ppmv	<17
Well Field Influent, as benzene:	mg/m3	<0.5
	ppmv(4)	<0.2
System Influent, as benzene:	mg/m3	<0.5
	ppmv	<0.2
System Effluent, as benzene:	mg/m3	<0.5
	ppmv	<0.2
Well Field Flow Rate, scfm(5):		17.6
System Influent Flow Rate, scfm:		187.8
Destruction Efficiency, percent(6):		NR(7)
Emission Rates (pounds per day)(8)		
Gasoline:		<1.01
Benzene:		<0.01
Operating Hours This Period:		544.7
Operating Hours To Date:		544.7
Pounds/ Hour Removal Rate, as gasoline(9):		0.04
Pounds Removed This Period, as gasoline(10):		23
Pounds Removed To Date, as gasoline:		23
Gallons Removed This Period, as gasoline(11):		4
Gallons Removed To Date, as gasoline:		4

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number:	771	Vapor Treatment Unit:	King Buck / 200 cfm
Location:	899 Rincon Avenue Livermore, California		Model MMC-6A/E catalytic oxidizer
Consultant:	EMCON 1921 Ringwood Avenue San Jose, California	Start-Up Date: Reporting Period From: To:	12-20-94 12-20-94 01-17-95

CURRENT REPORTING PERIOD:	12-20-94	to	01-17-95
DAYS / HOURS IN PERIOD:	28.1		674
DAYS / HOURS OF OPERATION:	22.7		545
DAYS / HOURS OF DOWN TIME:	5.4		130
PERCENT OPERATIONAL:			80.8 %
PERIOD POUNDS REMOVED:	23		
PERIOD GALLONS REMOVED:	4		
AVERAGE SYSTEM INFLUENT FLOW RATE (scfm):			187.8

1. mg/m3 = milligrams per cubic meter
2. ppmv = parts per million by volume
3. Concentration (as gasoline in ppmv) = [concentration (as gasoline in mg/m3) x 24.05 (lb/m3/lb-mole of air)/mg] / 87 lb/lb-mole
4. Concentration (as benzene in ppmv) = [concentration (as benzene in mg/m3) x 24.05 (lb/m3/lb-mole of air)/mg] / 78 lb/lb-mole
5. scfm = flow in standard cubic feet per minute at one atmosphere and 70 degrees Farenheit
6. Destruction efficiency, percent = ([system influent concentration (as gasoline in mg/m3) - system effluent concentration (as gasoline in mg/m3)] / system influent concentration (as gasoline in mg/m3)) x 100 percent
7. NR = Not reported; minimum destruction efficiency of 90 % is waived when mass emission rates are less than 1.0 lb/day for TPHG and 0.02 lb/day for benzene
8. Emission rates (pounds per day) = system effluent concentration (as gasoline or benzene in mg/m3) x system influent flow rate (scfm) x 0.02832 m3/ft3 x 1440 minutes/day x 1 pound/454,000 mg
9. Pounds/ hour removal rate (as gasoline) = system influent concentration (as gasoline in mg/m3) x system influent flow rate (scfm) x 0.02832 m3/ft3 x 60 minutes/hour x 1 pound/454,000 mg
10. Pounds removed this period (as gasoline) = pounds/ hour removal rate x hours of operation
11. Gallons removed this period (as gasoline) = pounds removed this period (as gasoline) x 0.1667 gallons/pound of gasoline

Table 6
Soil-Vapor Extraction Well Data

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-22-95
Project Number: 0805-122.01

Date	Well Identification											
	VW-1			MW-1			MW-2			MW-4		
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O
12-20-94	open	177 LAB	32.5	passive	NA	NA	passive	NA	NA	open	53 LAB	25.0

TVHG = concentration of total volatile hydrocarbons as gasoline
ppmv = parts per million by volume
in-H2O = inches of water
open = open to the system
passive = open to the atmosphere
closed = closed to the system and atmosphere
NA = not analyzed or not measured
FID = TVHG concentration was measured with a portable flame ionization detector
LAB = TVHG concentration was analyzed in the laboratory

Table 6
Soil-Vapor Extraction Well Data

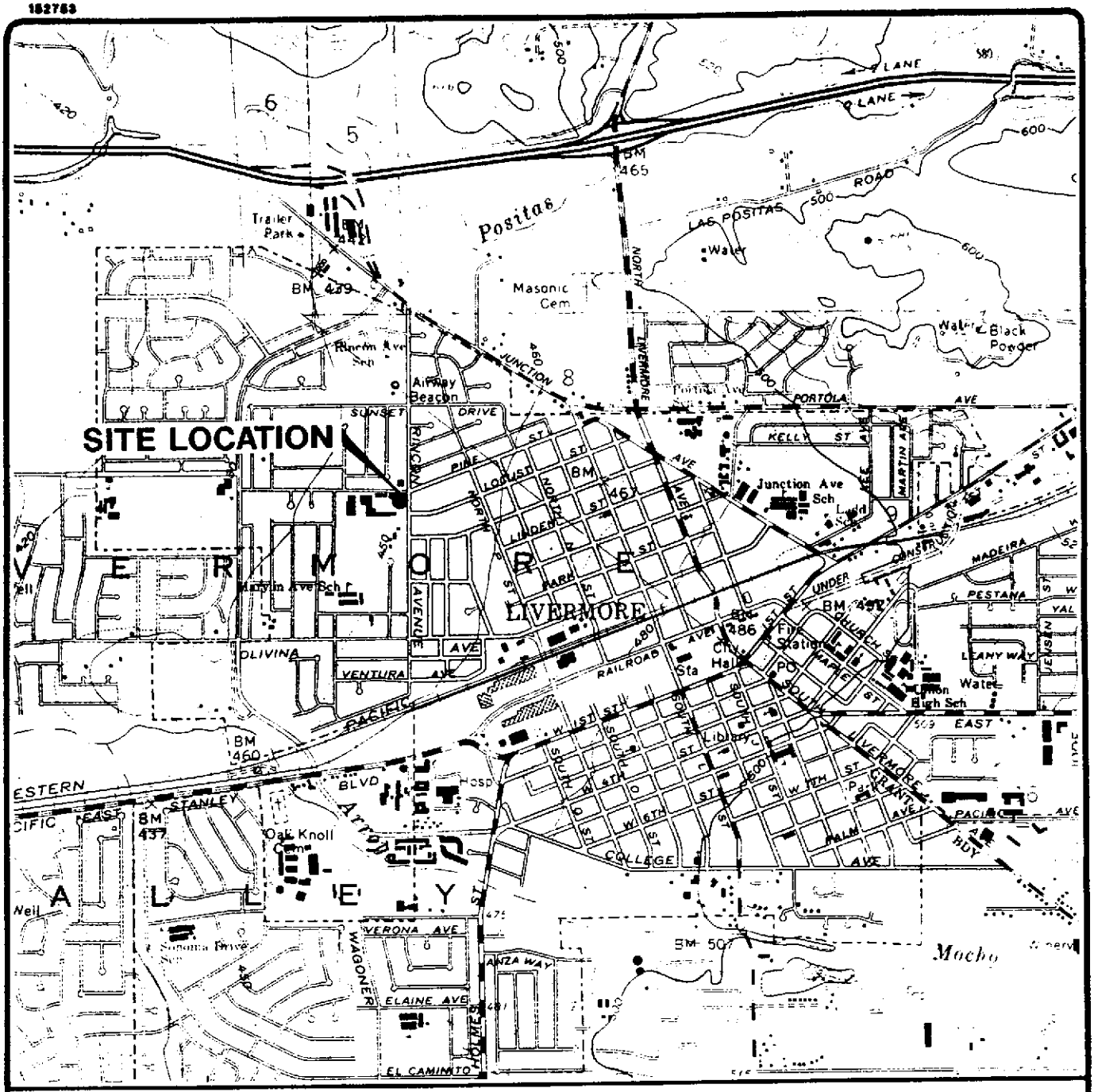
ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-22-95
Project Number: 0805-122.01

Date	Well Identification											
	MW-5			MW-7								
	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O	Valve Position	TVHG ppmv	Vacuum Response in-H2O
12-20-94	passive	NA	NA	passive	NA	NA						

TVHG = concentration of total volatile hydrocarbons as gasoline
ppmv = parts per million by volume
in-H2O = inches of water
open = open to the system
passive = open to the atmosphere
closed = closed to the system and atmosphere
NA = not analyzed or not measured
FID = TVHG concentration was measured with a portable flame ionization detector
LAB = TVHG concentration was analyzed in the laboratory

152763



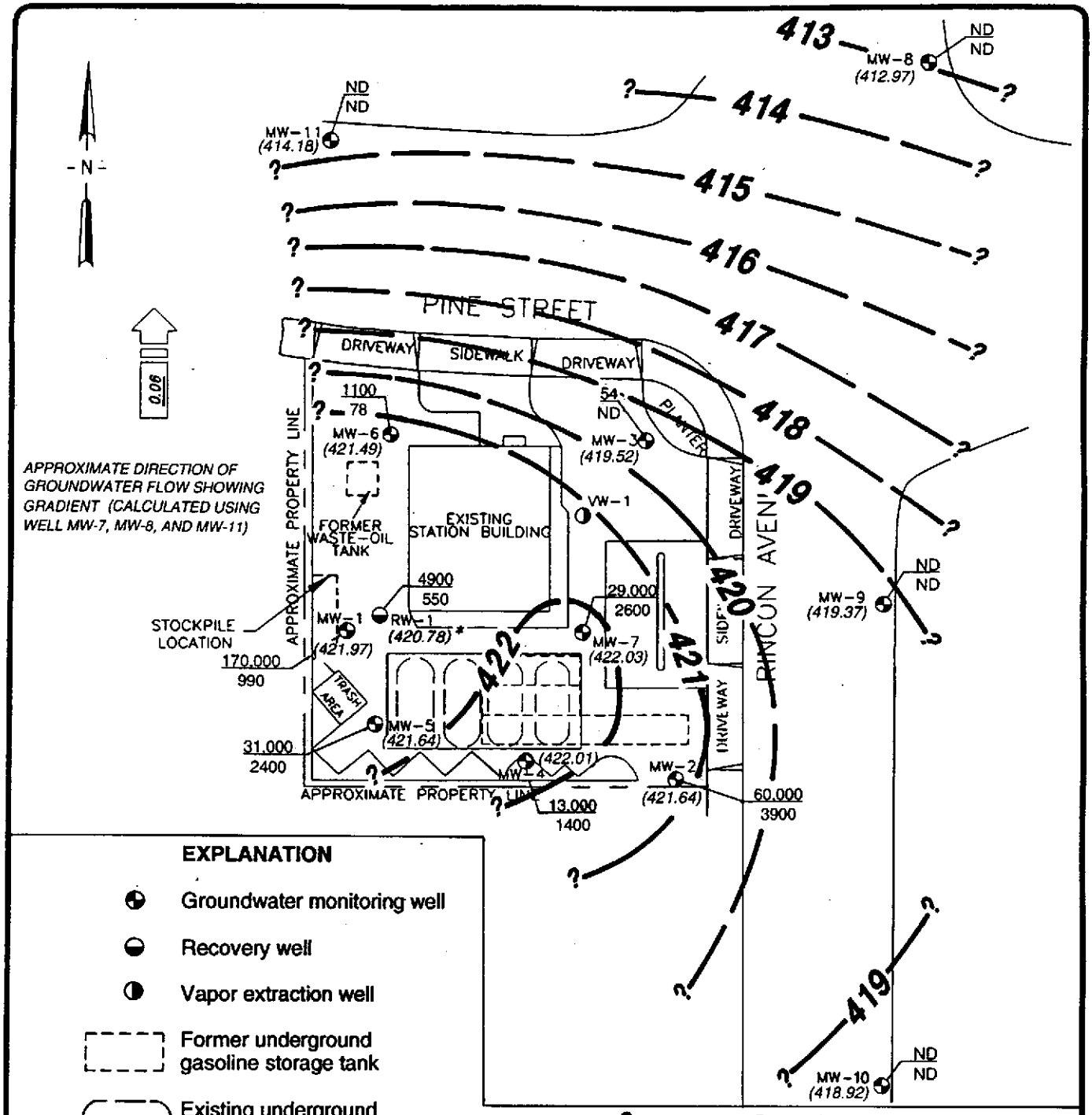
EMCON Associates

ARCO PRODUCTS COMPANY
SERVICE STATION 771, 899 RINCON AVENUE
QUARTERLY GROUNDWATER MONITORING
LIVERMORE, CALIFORNIA

SITE LOCATION

FIGURE
1
PROJECT NO.
805-122.01

155812



EMCON Associates

ARCO PRODUCTS COMPANY
SERVICE STATION 771, 899 RINCON AVENUE
QUARTERLY GROUNDWATER MONITORING
LIVERMORE, CALIFORNIA

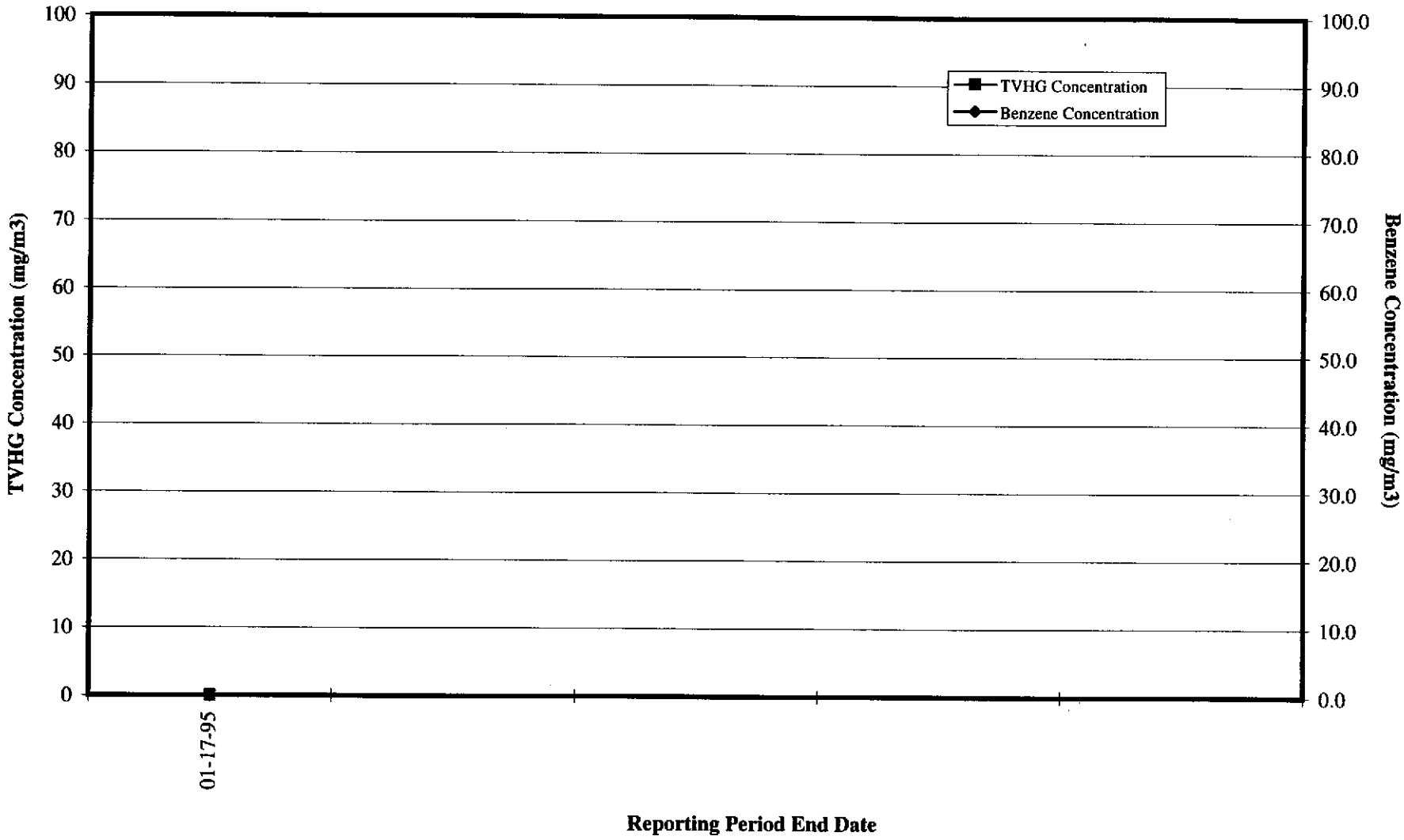
GROUNDWATER DATA
FOURTH QUARTER 1994

FIGURE 2

PROJECT NO. 805-122.01

Figure 3

ARCO Service Station 771
Soil-Vapor Extraction and Treatment System
Historical System Influent TVHG and Benzene Concentrations

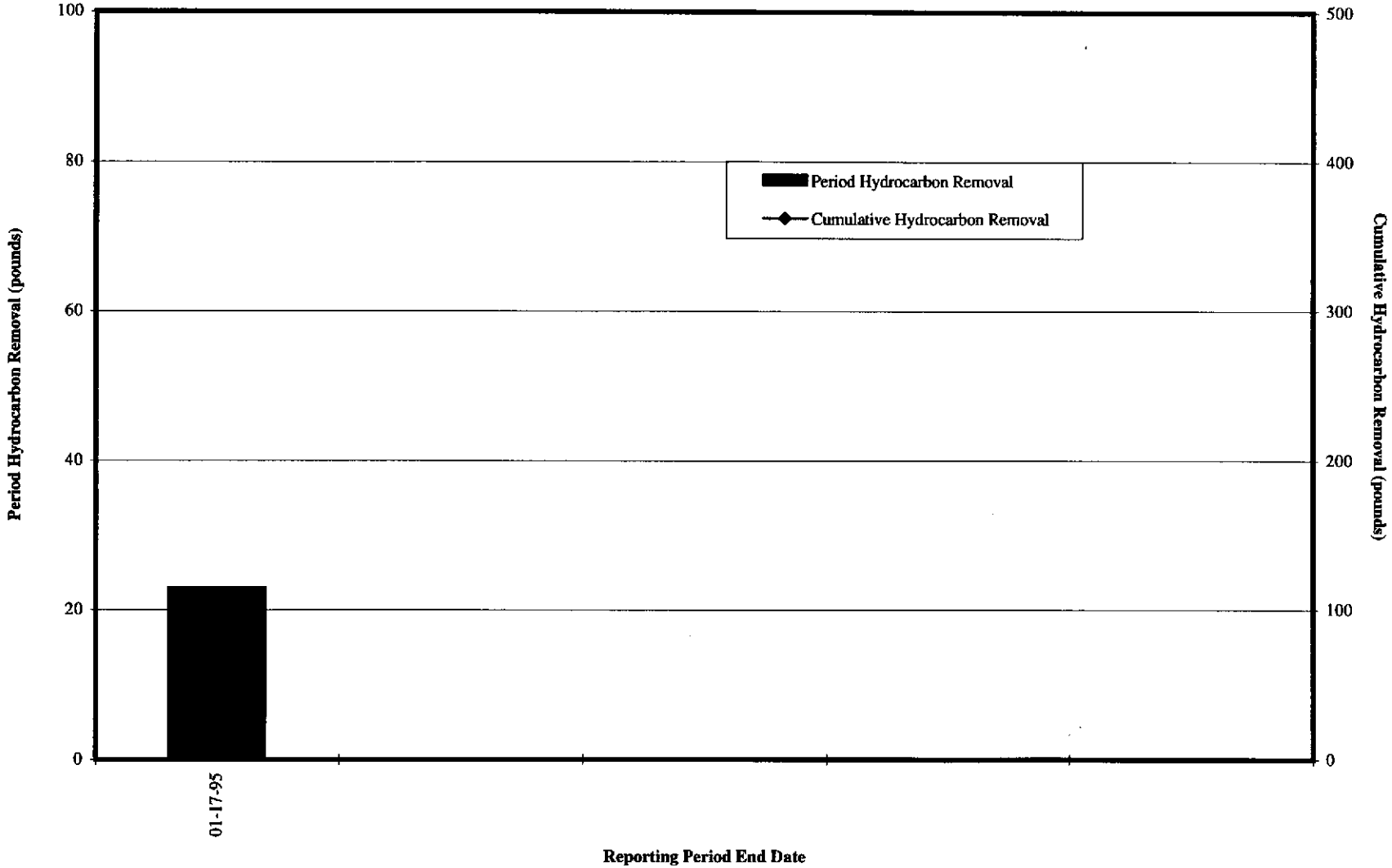


mg/m3 = Milligrams per cubic meter
TVHG = Total volatile hydrocarbons as gasoline

esj/h:\0771\0771tss.xls\0771tss:dcl
0805-122.01

Figure 4

ARCO Service Station 771
Soil-Vapor Extraction and Treatment System
Historical Hydrocarbon Removal Rates



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0805-122.01

APPENDIX A

FIELD DATA REPORT, INTEGRATED WASTESTREAM MANAGEMENT, DECEMBER 16, 1994

I NTEGRATED
W ASTESTREAM
M ANAGEMENT

December 16, 1994

John Young
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95131

Dear Mr. Young:

Attached are the field data sheets and analytical results for quarterly ground water sampling at ARCO Facility No. 771 in Livermore, California. Integrated Wastestream Management measured the depth to water and collected samples from wells at this site on November 25, 1994.

Sampling was carried out in accordance with the protocols described in the "Request for Bid for Quarterly Sampling at ARCO Facilities in Northern California".

Please call us if you have any questions.

Sincerely,
Integrated Wastestream Management

Tom DeLon
Project Manager

Walter H. Howe
Registered Geologist

REGISTERED GEOLOGIST
WALTER H. HOWE
No. 730
Exp. 4/'96
STATE OF CALIFORNIA

EMCON ASSOCIATES

DEC 2 8 1994

RECEIVED

950 AMES AVENUE MILPITAS, CA 95035 (408) 942-8955

INTEGRATED
WASTESTREAM
MANAGEMENT

A0771Q4.XLS

Summary of Ground Water Sample Analyses for ARCO Facility A-771, Livermore, California

WELL NUMBER	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	RW-1
DATE SAMPLED	11/25/94	11/25/94	11/25/94	11/25/94	11/25/94	11/25/94	11/25/94	11/25/94	11/25/94	11/25/94	11/25/94	11/25/94
DEPTH TO WATER	29.76	27.85	30.76	29.08	29.76	29.88	28.30	36.46	29.84	30.30	33.84	30.89
SHEEN	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
PRODUCT THICKNESS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPHg	170,000	60,000	54	13,000	31,000	1,100	29,000	ND	ND	ND	ND	4,900
BTEX												
BENZENE	990	3,900	ND	1,400	2,400	78	2,600	ND	ND	ND	ND	550
TOLUENE	1,000	4,100	ND	250	1,100	<2.5#	380	ND	ND	ND	ND	68
ETHLYBENZENE	1,700	1,400	ND	490	1,100	46	640	ND	ND	ND	ND	200
XYLENES	9,400	7,400	ND	1,200	4,400	17	3,300	ND	ND	ND	ND	230
TPHd												
DIESEL	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA
EPA 418.1	NA	NA	NA	NA	NA	0.5	NA	NA	NA	NA	NA	NA

FOOTNOTES:

Concentrations reported in ug/L (ppb)
TPHg = Total Purgeable Petroleum Hydrocarbons (USEPA Method 8015 Modified)
BTEX Distinction (USEPA Method 8020)
PCE = Tetrachloroethene (USEPA Method 8010)
* = Well inaccessible

** = Not sampled per consultant request
DCE = cis-1, 2-Dichloroethene (USEPA Method 8010)
TCE = Trichloroethene (USEAP Method 8010)
ND = Not Detected
NA = Not applicable
FP = Floating product
# = See laboratory analytical report

950 AMES AVENUE MILPITAS, CA 95035 (408) 942-8955

FIELD REPORT

Depth To Water / Floating Product Survey

Site Arrival Time: 1000
Site Departure Time: 1730
Weather Conditions: CLOUDY RAINY

DTW: Well Box or Well Casing (circle one)

Project No.: _____ **Location:** 899 RINCON AVE, LIVERM. **Date:** 11-25-94

Client / Station#: ARCO 771 **Field Technician:** THOMMY / CISCO **Day of Week:** FRIDAY

DTW ORDER	WELL ID	SURFACE SEAL	LID SECURE	GASKET	LOCK	EXPANDING CAP	TOTAL DEPTH (Feet)	FIRST DEPTH TO WATER (Feet)	SECOND DEPTH TO WATER (Feet)	DEPTH TO FLOATING PRODUCT (Feet)	FLOATING PRODUCT THICKNESS (Feet)	SHEEN (Y=YES, N=NO) FP=FLOATING PRODUCT	COMMENTS	MATERIALS
11	MW-1	OK	YES	OK	OK	OK	40.60	29.76	29.76	N/A	N/A	N	4"	3/4
10	MW-2	OK	YES	OK	OK	OK	37.90	27.85	27.85	N/A	N/A	N	4"	3/4
1	MW-3	OK	YES	OK	OK	OK	39.60	30.76	30.76	N/A	N/A	N	4"	15/16
8	MW-4	OK	YES	OK	OK	OK	41.10	29.08	29.08	N/A	N/A	N	4"	3/4
12	MW-5	OK	YES	OK	OK	OK	40.22	29.74	29.74	N/A	N/A	N	4"	3/4
6	MW-6	OK	YES	OK	OK	OK	43.30	29.88+	29.88+	N/A	N/A	N	4"	15/16
9	MW-7	OK	YES	OK	OK	OK	39.70	28.30	28.30	N/A	N/A	N	4"	3/4
2	MW-8	OK	YES	OK	OK	OK	41.70	36.46+	36.46+	N/A	N/A	N	2" THRU ON BOX	15/16
3	MW-9	OK	YES	OK	OK	OK	40.20	29.84 -	29.84 -	N/A	N/A	N	2"	15/16
4	MW-10	OK	YES	OK	OK	OK	36.10	30.30+	30.30+	N/A	N/A	N	2"	15/16
5	MW-11	OK	YES	OK	OK	OK	38.60	33.84	33.84	N/A	N/A	N	2"	15/16
7	RW-1	OK	YES	OK	NONE	NONE	39.70	30.89	30.89	N/A	N/A	N	6"	3/8 HEX

[redacted]

PAGE 1 OF 1 DATE: 11-25-94 CLIENT/STATION #: Arco 771 ADDRESS: 899 Rincon av. Livermore

WELL ID: RW-1 TD 39.7 - DTW 30.89 X 1.5 (Gal. Linear Ft.) X 2 (Casing Volume) = 26.42 (Calculated Purge)

DATE PURGED: 11-25-94 START (2400 HR): 1410 END (2400 HR) 1434

DATE SAMPLED: 11-25-94 TIME (2400 HR): 1456 DTW: 33.8

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1415	3	7.10	0.80	64.9	cloudy
1422	10	7.08	0.79	64.8	cloudy
1427	16	7.07	0.77	64.1	cloudy
1434	26	7.06	0.77	63.9	clear

Total purge: 26

PURGING EQUIP.: (Centrifugal Pump) Bailer Disp. SAMPLING EQUIP: (Bailer Disp.)

REMARKS:

WELL ID: TD - DTW X Gal. Linear Ft. X Casing Volume = Calculated Purge

DATE PURGED: START (2400 HR): END (2400 HR)

DATE SAMPLED: TIME (2400 HR): DTW:

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)

Total purge:

PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.

REMARKS:

WELL ID: TD - DTW X Gal. Linear Ft. X Casing Volume = Calculated Purge

DATE PURGED: START (2400 HR): END (2400 HR)

DATE SAMPLED: TIME (2400 HR): DTW:

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)

Total purge:

PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.

REMARKS:

WELL ID: TD - DTW X Gal. Linear Ft. X Casing Volume = Calculated Purge

DATE PURGED: START (2400 HR): END (2400 HR)

DATE SAMPLED: TIME (2400 HR): DTW:

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)

Total purge:

PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.

REMARKS:

PRINT NAME: Vince Valdes SIGNATURE: [signature]

CASING DIAMETER (inches):	2	3	4	6	8	12	Other:
GALLON/LINEAR FOOT:	0.17	0.38	0.66	1.5	2.6	5.8	Other:

PAGE 2 OF 4 DATE: 11-25-94 CLIENT/STATION #: ARCO 771 ADDRESS: 879 RINCON AVE

WELL ID: MW-3 TD 39.60 - DTW 30.76 X Gal. Linear Ft. .66 X Casing Volume 3 = Calculated Purge 17.50

DATE PURGED: 11-25-94 START (2400 HR): 1321 END (2400 HR) 1328
DATE SAMPLED: 11-25-94 TIME (2400 HR): 1332 DTW: 35.20

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1322	3.0	6.81	.71	68.6	CLOUDY
1324	8.0	6.73	.79	68.1	CLEAR
1328	11.0	6.64	.72	67.7	CLEAR

Total purge: 11.0
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS: WELL PUMPED DRY @ 11 GALS.

WELL ID: MW-8 TD 41.70 - DTW 36.46 X Gal. Linear Ft. .17 X Casing Volume 3 = Calculated Purge 2.67

DATE PURGED: 11-25-94 START (2400 HR): 1130 END (2400 HR) 1142
DATE SAMPLED: 11-25-94 TIME (2400 HR): 1145 DTW: 39.3

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1133	1.0	7.06	.72	61.1	CLOUDY
1137	2.0	7.05	.70	60.8	CLOUDY
1142	3.0	6.97	.67	60.2	CLOUDY

Total purge: 3.0
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

WELL ID: MW-9 TD 40.20 - DTW 29.84 X Gal. Linear Ft. .17 X Casing Volume 3 = Calculated Purge 5.28

DATE PURGED: 11-25-94 START (2400 HR): 1200 END (2400 HR) 1210
DATE SAMPLED: 11-25-94 TIME (2400 HR): 1215 DTW: 31.80

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1201	1.0	6.90	.70	64.0	CLOUDY
1205	3.0	6.89	.68	63.8	CLOUDY
1210	5.0	6.87	.67	63.1	CLOUDY

Total purge: 5.0
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

WELL ID: MW-10 TD 36.10 - DTW 30.30 X Gal. Linear Ft. .17 X Casing Volume 3 = Calculated Purge 2.96

DATE PURGED: 11-25-94 START (2400 HR): 1226 END (2400 HR) 1229
DATE SAMPLED: 11-25-94 TIME (2400 HR): 1235 DTW: 31.76

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1227	1.0	6.96	.73	67.3	CLOUDY
1228	2.0	6.96	.78	66.7	CLOUDY
1229	3.0	6.95	.78	66.0	CLOUDY

Total purge:
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

PRINT NAME: THOMMY REYES/ FRANCISCO ABONCIN SIGNATURE:

CASING DIAMETER (inches):	2	3	4	6	8	12	Other:
GALLON/LINEAR FOOT:	0.17	0.38	0.66	1.5	2.6	5.8	Other:

PAGE 3 OF 4 DATE: 11-25-94 CLIENT/STATION #: [redacted] ADDRESS: [redacted]

WELL ID: MW-11 | TD 38.60 | DTW 33.84 | Gal./Linear Ft. .17 | Casing Volume 3 | Calculated Purge 2.43

DATE PURGED: 11-25-94 START (2400 HR): 1304 END (2400 HR) 1310
DATE SAMPLED: 11-25-94 TIME (2400 HR): 1314 DTW: 36.6

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1305	0.5	7.05	.73	60.8	CLOUDY
1307	1.5	7.03	.76	60.1	CLOUDY
1310	2.5	6.91	.78	59.9	CLOUDY

Total purge: 2.5
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

WELL ID: MW-6 | TD 43.30 | DTW 29.88 | Gal./Linear Ft. .66 | Casing Volume 3 | Calculated Purge 26.57

DATE PURGED: 11-25-94 START (2400 HR): 1343 END (2400 HR) 1353
DATE SAMPLED: 11-25-94 TIME (2400 HR): 1400 DTW: 39.0

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1344	3	6.75	0.69	66.5	CLEAR
1348	12	6.75	0.61	66.0	CLEAR
1352	19.0	6.78	0.70	65.6	CLEAR
1353	20.0	6.73	0.65	65.1	CLEAR

Total purge: 20.0
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS: WELL PUMPED DRY @ 20 GALS

WELL ID: RW-1 | TD 38.72 | DTW 30.89 | Gal./Linear Ft. 07.8 | Casing Volume 2 | Calculated Purge

DATE PURGED: 11-25-94 START (2400 HR): END (2400 HR)
DATE SAMPLED: 11-25-94 TIME (2400 HR): 1456 DTW: 33.8

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)

NO H2O

Total purge:
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS: [illegible]

WELL ID: MW-4 | TD 41.10 | DTW 29.08 | Gal./Linear Ft. .66 | Casing Volume 3 | Calculated Purge 23.80

DATE PURGED: 11-25-94 START (2400 HR): 1422 END (2400 HR) 1441
DATE SAMPLED: 11-25-94 TIME (2400 HR): 1445 DTW: 36.94

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1425	6.0	6.96	0.63	62.3	CLEAR
1430	12.0	6.90	0.66	61.8	CLEAR
1435	18.00	6.91	0.64	61.4	CLEAR
1441	24.0	6.83	0.62	60.6	CLEAR

Total purge: 24.0
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

PRINT NAME: THOMMY REYES/ FRANCISCO ABUNGAN SIGNATURE: [signature]

CASING DIAMETER (inches): 2 | 3 | 4 | 6 | 8 | 12 | Other:

GALLON/LINEAR FOOT: 0.17 | 0.38 | 0.66 | 1.5 | 2.6 | 5.8 | Other:

PAGE 4 OF 4 DATE: 11-25-94 CLIENT/STATION #: [redacted] ADDRESS: [redacted]

WELL ID: MW-7 | TD 39.70 | DTW 28.30 | Gal./Linear Ft. .66 | Casing Volume 3 | Calculated Purge 22.57

DATE PURGED: 11-25-94 START (2400 HR): 1522 END (2400 HR): 1533
DATE SAMPLED: 11-25-94 TIME (2400 HR): 1537 DTW: 34.6

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1526	5	6.84	0.56	66.2	CLOUDY
1528	10	6.85	0.62	60.0	CLOUDY
1533	14	6.83	0.59	59.7	CLOUDY

Total purge: 14
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS: WELL PUMP DRY AT 14 GALLONS

WELL ID: MW-2 | TD 37.90 | DTW 27.85 | Gal./Linear Ft. .66 | Casing Volume 3 | Calculated Purge 19.90

DATE PURGED: 11-25-94 START (2400 HR): 1559 END (2400 HR): 1603
DATE SAMPLED: 11-25-94 TIME (2400 HR): 1607 DTW: 30.4

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1601	5.0	6.91	0.53	61.9	GRAY
1603	7.0	6.87	0.57	61.2	GRAY

Total purge: 7.0
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS: WELL PUMPED DRY @ 7 GALS

WELL ID: MW-1 | TD 40.60 | DTW 29.76 | Gal./Linear Ft. .66 | Casing Volume 3 | Calculated Purge 21.46

DATE PURGED: 11-25-94 START (2400 HR): 1621 END (2400 HR): 1638
DATE SAMPLED: 11-25-94 TIME (2400 HR): 1643 DTW: 35.4

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1625	5	7.00	0.48	61.2	CLOUDY
1630	10	6.95	0.50	62.1	CLOUDY
1634	15	6.95	0.52	61.6	CLOUDY/LT GRAY
1638	22	6.93	0.53	60.9	CLOUDY/LT GRAY

Total purge: 22
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

WELL ID: MW-5 | TD 40.22 | DTW 29.76 | Gal./Linear Ft. .66 | Casing Volume 3 | Calculated Purge 20.71

DATE PURGED: 11-25-94 START (2400 HR): 1647 END (2400 HR): 1656
DATE SAMPLED: 11-25-94 TIME (2400 HR): 1700 DTW: 36.00

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1648	1.0	6.96	0.62	63.7	CLOUDY/LT GRAY
1652	7.0	6.94	0.70	63.9	LT CLOUDY
1656	14.0	6.89	0.67	63.1	LT CLOUDY

Total purge: 14
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS: WELL PUMPED DRY @ 14 GALS

PRINT NAME: THOMMY REYES / CISCO ABUNGAN SIGNATURE: [signature]

CASING DIAMETER (inches):	2	3	4	6	8	12	Other:
GALLON/LINEAR FOOT:	0.17	0.38	0.66	1.5	2.6	5.8	Other:

APPENDIX B

ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION, GROUNDWATER MONITORING, FOURTH QUARTER 1994

Columbia Analytical Services, Inc.

December 9, 1994

Service Request No. S941530

Gina Austin
Tom DeLon
IWM
950 Ames Avenue
Milpitas, CA 95035

Re: **ARCO Facility No. 771**

Dear Ms. Austin/Mr. DeLon:

Attached are the results of the water samples submitted to our lab on November 30, 1994. For your reference, these analyses have been assigned our service request number S941530.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and CAS is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions.

Respectfully submitted:

COLUMBIA ANALYTICAL SERVICES, INC.

Keoni A. Murphy
Program Director

Annelise J. Bazar
Regional QA Coordinator

KAM/ajb

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

Acronyms

ASTM	American Society for Testing and Materials
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MRL	Method Reporting Limit
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 MRL
NR	Not Requested
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
VPH	Volatile Petroleum Hydrocarbons

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	IWM	**Service Request:**	S941530
Project:	ARCO Facility # 771	**Date Collected:**	11/25/94
Sample Matrix:	Water	**Date Received:**	11/30/94
		Date Extracted:	12/2/94
		Date Analyzed:	12/7/94

TPH as Diesel
EPA Method 3510/California DHS LUFT Method
Units: ug/L (ppb)

Sample Name	Lab Code	MRL	Result
MW-6 (39)	S941530-006	50	ND
Method Blank	S941202-WB	50	ND

Approved By: Keen A Murphy Date: December 7, 1994

IAMRL/060194

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	IWM	**Service Request:**	S941530
Project:	ARCO Facility # 771	**Date Collected:**	11/25/94
Sample Matrix:	Water	**Date Received:**	11/30/94
		Date Extracted:	NA
		Date Analyzed:	12/5,6/94

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method

Analyte:	**TPH as Gasoline**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes, Total**
Units:	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)
Method Reporting Limit:	50	0.5	0.5	0.5	0.5
Sample Name	**Lab Code**				
MW-1 (35.4)	S941530-001	170,000	990	1,000	1,700	9,400
MW-2 (30.7)	S941530-002	60,000	3,900	4,100	1,400	7,400
MW-3 (35.2)	S941530-003	54	ND	ND	ND	ND
MW-4 (36.94)	S941530-004	13,000	1,400	250	490	1,200
MW-5 (36)	S941530-005	31,000	2,400	1,100	1,100	4,400
MW-6 (39)	S941530-006	1,100	78	<2.5 *	46	17
MW-7 (34.6)	S941530-007	29,000	2,600	380	640	3,300
MW-8 (39.3)	S941530-008	ND	ND	ND	ND	ND
MW-9 (31.8)	S941530-009	ND	ND	ND	ND	ND
MW-10 (31.76)	S941530-010	ND	ND	ND	ND	ND
MW-11 (36.6)	S941530-011	ND	ND	ND	ND	ND
RW-1 (33.8)	S941530-012	4,900	550	68	200	230
Method Blank	S941205-WB	ND	ND	ND	ND	ND
Method Blank	S941206-WB	ND	ND	ND	ND	ND

* Raised MRL due to high analyte concentratioin requiring sample dilution.

Approved By: _____ Date: December 9, 1994

5ABTXGAS/061694

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility # 771
Sample Matrix: Water

Service Request: S941530
Date Collected: 11/25/94
Date Received: 11/30/94
Date Extracted: 12/2/94
Date Analyzed: 12/6,7/94

Surrogate Recovery Summary
TPH as Diesel
EPA Method 3510/California DHS LUFT Method

Sample Name	Lab Code	Percent Recovery p-Terphenyl
MW-6 (39)	S941530-006	122
MS	S941497-018MS	102
DMS	S941497-018DMS	108
Method Blank	S941202-WB	83

CAS Acceptance Limits: 66-123

Approved By: _____ Date: December 7, 1994

SUR1/062994

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility # 771

Service Request: S941530
Date Analyzed: 12/6/94

Initial Calibration Verification (ICV) Summary
TPH as Diesel
California DHS LUFT Method
Units: ppm

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
TPH as Diesel	1,000	1,090	109	90-110

Approved By: _____ Date: December 9, 1994

ICV25AL/060194

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility # 771
Sample Matrix: Water

Service Request: S941530
Date Collected: 11/25/94
Date Received: 11/30/94
Date Extracted: 12/2/94
Date Analyzed: 12/6/94

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Diesel
EPA Method 3510/California DHS LUFT Method
Units: ug/L (ppb)

Sample Name: Batch QC
Lab Code: S941497-018

Analyte	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference
TPH as Diesel	4,000	4,000	ND	4,060	4,050	102	101	61-141	<1

Approved By: _____ Date: December 9, 1994

DMS1S/060194

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility # 771
Sample Matrix: Water

Service Request: S941530
Date Collected: 11/25/94
Date Received: 11/30/94
Date Extracted: NA
Date Analyzed: 12/5,6/94

Surrogate Recovery Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method

Sample Name	Lab Code	Percent Recovery α,α,α-Trifluorotoluene
MW-1 (35.4)	S941530-001	119
MW-2 (30.7)	S941530-002	98
MW-3 (35.2)	S941530-003	92
MW-4 (36.94)	S941530-004	99
MW-5 (36)	S941530-005	95
MW-6 (39)	S941530-006	103
MW-7 (34.6)	S941530-007	101
MW-8 (39.3)	S941530-008	96
MW-9 (31.8)	S941530-009	97
MW-10 (31.76)	S941530-010	93
MW-11 (36.6)	S941530-011	94
RW-1 (33.8)	S941530-012	95
MW-3 (35.2) MS	S941530-003MS	96
MW-3 (35.2) DMS	S941530-003DMS	97
Method Blank	S941205-WB	92
Method Blank	S941206-WB	95

CAS Acceptance Limits: 69-116

Approved By: _____ Date: 12/9/94

SUR1/062994

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

Client: IWM
Project: ARCO Facility # 771

Service Request: S941530
Date Analyzed: 12/5/94

Initial Calibration Verification (ICV) Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ppb

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	27.0	108	85-115
Toluene	25	26.2	105	85-115
Ethylbenzene	25	26.5	106	85-115
Xylenes, Total	75	77.1	103	85-115
Gasoline	250	252	101	90-110

Approved By: Kevin A Murphy Date: December 7, 1994

ICV25AL/060194

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility # 771
Sample Matrix: Water

Service Request: S941530
Date Collected: 11/25/94
Date Received: 11/30/94
Date Extracted: NA
Date Analyzed: 12/5/94

Matrix Spike/Duplicate Matrix Spike Summary
BTE
EPA Methods 5030/8020
Units: ug/L (ppb)

Sample Name: MW-3 (35.2)
Lab Code: S941530-003

Analyte	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference
Benzene	25	25	ND	26.0	27.3	104	109	75-135	5
Toluene	25	25	ND	24.8	26.4	99	106	73-136	6
Ethylbenzene	25	25	ND	25.9	26.9	104	108	69-142	4

Approved By: Robin A Murphy Date: December 9, 1994

DMS1S/060194

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. IWM-94-5CC

Chain of Custody

ARCO Facility no. A 771	City (Facility) LIVERMORE	Project manager (Consultant) WM DeLon - R. Davis	Laboratory name Columbia
ARCO engineer M.W	Telephone no. (ARCO) 4/5571243 4	Telephone no. (Consultant) 408/9428955	Fax no. (Consultant) 408/9421499
Consultant name IWM-EMCON	Address (Consultant) 950 Ames av. Milp CA, 1921 Ringwood		Contract number 07077

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid HCl	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Semi Metals ☐ VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	Diesel
FB-1	13	2		✓		✓	✓	11-25-94	700		✓	✓									
35.4 MW-1	1	2		✓		✓	✓		1643		✓	✓									
30.7 MW-2	2	2		✓		✓	✓		1607		✓	✓									
35.2 MW-3	3	2		✓		✓	✓		1332		✓	✓									
36.84 MW-4	4	2		✓		✓	✓		1445		✓	✓									
36 MW-5	5	2		✓		✓	✓		1700		✓	✓									
39 MW-6	6	6		✓		✓	✓		1400		✓	✓		✓							✓
37.6 MW-7	7	2		✓		✓	✓		1537		✓	✓									
39.3 MW-8	8	2		✓		✓	✓		1145		✓	✓									
31.8 MW-9	9	2		✓		✓	✓		1215		✓	✓									
31.76 MW10	10	2		✓		✓	✓		1235		✓	✓									
36.4 MW-11	11	2		✓		✓	✓		1314		✓	✓									
37.8 RW-1	12	2		✓		✓	✓		1456		✓	✓									

Special detection Limit/reporting

Special QA/QC

Method of shipment: CAS COURIER

Remarks: Hold on FB-1

Lab number: 9411530

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: Tim Valdes	Date	Time	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date 11-30-94	Time 1000	Received by laboratory: Kelly A Murphy

Date 11-30-94 Time 1000

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant
APPC-3292 (2-91)

Kelso; (418.1) SM503E

Columbia Analytical Services inc.

December 9, 1994

Service Request No.: K947505S

Tom Delon
IWM
950 Ames Avenue
Milpitas, CA 95035

Re: **ARCO 771/Livermore/SJ941530**

Dear Tom:

Enclosed are the results of the Rush sample(s) submitted to our laboratory on December 2, 1994. For your reference, these analyses have been assigned our service request number K947505S.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions. My extension is 239.

Respectfully submitted,

Columbia Analytical Services, Inc.

Howard Boorse
Project Chemist

HB/sl

1317 South 13th Avenue • P.O. Box 479 • Kelso, Washington 98626 • Telephone 206/577-7222 • Fax 206/636-1068

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

ASTM	American Society for Testing and Materials
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
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 MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	IWM	**Service Request:**	K947505S
Project:	Arco 771/Livermore	**Date Collected:**	11/25/94
Sample Matrix:	Water	**Date Received:**	12/2/94
		Date Extracted:	12/6/94
		Date Analyzed:	12/6/94

Total Recoverable Petroleum Hydrocarbons
EPA Methods 418.1/SM 503E
Units: mg/L (ppm)

Sample Name	Lab Code	MRL	Result
MW-6	K947505-001	0.5	0.5
Method Blank	K941206-WB	0.5	ND

Approved By: Ulandener Date: 12/8/94

1AMRL/102594
7505SPHC.SP1 - 418w 12/7/94

APPENDIX A

LABORATORY QC RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	IWM	**Service Request:**	K947505S
Project:	Arco 771/Livermore	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	12/6/94
		Date Analyzed:	12/6/94

Laboratory Control Sample Summary
Total Recoverable Petroleum Hydrocarbons
EPA Methods 418.1/SM 503E
Units: mg/L (ppm)

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Oil	20	16.8	84	81-110

Approved By: Vandam Date: 12/8/94

LCS/102194

7505SPHC.SP1 - 418wLCS 12/8/94

APPENDIX B

CHAIN OF CUSTODY INFORMATION

[redacted]RC[redacted]rod[redacted] Co[redacted]pany[redacted]
Division of AtlanticRichfieldCompany

Task Order No. IWM-94-5CC

Chain of Custody

ARCO Facility no. A771	City (Facility) LIVERMORE		Project manager (Consultant) IWM De Leon - R. Davis		Laboratory name Columbia
ARCO engineer M.W	Telephone no. (ARCO) 4155712434		Telephone no. (Consultant) 408/9428955	Fax no. (Consultant) 408/9421499	Contract number 07077
Consultant name IWM - EMCON		Address (Consultant) 950 Ames av. Milp CA, 1921 Ringwood			

	Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid [illegible]	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas☐ Diesel☐	Oil and Grease 413.1☐ 413.2☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals☐ VOA☐ VOA☐ Semi	CAM Metals EPA 6010/7000 TTLC☐ STLC☐	Lead Org./DHS☐ Lead EPA 7420/7421☐	Diesel	
	FB-1	13	2		✓		✓	✓	11-25-94	700		✓	✓										
5.4	MW-1	1	2		✓		✓	✓		1643		✓	✓										
0.7	MW-2	2	2		✓		✓	✓		1607		✓	✓										
5.2	MW-3	3	2		✓		✓	✓		1332		✓	✓										
6.94	MW-4	4	2		✓		✓	✓		1445		✓	✓										
36	MW-5	5	2		✓		✓	✓		1700		✓	✓										
39	MW-6	6	6		✓		✓	✓		1400		✓	✓		✓							✓	
4.6	MW-7	7	2		✓		✓	✓		1537		✓	✓										
9.3	MW-8	8	2		✓		✓	✓		1145		✓	✓										
1.8	MW-9	9	2		✓		✓	✓		1215		✓	✓										
1.74	MW10	10	2		✓		✓	✓		1235		✓	✓										
36.4	MW-11	11	2		✓		✓	✓		1314		✓	✓										
3.8	RW-1	12	2		✓		✓	✓		1456		✓	✓										

Method of shipment: CAS COURIER

Special detection Limit/reporting

Special QA/QC

Remarks: Hold on FB-1

Lab number: S941530

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: Jim Valdes	Date	Time	Received by		
Relinquished by: John Juarez	Date 12/1/94	Time 1600	Received by: Ruth Higley 12-2-94 1000		
Relinquished by	Date 11-30-94	Time 1000	Received by laboratory: [signature]	Date 11-30-94	Time 1000

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant
APPC-3292 (2-91)

APPENDIX C

ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION, SVE SYSTEM AIR SAMPLES, FOURTH QUARTER 1994

GOLDEN STATE/CAS
LABORATORIES, INC.

December 27, 1994

Valli Voruganti
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95131-1721

Re: **ARCO Facility #771-Livermore/Project #0805-122.01**

Dear Valli:

Enclosed are the results of the rush samples submitted to our lab on December 23, 1994. For your reference, these analyses have been assigned our service request number L943912.

All analyses were performed in accordance with our laboratory's quality assurance program. Golden State / CAS is certified for environmental analyses by the California Department of Health Services (Certificate # 1296/Expiration - August 1996).

Please call if you have any questions.

Respectfully submitted,

Golden State / CAS Laboratories, Inc.

Eydie Schwartz for

Dr. B. Gene Bennett
Laboratory Director

Stuart Sigman
Quality Assurance Coordinator

GB/iz

6925 CANOGA AVENUE ■ CANOGA PARK, CA 91303 ■ 818 587-5550 ■ FAX 818 587-5555

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: ARCO Products Company/#0805-122.01
Sample Matrix: Vapor

Service Request: L943912
Date Collected: 12/20/94
Date Received: 12/23/94
Date Extracted: NA

Permanent Gases*
Units: % (v/v)

	Sample Name:	I-1	Method Blank
	Lab Code:	L943912-003	L943912-MB
	Date Analyzed:	12/23/94	
Analyte	**MRL**		
Carbon Dioxide	1	6	ND
Oxygen	1	17	ND

NA Not Applicable
* Analysis performed using gas chromatography with a thermal conductivity detector.
MRL Method Reporting Limit
ND None detected at or above the method reporting limit

Approved By: Eydie Schwartz Date: 12/27/94

3S22/060194
Prmgsdup7 - permgas2 12/27/94

6925 CANOGA AVENUE ■ CANOGA PARK, CA 91303 ■ 818 587-5550 ■ FAX 818 587-5555

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: ARCO Products Company/#0805-122.01
Sample Matrix: Vapor

Service Request: L943912
Date Collected: 12/20/94
Date Received: 12/23/94
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons*
Units: mg/m^3

Sample Name:	E-1	I-2	I-1
Lab Code:	L943912-001	L943912-002	L943912-003
Date Analyzed:	12/23/94	12/23/94	12/23/94

Analyte	MRL			
Benzene[1]	0.5	ND	ND	ND
Toluene[1]	0.5	0.7	ND	ND
Ethylbenzene[2]	0.5	ND	ND	ND
Total Xylenes[2]	1.0	2.5	1.9	7.1
Total Volatile Hydrocarbons**	60	ND	ND	350
C_1-C_4 Hydrocarbons*	20	ND	ND	48
C_5-C_8 Hydrocarbons*	20	ND	ND	200
C_9-C_{12} Hydrocarbons*	20	ND	ND	99
Total Volatile Hydrocarbons**[a]	60	ND	ND	300

NA Not Applicable
1 Benzene and Toluene are included in the C_5-C_8 hydrocarbon fraction.
2 Ethylbenzene and Total Xylenes are included in the C_9-C_{12} hydrocarbon fraction due to the use of C_1-C_8 n-paraffins as the standard for Total Volatile Hydrocarbons.
* Total Volatile Hydrocarbons quantified using n-paraffins with a range of C_1-C_8.
** Result is rounded to two significant figures.
a Gasoline Fraction (C_5-C_{12})
MRL Method Reporting Limit
ND None detected at or above the method reporting limit.

Approved By: Eydie Schwartz Date: 12/27/94

3SOTW/060194
Prmgsdup7 - 8020arc 12/27/94

6925 CANOGA AVENUE ■ CANOGA PARK, CA 91303 ■ 818 587-5550 ■ FAX 818 587-5555

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: ARCO Products Company/#0805-122.01
Sample Matrix: Vapor

Service Request: L943912
Date Collected: 12/20/94
Date Received: 12/23/94
Date Extracted: NA

BTEX and Total Volatile Hydrocarbons*
Units: mg/m^3

Sample Name:	**VW-1**	**MW-4**	**Method Blank**
Lab Code:	L943912-004	L943912-005	L943912-MB
Date Analyzed:	12/23/94	12/23/94	12/23/94

Analyte	**MRL**			
Benzene[1]	0.5	ND	ND	ND
Toluene[1]	0.5	ND	ND	ND
Ethylbenzene[2]	0.5	4.0	ND	ND
Total Xylenes[2]	1.0	13	ND	ND
Total Volatile Hydrocarbons**	60	720	260	ND
C_1-C_4 Hydrocarbons*	20	79	72	ND
C_5-C_8 Hydrocarbons*	20	430	190	ND
C_9-C_{12} Hydrocarbons*	20	210	ND	ND
Total Volatile Hydrocarbons**[a]	60	640	190	ND

NA	Not Applicable
1	Benzene and Toluene are included in the C_5-C_8 hydrocarbon fraction.
2	Ethylbenzene and Total Xylenes are included in the C_9-C_{12} hydrocarbon fraction due to the use of C_1-C_8 n-paraffins as the standard for Total Volatile Hydrocarbons.
*	Total Volatile Hydrocarbons quantified using n-paraffins with a range of C_1-C_8.
**	Result is rounded to two significant figures.
a	Gasoline Fraction (C_5-C_{12})
MRL	Method Reporting Limit
ND	None detected at or above the method reporting limit.

Approved By: Eydie Schwartz Date: 12/27/94

3SOTW/060194
Prmgsdup7 - 8020arc (2) 12/27/94

0003
Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: ARCO Products Company/#0805-122.01
Sample Matrix: Vapor

Service Request: L943912
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: NA

Duplicate Summary
Permanent Gases*
% (v/v)

Sample Name	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Carbon Dioxide	1	7.17	6.75	6.96	6
Oxygen	1	15.8	17.2	16.5	8

NA Not Applicable
* Analysis performed using gas chromatography with a thermal conductivity detector.
MRL Method Reporting Limit

Approved By: Eydie Schwartz Date: 12/27/94

DUP1A/060194
Prmgsdup7 - prmgsdup 12/27/94

6925 CANOGA AVENUE ■ CANOGA PARK, CA 91303 ■ 818 587-5550 ■ FAX 818 587-5555

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: ARCO Products Company/#0805-122.01
Sample Matrix: Vapor

Service Request: L943912
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 12/23/94

Duplicate Summary
BTEX and Total Volatile Hydrocarbons*
Units: mg/m^3

Sample Name: Batch QC
Lab Code: L943908-002

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	64.3	63.5	63.9	1
Toluene	0.5	354	352	353	<1
Ethylbenzene	0.5	64.0	65.0	64.5	2
Total Xylenes	1.0	419	429	424	2
Total Volatile Hydrocarbon**	60	4800	4500	4600	6
C_1-C_4 Hydrocarbons*	20	33.3	31.3	32.3	6
C_5-C_8 Hydrocarbons*	20	3280	3270	3280	<1
C_9-C_{12} Hydrocarbons*	20	1480	1210	1340	20

NA Not Applicable
* Total Volatile Hydrocarbons quantified using n-paraffins with a range of C_1-C_8.
** Result is rounded to two significant figures.
MRL Method Reporting Limit
ND None detected at or above the method reporting limit.

Approved By: Eydie Schwartz Date: 12/27/94

Prmgsdup7 - 8020DA 12/27/94

0005
Page No.:

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 771-94-5

Chain of Custody

ARCO Facility no. 771	City (Facility) Livermore	Project manager (Consultant) V. Voraganti / D. Larsen	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO) 415 5712449	Telephone no. (Consultant) 408 453 7300	Fax no. (Consultant) 408 453 0452
Consultant name EMCON	Address (Consultant) 1921 Ringwood San Jose, CA. 95131		Contract number 02077

Method of shipment: Tech.

Sample I.D.	Lab no. L943912	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other Vapor	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015 Gas	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 Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	CO_2 O_2
E-1	1	1			X			12-20-94	1500		X										
I-2	2	1			X				1505		X										
I-1	3	1			X				1514		X										X
VW-1	4	1			X				1550		X										
MW-4	5	1			X			↓	1619		X										

Special detection Limit/reporting: please report in mg/m³

Special QA/QC

Remarks: 0805-122.01

Lab number: L943912

Turnaround time

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

Condition of sample:		Temperature received:	
Relinquished by sampler: [signature]	Date 12-21-94 Time 0905	Received by: [signature]	12/21/94 0910
Relinquished by: [signature]	Date 12/21/94 Time 400	Received by	
Relinquished by	Date Time	Received by laboratory: [signature]	Date 12-23-94 Time 0900

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

APPC-3292 (2-91)

Columbia Analytical Services, Inc.

January 24, 1995 Service Request No. S950048

Ms. Valli Voruganti
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95131

Re: **ARCO Facility No. 771 / EMCON Project No. 0805-122.01**

Dear Ms. Voruganti:

Attached are the results of the vapor sample(s) submitted to our lab on January 18, 1995. For your reference, these analyses have been assigned our service request number S950048.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and CAS is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions.

Respectfully submitted:

COLUMBIA ANALYTICAL SERVICES, INC.

Carol D. Klein
Keoni A. Murphy
Program Director

Annelise Jade Bazar
Annelise J. Bazar
Regional QA Coordinator

KAM/ajb

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
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
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is 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
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 MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL, but greater than or equal to the MDL

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Service Request:**	S950048
Project:	ARCO Facility No. 771/ EMCON Project No. 0805-122.01	**Date Collected:**	1/17/95
Sample Matrix:	Vapor	**Date Received:**	1/18/95
		Date Extracted:	NA

BTEX and Total Volatile Hydrocarbons

Units: mg/m^3 (ppb)

		Sample Name:	I-1	Method Blank
		Lab Code:	S950048-001	S950119-VB1
		Date Analyzed:	1/19/95	1/19/95
Analyte	**MRL**			
Benzene	0.5		ND	ND
Toluene	0.5		ND	ND
Ethylbenzene	0.5		ND	ND
Total Xylenes	1		ND	ND
Total Volatile Hydrocarbons				
C_1 - C_4 Hydrocarbons	20		ND	ND
C_5 - C_8 Hydrocarbons	20		ND	ND
C_9 - C_{12} Hydrocarbons	20		ND	ND
Gasoline Fraction (C_5-C_{12})	60		ND	ND

Approved By: Annelise Jade Bayan Date: Jan 24, 1995

3S22/060194

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Service Request:**	S950048
Project:	ARCO Facility No. 771/ EMCON Project No. 0805-122.01	**Date Collected:**	1/18/95
Sample Matrix:	Vapor	**Date Received:**	1/18/95
		Date Extracted:	NA
		Date Analyzed:	1/19/95

Duplicate Summary
BTEX and Total Volatile Hydrocarbons

Units: mg/m^3 (ppb)

Sample Name: Batch QC
Lab Code: S950047-001

Analyte	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference
Benzene	0.5	ND	ND	ND	<1
Toluene	0.5	ND	ND	ND	<1
Ethylbenzene	0.5	ND	ND	ND	<1
Total Volatile Hydrocarbons					
C_1 - C_4 Hydrocarbons	2	ND	ND	ND	<1
C_5 - C_8 Hydrocarbons	2	3.4	3.1	3.25	9
C_9 - C_{12} Hydrocarbons	2	3.8	3.9	3.85	3
Gasoline Fraction (C_5-C_{12})	6	7.2	7.0	7.1	3

Approved By: Cornelia Jade Burgon Date: Jan 24, 1995

DUP1S/060194

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Client: EMCON Associates
Project: ARCO Facility No. 771/ EMCON Project No. 0805-122.01

Service Request: S950048
Date Analyzed: 1/19/95

Initial Calibration Verification (ICV) Summary
BTEX and Total Volatile Hydrocarbons

Units: ppb

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	16	15.0	94	85-115
Toluene	16	14.6	91	85-115
Ethylbenzene	16	14.7	92	85-115
Xylenes, Total	48	42.2	88	85-115
Gasoline	200	211	106	90-110

Approved By: Annelise Jacke Burgess Date: Jan. 24, 1995

ICV25AL/060194

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[redacted]RC[redacted]rod[redacted]s C[redacted]any[redacted]
Division of AtlanticRichfieldCompany

Task Order No. 771-94-5

Chain of Custody

ARCO Facility no.: 771
City (Facility): Livermore
Project manager (Consultant): D. Larsen / V. Voraganti
Laboratory name: CAS
ARCO engineer: Mike Whelan
Telephone no. (ARCO): 415 571 2449
Telephone no. (Consultant): 408 453 7300
Fax no. (Consultant): 408 453 0452
Contract number: 07077
Consultant name: EMCON
Address (Consultant): 1921 Ringwood San Jose, CA

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 Gas EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	CO2 O2	
					Vapor																	
I-1		1			X			1/17/95	1345		X										X	

Method of shipment: Tech

Special detection Limit/reporting: please report results in mg/m3

Special QA/QC:

Remarks: 0805-122.01

Lab number: 5950048

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	Time	Received by
[signature]	1/18/95	0808	

Relinquished by	Date	Time	Received by

Relinquished by	Date	Time	Received by laboratory	Date	Time
			[signature]	1/18/95	0809

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant
APPC-3292 (2-91)

APPENDIX D

OPERATION AND MAINTENANCE FIELD DATA SHEETS, SVE SYSTEM, FOURTH QUARTER 1994

EMCON ASSOCIATES

FIELD REPORT
FIELD SERVICES GROUP

PROJECT NO: 0805-122.01 DATE: 12-16-94

CLIENT NAME: Arco 771 NAME: Mark Adler

LOCATION: Livermore, CA.

SERVICES RENDERED

GROUND WATER WELLS: ☐ Sampling ☐ Development ☐ Maintenance/Repair ☐ Water-Level Survey

SOIL SAMPLING: ☐ Excavation ☐ Borings ☐ Stockpile

OTHER:

REMARKS:

New locks on gates needed (Possibly)

Phase converter needs a lock

Yokogawa strip chart

Multi Mode combustor Model MMC-6E Ser No. 9231
Catalytic Oxidizer
208-230 V 60 Amp 3 ph

No Hour meter on blower

Vaccuum collection unit
MMC-6E Ser No 9231
208-230V 21 Amp 3ph

Picked up Paratax-disc.

Telemetry
MMC-1E 9231
115 V 1.5 Amp ph 1

Recorder
MMC-1E 9231
115 V 1.5 amp ph 1

SIGNATURE: Mark Adler

REMARKS: Met contractors on site - They dug up line (irrigation & repaired) Took water levels in SVE wells & RW-1 Met Mike Reese on site for King Buck Start-up. (See field reports) Started System at 1230
Replaced broken sample cock at MW-5 well head.
Took samples at VW-1, MW-5, I-1, I-2, & E-1
MW-2 needs short section 4" pipe & 4" slip cap

Unscheduled site visit ☐ or Scheduled site visit no. 1 of 14

KING/BUCK (model MMC-6A/E) CATALYTIC OXIDIZER

Arrival Time (24:00 hour)	0900	After Blower (system) (I2) (pipe dia. 3½")	
System Status (on or off)	OFF	Pressure (In. of H2O)	2.3 differential
Shutdown Time (24:00 hour)		System Influent Flow (in. of H2O)	
Alarm Lights on ?		Temperature (°F)	
Restart Time (24:00 hour)	1230	System	
Reading Time (24:00 hour)	1530	Set Point (°F)	700°/975°
Well Field (I1) (before dilution)	0" wtr differential	Fire Box Temperature (°F)	
Vacuum (In. of H2O)	32.5	Stack Temperature (°F) (stack dia. 2")	
Flow (velocity: ft/min) (pipe dia. 4")	450-500	Total Hours	
Temperature (°F)	50	Electric Meter (kwh)	00081

CAT entry = 699°
CAT center = 703°
CAT exit = 700°
Total AIR FLOW = 131 CFM

Do once every 2 weeks for the first 3 months; monthly thereafter

PID READINGS (ppm)	I-1	I-2	E-1
Note: PID	59.8	14.5	1.6
Date: Isobutylene span 100 ppm			

WELL FIELD (do monthly)

Well	Well Dia.	Screen interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (inch. water)	Air flow (ft/min)	FID/PID Reading(ppm)	Remarks Total Depth
VW-1 (SVE)	4"	18.5 - 28.5		21.18	Full open	32.5		64.0	27.9
MW-1 (SVE)	4"	32 - 41		27.51	CLOSED SOIL VENT				40.4
MW-2 (SVE)	4"	30 - 38		26.55	CLOSED SOIL VENT				37.2
MW-3	4"	32 - 40							
MW-4 (SVE)	4"	26 - 42		27.82	Full open	25.0		17.1	41.0
MW-5 (SVE)	4"	31.5 - 41		27.35	CLOSED SOIL VENT				40.0
MW-6	4"	32.5 - 42.5							
MW-7 (SVE)	4"	30 - 40		27.12	CLOSED SOIL VENT				39.6
MW-8	4"	27.5 - 42.5							
MW-9	4"	29.5 - 39.5							
MW-10	4"	29 - 37							
MW-11	4"	29 - 39							
RW-1 (SVE)	6"	25 - 40		23.60	not connected to SVE				

Special Instructions:
Remember to use ARCO chain-of-custody forms. Please include all analytical method numbers, as indicated on the O&M request forms and on the chain-of-custody forms. Request TPHG, BTEX, and benzene results in mg/m3 on the chain-of-custody forms.

Operator: Matthew Date: 12-22-94 **Project: 0805-122.01**

Rev. 0, 1/91

FIELD REPORT
FIELD SERVICES GROUP

EMCON ASSOCIATES

PROJECT NO: 0805-122.01 DATE: 12-20-94

CLIENT NAME: ARCO 771 NAME: MAdler

LOCATION: Livermore, CA.

SERVICES RENDERED

GROUND WATER WELLS: ☐ Sampling ☐ Development ☐ Maintenance/Repair ☐ Water-Level Survey

SOIL SAMPLING: ☐ Excavation ☐ Borings ☐ Stockpile

OTHER:

REMARKS:

Phase converter was having a voltage spike intermittently as dilution valve on unit was slowly closed down. Voltage was 245 V & spiking to 254. An adiabatic fluctuation of the blower happens when the spike occurs. Mike Reece of Dodd D noticed only L3 had spike. Leg 1 & 2 stayed constant. Called Vallic. Checked blower doesn't appear mechanical unless its caused by bearings that have just set around.

Mike Reece showed me the operation of the unit. - We will probably want to change set points on next visit.

Ill order sample cocks for unit. M. Reece will install filter/silencer & blower hour meter on his next visit.

Well box lids are a pain bolts hard to set in.

Influent Temp gauge may not be working - showing 50°F.

System ran for 3 hours before startup - Very low PID readings at Influent & low flow only 200-250 FPM in 2½" line at 20" wtr vac. I kept increasing vac. as long as flow increased to 32.5" wtr. vac with 450-500 FPM in 2½" line

System is on & running. Lab samples will be for 48 HR Rush.

Total AIR FLOW to unit = 131 CFM

Strip chart recorder is operating.

SIGNATURE: MAdler

EMCON ASSOCIATES

FIELD REPORT
FIELD SERVICES GROUP

PROJECT NO: 0805-122.01 DATE: 12-20-94

CLIENT NAME: ARCO 771 NAME: MAdler

LOCATION: Livermore, CA.

SERVICES RENDERED

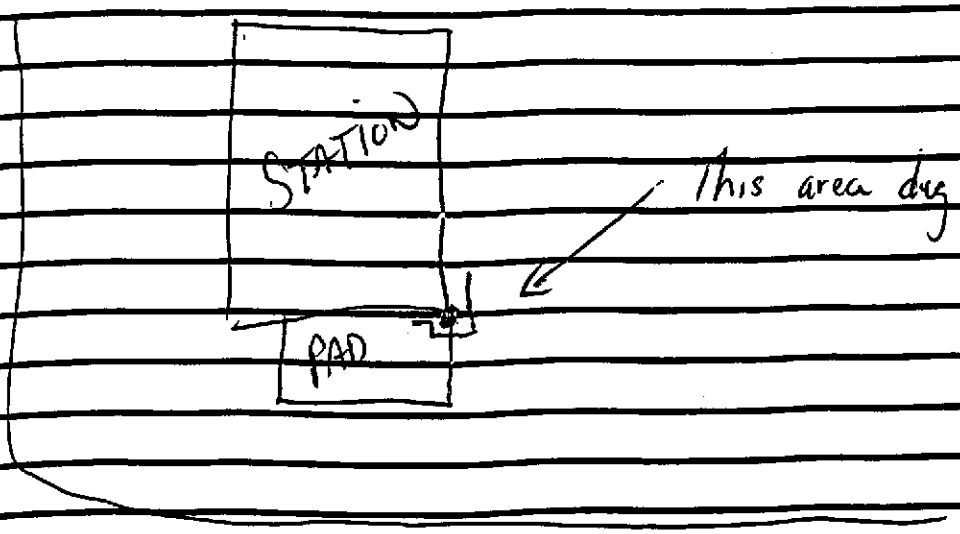
GROUND WATER WELLS: ☐ Sampling ☐ Development ☐ Maintenance/Repair ☐ Water-Level Survey

SOIL SAMPLING: ☐ Excavation ☐ Borings ☐ Stockpile

OTHER:

REMARKS:

Contractor found & dug up leaky irrigation line



The corner post of remediation system fence hit line (1" PVC) It appears to have been repaired by 90° around fence post. but pipe appeared to have been wet when fluid & no primer was used so pipe was seperating from fittings causing the leak.

SIGNATURE: MAdler

REMARKS:

Installed thermometers & sample ports at I-1 & I-2 and a sample port at E-1 Hour meter has been installed by D&D also dilution air silencer
Decreased flow to 500 FPM (2.5") @ 20" wtr vac. 1/2 hr I-1 = 30.2 PPM
Let run for 20 min and checked all 3 again

1303 on 12-29-94 HR meter installed

Unscheduled site visit ☐ or Scheduled site visit no. 2 of 14

KING/BUCK (model MMC-6A/E) CATALYTIC OXIDIZER

Arrival Time (24:00 hour)	1250	After Blower (system) (I2) (pipe dia. 2 1/2")	
System Status (on or off)	ON	Pressure (in. of H2O)	10.6
Shutdown Time (24:00 hour)	—	System Influent Flow (in. of H2O)	2.3
Alarm Lights on ?	NONE	Temperature (°F)	114
Restart Time (24:00 hour)	—	**System**	
Reading Time (24:00 hour)	1356	Set Point (°F)	700
Well Field (I1) (before dilution)		Fire Box Temperature (°F)	704
Vacuum (In. of H2O)	29-30	Stack Temperature (°F) (stack dia. 2")	699
Flow (velocity: ft/min) 2 1/2" (pipe dia. 4")	750-950	Total Hours	61.3
Temperature (°F)	61	Electric Meter (kwh)	

Do once every 2 weeks for the first 3 months; monthly thereafter

FID READINGS (ppm)	I-1	I-2	E-1
Date: 1/3/95 PID	8.1	0.0	0.0
# Date: 1/3/95	37.3	13.8	0.0

High temp set point = 975°
Changed low set point to 610°
Total CFM off Chart recorder = 126

WELL FIELD (do monthly)

Well ID	Well Dia.	Screen interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (inch. water)	Air flow (ft/min)	FID/PID Reading(ppm)	Remarks
VW-1 (SVE)	4"	18.5 - 28.5							
MW-1 (SVE)	4"	32 - 41							
MW-2 (SVE)	4"	30 - 38							
MW-3	4"	32 - 40							
MW-4 (SVE)	4"	26 - 42							
MW-5 (SVE)	4"	31.5 - 41							
MW-6	4"	32.5 - 42.5							
MW-7 (SVE)	4"	30 - 40							
MW-8	4"	27.5 - 42.5							
MW-9	4"	29.5 - 39.5							
MW-10	4"	29 - 37							
MW-11	4"	29 - 39							
RW-1 (SVE)	6"	25 - 40							

Special Instructions:
Remember to use ARCO chain-of-custody forms. Please include all analytical method numbers, as indicated on the O&M request forms and on the chain-of-custody forms. Request TPHG, BTEX, and benzene results in mg/m3 on the chain-of-custody forms.

Operator: MAdler Date: 1/3/95 **Project: 0805-122.01**

REMARKS: I talked to Manager about wood, molding, shelving, & peg board in compound. All materials have been removed now. I cut off locks and installed 3476 Masterlocks for now. D&D found unit off on 1-2-95 - The power had been shut off at the street (probably Kids) It is locked now. Chart Recorder shows OFF at 0600 on 12/31/94 and on at 1700 on 1-2-95 (New hour meter started on 12-29-94 at 1303 with zero verifies down time) Set & tested Paxafax - OK (some changes need set) I gave D&D Keys for compound Cleaned pad

Unscheduled site visit ☐ or Scheduled site visit no. 2 of 14

KING/BUCK (model MMC-6A/E) CATALYTIC OXIDIZER

Arrival Time (24:00 hour)	1250
System Status (on or off)	ON
Shutdown Time (24:00 hour)	—
Alarm Lights on ?	—
Restart Time (24:00 hour)	—
Reading Time (24:00 hour)	1452
Well Field (I1) (before dilution)	
Vacuum (In. of H2O)	20.1
Flow (velocity: ft/min) (pipe dia. 2.5")	500
Temperature (°F)	62

After Blower (system) (I2) (pipe dia. 2.5")	
Pressure (In. of H2O)	8.4
System Influent Flow (in. of H2O)	1.8
Temperature (°F)	111
System	
Set Point (°F)	610
Fire Box Temperature (°F)	610
Stack Temperature (°F) (stack dia. 2")	608
Total Hours	62.2
Electric Meter (kwh)	05608

Do once every 2 weeks for the first 3 months; monthly thereafter

FID READINGS (ppm)	I-1	I-2	E-1
Date: PTO	33.1	13.0	0.0
Date:			

WELL FIELD (do monthly)

Well ID	Well Dia.	Screen interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (inch. water)	Air flow (ft/min)	FID/PID Reading(ppm)	Remarks
VW-1 (SVE)	4"	18.5 - 28.5							
MW-1 (SVE)	4"	32 - 41							
MW-2 (SVE)	4"	30 - 38							
MW-3	4"	32 - 40							
MW-4 (SVE)	4"	26 - 42							
MW-5 (SVE)	4"	31.5 - 41							
MW-6	4"	32.5 - 42.5							
MW-7 (SVE)	4"	30 - 40							
MW-8	4"	27.5 - 42.5							
MW-9	4"	29.5 - 39.5							
MW-10	4"	29 - 37							
MW-11	4"	29 - 39							
VW-1 (SVE)	6"	25 - 40							

Special Instructions:
Remember to use ARCO chain-of-custody forms. Please include all analytical method numbers, as indicated on the O&M request forms and on the chain-of-custody forms. Request TPHG, BTEX, and benzene results in mg/m3 on the chain-of-custody forms.

Operator: MAdler Date: 1-3-95 **Project: 0805-122.01**

REMARKS: PG&E replaced stolen elect meter It has a locking ring around it. Breaker box is locked also. I photographed it. The station manager said that the air pumps irrigation controller were also stolen. I checked power & let phase converter warm up then restarted system

Totalizer = 75.8 before Startup

Elect. Meter Start = 0000 KWH (Ser# 238748 PG&E)

Unscheduled site visit [X] or Scheduled site visit no. _____ of 14

KING/BUCK (model MMC-6A/E) CATALYTIC OXIDIZER

Arrival Time (24:00 hour)	1230	**After Blower (system)** (I2) (pipe dia. 4")	
System Status (on or off)	OFF	Pressure (In. of H2O)	—
Shutdown Time (24:00 hour)	—	System Influent Flow (in. of H2O)	1.7
Alarm Lights on ?	—	Temperature (°F)	110
Restart Time (24:00 hour)	1305	**System**	
Reading Time (24:00 hour)	1338	Set Point (°F)	610
Well Field (I1) (before dilution)		Fire Box Temperature (°F)	609
Vacuum (In. of H2O)	20.8 - 21.2	Stack Temperature (°F) (stack dia. 2")	600
Flow (velocity: ft/min) (pipe dia. 4")	400 - 550	Total Hours	76.4
Temperature (°F)	58	Electric Meter (kwh)	00013

Do once every 2 weeks for the first 3 months; monthly thereafter

FID READINGS (ppm)	I-1	I-2	E-1
Date:			
Date:			

CAT entry 610
CAT center 613
CAT exit 603

WELL FIELD (do monthly)

Well ID	Well Dia.	Screen interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (inch. water)	Air flow (ft/min)	FID/PID Reading(ppm)	Remarks
VW-1 (SVE)	4"	18.5 - 28.5							
MW-1 (SVE)	4"	32 - 41							
VW-2 (SVE)	4"	30 - 38							
MW-3	4"	32 - 40							
MW-4 (SVE)	4"	26 - 42							
MW-5 (SVE)	4"	31.5 - 41							
MW-6	4"	32.5 - 42.5							
MW-7 (SVE)	4"	30 - 40							
MW-8	4"	27.5 - 42.5							
MW-9	4"	29.5 - 39.5							
MW-10	4"	29 - 37							
MW-11	4"	29 - 39							
BW-1 (SVE)	6"	25 - 40							

Special Instructions:
Remember to use ARCO chain-of-custody forms. Please include all analytical method numbers, as indicated on the O&M request forms and on the chain-of-custody forms. Request TPHG, BTEX, and benzene results in mg/m3 on the chain-of-custody forms.

Operator: MAdler Date: 1-9-95 **Project: 0805-122.01**

ARCO 771 . 899 Rincon Ave., [illegible]rmore . Operation Maintenance Log for [illegible]. EMCON Project: 0805-122.01 94-5

REMARKS: System on & running upon arrival • Pad flooded by rainwater — pumped out. • Replaced 3496 Master locks with Sesamee combination locks #0771 Delivered 2 rolls of chart paper • Called Sai — shut down system @ 1352 Blower hours = 268.6 Took only sample at I-1 before shutdown per Sai Paratex Pin#1 - 29 VDC 2 - 1.2V 3-0 4-0 5-0 6-6.5V pin # 8 & pin #10 need grounding ~~rag~~ screws for TC-1 TC-2 cont Test Flex flow OK now

Unscheduled site visit ☐ or (Scheduled site visit) no. _____ of 14

KING/BUCK (model MMC-6A/E) CATALYTIC OXIDIZER

Arrival Time (24:00 hour)	1115
System Status (on or off)	ON
Shutdown Time (24:00 hour)	1352
Alarm Lights on ?	NONE
Restart Time (24:00 hour)	—
Reading Time (24:00 hour)	1153
Well Field (I1) (before dilution)	
Vacuum (in. of H2O)	22.5
Flow (velocity: ft/min) (pipe dia. 2½")	200-250
Temperature (°F)	54

After Blower (system) (I2) (pipe dia. 2½")	
Pressure (in. of H2O)	8.4
System Influent Flow (diff. pressure (in. of H2O)	1.7
Temperature (°F)	104
System (Stack dia. 4")	
Operating Temp. Set Point (°F)	610
High Temp. Set Point (°F)	975
Fire Box Temp (°F) (catalyst entry temp.)	609
Catalyst Temp (°F)	611
Stack Temp. (°F) (catalyst exit temp.)	608
Total Hours	266.6
Electric Meter (kwh)	02886
Total Flow (Chart Recorder) (cfm)	108

Do once every 2 weeks for the first 3 months; monthly thereafter

PID/FID READINGS (ppm)	I-1	I-2	E-1
Date: 1/17/95	5.1	0.0	0.0
Date:			

WELL FIELD (do monthly)

Well	Well Dia.	Screen Interval	DTFP (feet)	DTW (feet)	Valve Position (% open)	Vacuum (inch. water)	Air flow (ft/min)	FID/PID Reading(ppm)	Remarks
[illegible]-1 (SVE)	4"	18.5 - 28.5							
MW-1 (SVE)	4"	32 - 41							
[illegible]-2 (SVE)	4"	30 - 38							
MW-3	4"	32 - 40							
[illegible]-4 (SVE)	4"	26 - 42							
[illegible]-5 (SVE)	4"	31.5 - 41							
MW-6	4"	32.5 - 42.5							
[illegible]-7 (SVE)	4"	30 - 40							
MW-8	4"	27.5 - 42.5							
MW-9	4"	29.5 - 39.5							
[illegible]-10	4"	29 - 37							
MW-11	4"	29 - 39							
[illegible]-1 (SVE)	6"	25 - 40							

Special Instructions:
Remember to use ARCO chain-of-custody forms. Please include all analytical method numbers, as indicated on the O&M request forms and on the chain-of-custody forms. Request TPHG, BTEX, and benzene results in mg/m3 on the chain-of-custody forms.

Operator: MAdler Date: 1/17/95 **EMCON Project: 0805-122.01 94-5**