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

Date March 31, 1996
Project 20805-122.002

To:

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

ENVIRONMENTAL PROTECTION
96 MAR 21 PM 2:31

We are enclosing:

Copies	Description
1	Fourth quarter 1995 groundwater monitoring results and 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: Cert. 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.

John C. Young
Project Manager

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

ARCO Products Company

Date: March 31, 1996

Re: ARCO Station # 771 • 899 Rincon Avenue • Livermore, CA
Fourth Quarter 1995 Groundwater Monitoring Results and
Remediation System Performance Evaluation 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 1, 1996
Project 20805-122.002

Mr. Michael Whelan
ARCO Products Company
P.O. Box 612530
San Jose, California 95161

Re: Fourth quarter 1995 groundwater monitoring program results and remediation system performance evaluation report, ARCO service station 771, Livermore, California

Dear Mr. Whelan:

This letter presents the results of the fourth quarter 1995 groundwater monitoring program at ARCO Products Company (ARCO) service station 771, 899 Rincon Avenue, Livermore, California (Figure 1). Operation and performance data for the site's 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.

MONITORING PROGRAM FIELD PROCEDURES

A program of quarterly groundwater monitoring was initiated during the first quarter of 1991 to provide information concerning water quality, flow direction, and gradient, and to meet ACHCSA and Regional Water Quality Control Board (RWQCB) requirements regarding underground fuel tank investigations. Water levels are measured quarterly in wells MW-1 through MW-11 and RW-1. Wells MW-8 through MW-11 are sampled semiannually, during the first and third quarters of the year. Wells MW-1 through MW-7 and RW-1 are sampled quarterly.

Beginning with the first quarter in 1996, wells MW-4, MW-7, MW-9, MW-10, and RW-1 will be sampled annually, during the first quarter of the year. Wells MW-8 and MW-11 will be sampled semiannually, during the first and third quarters of the year. Wells MW-1, MW-2, MW-3, MW-5, and MW-6 will be sampled quarterly. Water levels will be measured in all wells quarterly.

EMCON performed the fourth quarter 1995 groundwater monitoring event on December 4, 1995. Field work 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-7 and RW-1 for laboratory analysis; and (3) directing a state-certified laboratory to analyze the groundwater samples. Copies of all field data sheets from the fourth quarter 1995 groundwater monitoring event are included in Appendix A.

MONITORING PROGRAM RESULTS

Results of the fourth quarter 1995 groundwater monitoring event are summarized in Table 1 and illustrated in Figure 2. Historical groundwater elevation data are summarized in Table 2. Table 3 summarizes historical analytical data for analysis of petroleum hydrocarbons and their constituents. Table 4 summarizes historical floating product recovery data for wells MW-1, MW-2, and MW-5. Copies of the fourth quarter 1995 analytical results and chain-of-custody documentation are included in Appendix B.

Groundwater elevation data collected on December 4, 1995, indicate that groundwater beneath the site flows north-northwest with an approximate hydraulic gradient of 0.03 foot per foot. Figure 2 illustrates groundwater contours and analytical data for the fourth quarter of 1995.

REMEDIATION SYSTEM PERFORMANCE EVALUATION

Floating Product Recovery

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

The SVE system was initially activated on December 20, 1994. A review of TVHG concentrations in extracted soil vapor indicates a decrease from 300 milligrams per cubic meter (mg/m^3) in December 1994 (initial system startup), to 98 mg/m^3 in September 1995. The low hydrocarbon concentrations in extracted soil vapor warrant increased addition of supplemental fuel (natural gas) to the abatement unit for combustion. To evaluate changes in hydrocarbon concentrations in extracted soil vapor, EMCON began pulsing the SVE and

air bubbling systems (turning the systems on and off for prescribed periods of time) at the end of third quarter 1995. Therefore, the SVE and air bubbling systems were off-line during the fourth quarter of 1995. EMCON will use the results of the evaluation to determine appropriate schedules for future operation of both systems. Table 5 summarizes SVE system operation and performance data from initial startup to the end of the fourth quarter 1995 reporting period on January 1, 1996. Historical SVE system monitoring data log sheets are included in Appendix C.

LIMITATIONS

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

SITE STATUS UPDATE

This update reports site activities performed during the fourth quarter of 1995 and the anticipated site activities for the first quarter of 1996.

Fourth Quarter 1995 Activities

- Prepared and submitted quarterly groundwater monitoring results and SVE system performance evaluation report for third quarter 1995.
- Performed quarterly groundwater monitoring for fourth quarter 1995.

Work Anticipated for First Quarter 1996

- Prepare and submit quarterly groundwater monitoring results and SVE system performance evaluation report for fourth quarter 1995.
- Perform quarterly groundwater monitoring for first quarter 1996.

- Discontinue diesel analysis in well MW-6. Based on four years of historical TPHD results, it appears that samples from this well contain lower boiling point hydrocarbons, possibly gasoline.
- Continue pulsing the SVE and air bubbling systems.
- Evaluate the change hydrocarbon concentrations in extracted soil vapor that may result from pulsing the SVE and air bubbling systems.
- Perform operation and maintenance activities for the SVE and air bubbling system during first quarter 1996.

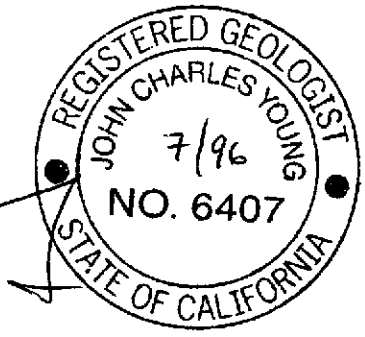
Please call if you have questions.

Sincerely,

EMCON

Sailaja Yelamanchili
Staff Engineer

John C. Young, R.G. 6407
Project Manager



Attachments:

Table 1 -	Groundwater Monitoring Data, Fourth Quarter 1995
Table 2 -	Historical Groundwater Elevation Data
Table 3 -	Historical Groundwater Analytical Data, Petroleum Hydrocarbons and Their Constituents
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 1995
Appendix A -	Field Data Sheets, Fourth Quarter 1995 Groundwater Monitoring Event
Appendix B -	Analytical Results and Chain-of-Custody Documentation, Groundwater Monitoring, Fourth Quarter 1995
Appendix C -	SVE System Monitoring Data Log Sheets

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

Table 1
Groundwater Monitoring Data
Fourth Quarter 1995

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-29-96

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TPHD LUFT Method	TOG SM 5520F	TOG SM 5520C	TOG EPA 413.2	TRPH EPA 418.1
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
MW-1	12-04-95	451.73	31.31	420.42	ND	NNW	0.03	12-04-95	22000	870	660	390	2200	--	100	--	--	--	--	--
MW-2	12-04-95	449.49	28.52	420.97	ND	NNW	0.03	12-04-95	19000	680	150	410	1600	--	--	--	--	--	--	--
MW-3	12-04-95	450.28	29.52	420.76	ND	NNW	0.03	12-04-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-4	12-04-95	451.09	29.85	421.24	ND	NNW	0.03	12-04-95	6700	100	<10	90	38	--	--	--	--	--	--	--
MW-5	12-04-95	451.40	29.83	421.57	ND	NNW	0.03	12-04-95	7600	230	13	61	80	--	--	--	--	--	--	--
MW-6	12-04-95	451.37	32.28	419.09	ND	NNW	0.03	12-04-95	2500	52	5.8	59	13	--	--	1100*	--	--	--	1.5
MW-7	12-04-95	450.33	29.45	420.88	ND	NNW	0.03	12-04-95	23000	1100	74	490	720	--	--	--	--	--	--	--
MW-8	12-04-95	449.43	31.99	417.44	ND	NNW	0.03	12-04-95	Not sampled: not scheduled for chemical analysis											
MW-9	12-04-95	449.21	27.90	421.31	ND	NNW	0.03	12-04-95	Not sampled: not scheduled for chemical analysis											
MW-10	12-04-95	449.22	26.97	422.25	ND	NNW	0.03	12-04-95	Not sampled: not scheduled for chemical analysis											
MW-11	12-04-95	448.02	31.63	416.39	ND	NNW	0.03	12-04-95	Not sampled: not scheduled for chemical analysis											
RW-1	12-04-95	451.67	31.15	420.52	ND	NNW	0.03	12-04-95	2600	140	59	83	210	--	--	--	--	--	--	--

ft-MSL: elevation in feet, relative to mean sea level
MWN: ground-water flow direction and gradient apply to the entire monitoring well network
ft/ft: foot per foot
TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method
µg/L: micrograms per liter
EPA: United Statest Environmental Protection Agency
MTBE: methyl-tert-butyl ether
TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method
TOG: total oil and grease
SM: standard method
mg/L: milligrams per liter
TRPH: total recoverable petroleum hydrocarbons
ND: none detected
NNW: north-northwest
- - : not analyzed
*: chromatogram does not match the typical fingerprint for diesel

esj/h:\0771\0771mdb.xls\Table 1:dcl
20805-122.002

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-12-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient 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
MW-1	03-20-95	451.73	24.50	427.23	ND	NW	0.03
MW-1	06-02-95	451.73	25.60	426.13	ND	NNW	0.014
MW-1	08-23-95	451.73	29.04	422.69	ND	NNW	0.03
MW-1	12-04-95	451.73	31.31	420.42	ND	NNW	0.03

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-12-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient 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
MW-2	03-20-95	449.49	20.27	429.22	ND	NW	0.03
MW-2	06-02-95	449.49	22.32	427.17	ND	NNW	0.014
MW-2	08-23-95	449.49	25.69	423.80	ND	NNW	0.03
MW-2	12-04-95	449.49	28.52	420.97	ND	NNW	0.03

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-12-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient 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
MW-3	03-20-95	450.28	22.19	428.09	ND	NW	0.03
MW-3	06-02-95	450.28	23.28	427.00	ND	NNW	0.014
MW-3	08-23-95	450.28	26.55	423.73	ND	NNW	0.03
MW-3	12-04-95	450.28	29.52	420.76	ND	NNW	0.03

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-12-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater 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
MW-4	03-20-95	451.09	22.68	428.41	ND	NW	0.03
MW-4	06-02-95	451.09	24.41	426.68	ND	NNW	0.014
MW-4	08-23-95	451.09	27.72	423.37	ND	NNW	0.03
MW-4	12-04-95	451.09	29.85	421.24	ND	NNW	0.03

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-12-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient 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
MW-5	03-20-95	451.40	23.20	428.20	ND	NW	0.03
MW-5	06-02-95	451.40	24.80	426.60	ND	NNW	0.014
MW-5	08-23-95	451.40	28.10	423.30	ND	NNW	0.03
MW-5	12-04-95	451.40	29.83	421.57	ND	NNW	0.03

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-12-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient 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
MW-6	03-20-95	451.37	25.19	426.18	ND	NW	0.03
MW-6	06-02-95	451.37	25.75	425.62	ND	NNW	0.014
MW-6	08-23-95	451.37	29.53	421.84	ND	NNW	0.03
MW-6	12-04-95	451.37	32.28	419.09	ND	NNW	0.03

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-12-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient 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
MW-7	03-20-95	450.33	22.07	428.26	ND	NW	0.03
MW-7	06-02-95	450.33	23.42	426.91	ND	NNW	0.014
MW-7	08-23-95	450.33	27.13	423.20	ND	NNW	0.03
MW-7	12-04-95	450.33	29.45	420.88	ND	NNW	0.03

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-12-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient 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-8	03-20-95	449.43	24.75	424.68	ND	NW	0.03
MW-8	06-02-95	449.43	24.95	424.48	ND	NNW	0.014
MW-8	08-23-95	449.43	30.94	418.49	ND	NNW	0.03
MW-8	12-04-95	449.43	31.99	417.44	ND	NNW	0.03
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
MW-9	03-20-95	449.21	19.11	430.10	ND	NW	0.03
MW-9	06-02-95	449.21	21.23	427.98	ND	NNW	0.014
MW-9	08-23-95	449.21	24.33	424.88	ND	NNW	0.03
MW-9	12-04-95	449.21	27.90	421.31	ND	NNW	0.03

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-12-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater 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-10	03-20-95	449.22	20.96	428.26	ND	NW	0.03
MW-10	06-02-95	449.22	22.15	427.07	ND	NNW	0.014
MW-10	08-23-95	449.22	24.47	424.75	ND	NNW	0.03
MW-10	12-04-95	449.22	26.97	422.25	ND	NNW	0.03
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
MW-11	03-20-95	448.02	25.02	423.00	ND	NW	0.03
MW-11	06-02-95	448.02	23.82	424.20	ND	NNW	0.014
MW-11	08-23-95	448.02	30.15	417.87	ND	NNW	0.03
MW-11	12-04-95	448.02	31.63	416.39	ND	NNW	0.03

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-12-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater 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
RW-1	03-20-95	451.67	23.76	427.91	ND	NW	0.03
RW-1	06-02-95	451.67	25.12	426.55	ND	NNW	0.014
RW-1	08-23-95	451.67	28.80	422.87	ND	NNW	0.03
RW-1	12-04-95	451.67	31.15	420.52	ND	NNW	0.03

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
NW: northwest
NNW: north-northwest

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-29-96

Well Designation	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TPHD LUFT Method	TOG SM 5520F	TOG SM 5520C	TOG EPA 413.2	TRPH EPA 418.1
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
MW-1	01-15-91	Not sampled: well contained floating product											
MW-1	04-10-91	98000	11000	18000	2800	20000	--	--	--	--	--	--	--
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	--	--	--	--	--	--	--
MW-1	05-10-93	1900000	4100	15000	21000	140000	--	--	--	--	--	--	--
MW-1	09-16-93	1800000	6400	21000	19000	140000	--	--	--	--	--	--	--
MW-1	11-05-93	700000	3000	7600	8600	65000	--	--	--	--	--	--	--
MW-1	03-26-94	29000	1000	290	610	3300	--	--	--	--	--	--	--
MW-1	06-13-94	25000	600	160	500	2500	--	--	--	--	--	--	--
MW-1	09-22-94	51000	1400	280	570	2800	--	--	--	--	--	--	--
MW-1	11-25-94	170000	990	1000	1700	9400	--	--	--	--	--	--	--
MW-1	03-20-95	90000	1800	1100	1000	5600	--	--	--	--	--	--	--
MW-1	06-03-95	81000	2000	1400	990	4600	--	--	--	--	--	--	--
MW-1	08-23-95	44000	2400	1900	670	3800	<300	--	--	--	--	--	--
MW-1	12-04-95	22000	870	660	390	2200	--	100	--	--	--	--	--
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	--	--	--	--	--	--	--
MW-2	06-12-92	110000	8900	13000	2800	16000	--	--	--	--	--	--	--
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	--	--	--	--	--	--	--
MW-2	05-10-93	440000	3900	4300	4400	36000	--	--	--	--	--	--	--
MW-2	09-16-93	200000	5500	4300	2300	19000	--	--	--	--	--	--	--
MW-2	11-05-93	250000	7800	8400	3100	24000	--	--	--	--	--	--	--
MW-2	03-26-94	22000	1100	1400	190	3700	--	--	--	--	--	--	--
MW-2	06-13-94	71000	4100	4600	1700	9900	--	--	--	--	--	--	--
MW-2	09-22-94	42000	1200	620	710	2000	--	--	--	--	--	--	--
MW-2	11-25-94	60000	3900	4100	1400	7400	--	--	--	--	--	--	--
MW-2	03-20-95	54000	2600	1600	1200	7600	--	--	--	--	--	--	--
MW-2	06-03-95	37000	2200	800	980	4800	--	--	--	--	--	--	--
MW-2	08-23-95	65000	1100	310	840	3000	<500	--	--	--	--	--	--
MW-2	12-04-95	19000	680	150	410	1600	--	--	--	--	--	--	--

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-29-96

Well Designation	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TPHD LUFT Method	TOG SM 5520F	TOG SM 5520C	TOG EPA 413.2	TRPH EPA 418.1
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
MW-3	01-15-91	230	<0.5	<0.5	2.2	2.1	--	--	--	--	--	--	--
MW-3	04-10-91	530	12	8.4	4	7	--	--	--	--	--	--	--
MW-3	07-25-91	110	0.32	0.75	1.2	1	--	--	--	--	--	--	--
MW-3	10-30-91	Not sampled: dry well											
MW-3	03-31-92	670	12	1.1	7.4	27	--	--	--	--	--	--	--
MW-3	06-12-92	280	<0.5	<0.5	2.1	2	--	--	--	--	--	--	--
MW-3	09-15-92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-3	11-25-92	220	1	<0.5	4.9	1.2	--	--	--	--	--	--	--
MW-3	01-29-93	380*	0.8	0.6	2.1	2	--	--	--	--	--	--	--
MW-3	05-10-93	170	<0.5	<0.5	2	0.6	--	--	--	--	--	--	--
MW-3	09-15-93	120	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-3	11-05-93	110	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-3	03-26-94	54	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-3	06-13-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-3	09-22-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-3	11-25-94	54	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-3	03-20-95	94	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-3	06-02-95	72	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-3	08-23-95	98	<0.5	<0.5	<0.6	0.5	<3	--	--	--	--	--	--
MW-3	12-04-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-4	07-25-91	23000	590	730	360	3500	--	--	--	--	--	--	--
MW-4	10-30-91	19000	320	340	230	180	--	--	--	--	--	--	--
MW-4	03-31-92	30000	1300	740	770	4800	--	--	--	--	--	--	--
MW-4	06-12-92	28000	990	440	550	3200	--	--	--	--	--	--	--
MW-4	09-16-92	21000	740	240	350	1300	--	--	--	--	--	--	--
MW-4	11-25-92	26000	1200	300	350	730	--	--	--	--	--	--	--
MW-4	01-29-93	23000	2000	580	770	2500	--	--	--	--	--	--	--
MW-4	05-10-93	74000	2200	890	1400	4000	--	--	--	--	--	--	--
MW-4	09-16-93	43000	640	90	360	690	--	--	--	--	--	--	--
MW-4	11-05-93	30000	1000	240	390	1300	--	--	--	--	--	--	--
MW-4	03-26-94	27000	1800	830	1300	2900	--	--	--	--	--	--	--
MW-4	06-13-94	17000	1300	620	670	1600	--	--	--	--	--	--	--
MW-4	09-22-94	10000	700	61	420	570	--	--	--	--	--	--	--
MW-4	11-25-94	13000	1400	250	490	1200	--	--	--	--	--	--	--
MW-4	03-20-95	12000	1000	100	450	700	--	--	--	--	--	--	--
MW-4	06-02-95	9000	850	56	380	430	--	--	--	--	--	--	--
MW-4	08-23-95	5300	400	25	240	170	<100	--	--	--	--	--	--
MW-4	12-04-95	6700	100	<10	90	38	--	--	--	--	--	--	--

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-29-96

Well Designation	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TPHD LUFT Method	TOG SM 5520F	TOG SM 5520C	TOG EPA 413.2	TRPH EPA 418.1
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
MW-5	07-25-91	57000	2300	4200	77	14000	--	--	--	--	--	--	--
MW-5	10-30-91	Not sampled: well contained floating product											
MW-5	03-31-92	80000	7100	9100	2000	16000	--	--	--	--	--	--	--
MW-5	06-12-92	69000	4000	5300	2200	12000	--	--	--	--	--	--	--
MW-5	09-16-92	65000	2300	2600	1700	9900	--	--	--	--	--	--	--
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	--	--	--	--	--	--	--
MW-5	09-16-93	180000	3500	3300	2700	10000	--	--	--	--	--	--	--
MW-5	11-05-93	66000	3000	2300	1700	6200	--	--	--	--	--	--	--
MW-5	03-26-94	39000	4000	2300	1600	6200	--	--	--	--	--	--	--
MW-5	06-13-94	28000	2500	1700	1100	3900	--	--	--	--	--	--	--
MW-5	09-22-94	Not sampled: vehicle was parked on well											
MW-5	11-25-94	31000	2400	1100	1100	4400	--	--	--	--	--	--	--
MW-5	03-20-95	26000	1300	180	890	2900	--	--	--	--	--	--	--
MW-5	06-02-95	39000	940	160	740	1900	--	--	--	--	--	--	--
MW-5	08-23-95	14000	490	74	250	890	<300	--	--	--	--	--	--
MW-5	12-04-95	7600	230	13	61	80	--	--	--	--	--	--	--
MW-6	07-25-91	10000	3000	200	340	1000	--	--	--	--	--	--	--
MW-6	10-30-91	970	150	4.4	4.9	6.6	--	--	--	--	--	--	--
MW-6	03-31-92	16000	3600	1500	660	1700	--	--	2400*	2.5	4		--
MW-6	06-12-92	2900	480	17	190	170	--	--	1100*	--	--	1.2	--
MW-6	09-16-92	2300	220	<5	92	43	--	--	810*	--	--	--	1.5
MW-6	11-25-92	2700	240	11	103	32	--	--	720*	1.6	1.8	--	--
MW-6	01-29-93	20000	1800	1700	490	2600	--	--	2300*	3.6	4	--	--
MW-6	05-10-93	43000	3000	1700	1100	4800	--	--	3900*	16	110	--	--
MW-6	09-15-93	3500	300	10	100	180	--	--	1100*	1	1	--	--
MW-6	11-05-93	1100	140	<5	35	23	--	--	290	1	1	--	--
MW-6	03-26-94	3100	350	99	130	340	--	--	880	--	--	--	1.5
MW-6	06-13-94	2300	250	12	130	31	--	--	350*	--	--	--	0.8
MW-6	09-22-94	73	2.6	<0.5	1.7	0.7	--	--	<50	<0.5	--	--	--
MW-6	11-25-94	1100	78	<2.5	46	17	--	--	<50	--	--	--	<0.5
MW-6	03-20-95	2600	210	87	82	140	--	--	2000*	--	--	--	1.7
MW-6	06-02-95	1600	55	7.9	40	26	--	--	1200*	--	--	--	1
MW-6	08-23-95	1400	42	2.5	36	13	<20	--	530*	--	--	--	1.6
MW-6	12-04-95	2500	52	5.8	59	13	--	--	1100*	--	--	--	1.5

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-29-96

Well Designation	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TPHD LUFT Method	TOG SM 5520F	TOG SM 5520C	TOG EPA 413.2	TRPH EPA 418.1
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
MW-7	07-25-91	45000	1500	2700	1200	9200	--	--	--	--	--	--	--
MW-7	10-30-91	93000	1800	770	780	6700	--	--	--	--	--	--	--
MW-7	03-31-92	35000	960	350	300	5900	--	--	--	--	--	--	--
MW-7	06-12-92	27000	900	270	340	4800	--	--	--	--	--	--	--
MW-7	09-16-92	39000	1900	410	470	5000	--	--	--	--	--	--	--
MW-7	11-25-92	49000	2900	810	750	5300	--	--	--	--	--	--	--
MW-7	01-29-93	38000	3200	1100	740	4300	--	--	--	--	--	--	--
MW-7	05-10-93	54000	1600	160	560	3100	--	--	--	--	--	--	--
MW-7	09-16-93	37000	1400	170	560	2700	--	--	--	--	--	--	--
MW-7	11-05-93	40000	1900	210	570	2900	--	--	--	--	--	--	--
MW-7	03-26-94	22000	2700	280	500	2600	--	--	--	--	--	--	--
MW-7	06-13-94	21000	1500	180	360	1900	--	--	--	--	--	--	--
MW-7	09-22-94	22000	1800	240	430	1900	--	--	--	--	--	--	--
MW-7	11-25-94	29000	2600	380	640	3300	--	--	--	--	--	--	--
MW-7	03-20-95	31000	2300	400	620	2900	--	--	--	--	--	--	--
MW-7	06-03-95	40000	1400	280	610	2400	--	--	--	--	--	--	--
MW-7	08-23-95	25000	1400	200	600	1600	350	--	--	--	--	--	--
MW-7	12-04-95	23000	1100	74	490	720	--	--	--	--	--	--	--
MW-8	01-29-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-8	05-10-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-8	09-15-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-8	11-05-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-8	03-26-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-8	06-13-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-8	09-22-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-8	11-25-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-8	03-20-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-8	06-02-95	Not sampled: not scheduled for chemical analysis											
MW-8	08-23-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--	--	--
MW-8	12-04-95	Not sampled: not scheduled for chemical analysis											

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-29-96

Well Designation	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TPHD LUFT Method	TOG SM 5520F	TOG SM 5520C	TOG EPA 413.2	TRPH EPA 418.1
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
MW-9	01-29-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-9	05-10-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-9	09-15-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-9	11-05-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-9	03-26-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-9	06-13-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-9	09-22-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-9	11-25-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-9	03-20-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-9	06-02-95	Not sampled: not scheduled for chemical analysis											
MW-9	08-23-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--	--	--
MW-9	12-04-95	Not sampled: not scheduled for chemical analysis											
MW-10	01-29-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-10	05-10-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-10	09-15-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-10	11-05-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-10	03-26-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-10	06-13-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-10	09-22-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-10	11-25-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-10	03-20-95	Not sampled: not scheduled for chemical analysis											
MW-10	06-02-95	Not sampled: not scheduled for chemical analysis											
MW-10	08-23-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--	--	--
MW-10	12-04-95	Not sampled: not scheduled for chemical analysis											

Table 3
Historical Groundwater Analytical Data
Petroleum Hydrocarbons and Their Constituents

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-29-96

Well Designation	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TPHD LUFT Method	TOG SM 5520F	TOG SM 5520C	TOG EPA 413.2	TRPH EPA 418.1
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
MW-11	06-12-92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-11	09-15-92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-11	11-25-92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-11	01-29-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-11	05-10-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-11	09-15-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-11	11-05-93	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-11	03-26-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-11	06-13-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-11	09-22-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-11	11-25-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-11	03-20-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
MW-11	06-02-95	Not sampled: not scheduled for chemical analysis											
MW-11	08-23-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	--	--	--
MW-11	12-04-95	Not sampled: not scheduled for chemical analysis											
RW-1	06-12-92	54000	2300	4400	1200	12000	--	--	--	--	--	--	--
RW-1	09-15-92	49000	1500	2200	870	6900	--	--	--	--	--	--	--
RW-1	11-25-92	32000	1500	2500	1000	5500	--	--	--	--	--	--	--
RW-1	01-29-93	43000	3100	2500	990	7400	--	--	--	--	--	--	--
RW-1	05-10-93	30000	2900	1100	690	4300	--	--	--	--	--	--	--
RW-1	09-16-93	20000	1800	580	620	2300	--	--	--	--	--	--	--
RW-1	11-05-93	25000	1800	250	740	1300	--	--	--	--	--	--	--
RW-1	03-26-94	8100	780	100	360	340	--	--	--	--	--	--	--
RW-1	06-13-94	4900	510	32	150	170	--	--	--	--	--	--	--
RW-1	09-22-94	4900	390	30	190	210	--	--	--	--	--	--	--
RW-1	11-25-94	4900	550	68	200	230	--	--	--	--	--	--	--
RW-1	03-20-95	15000	1000	140	310	950	--	--	--	--	--	--	--
RW-1	06-02-95	12000	1300	280	420	1100	--	--	--	--	--	--	--
RW-1	08-23-95	8200	520	190	240	610	<50	--	--	--	--	--	--
RW-1	12-04-95	2600	140	59	83	210	--	--	--	--	--	--	--

TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method
µg/L: micrograms per liter
EPA: United Statest Environmental Protection Agency
MTBE: methyl-tert-butyl ether
TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method
TOG: total oil and grease
SM: standard method
mg/L: milligrams per liter
TRPH: total recoverable petroleum hydrocarbons
- - : not analyzed
*: chromatogram does not match the typical fingerprint for gasoline or diesel

Table 4
Approximate Cumulative Floating Product Recovered

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-12-96

Well Designations	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
MW-1, MW-2, and MW-5	1994	0.00
MW-1, MW-2, and MW-5	1995	0.00
	1991 to 1995 Total:	3.06

esj/h:\0771\0771mdb.xls\Table 4:dcl
20805-122.002

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: 12-01-94
To: 01-01-96

Date Begin:		12-01-94	01-01-95	02-01-95	07-01-95	08-01-95
Date End:		01-01-95	02-01-95	07-01-95	08-01-95	09-01-95
Mode of Oxidation:		Catalytic	Catalytic	Catalytic	Catalytic	Catalytic
Days of Operation:		11.48	11.22	0.00	8.14	14.25
Days of Downtime:		19.52	19.78	150.00	22.86	16.75
Average Vapor Concentrations (1)						
Well Field Influent:	ppmv (2) as gasoline	100	<15	NA	54	33
	mg/m3 (3) as gasoline	300	<60	NA	218	120
	ppmv as benzene	<0.1	<0.1	NA	1.2	0.4
	mg/m3 as benzene	<0.5	<0.5	NA	3.6	1.2
System Influent:	ppmv as gasoline	<15	NA	NA	48	24
	mg/m3 as gasoline	<60	NA	NA	200	87
	ppmv as benzene	<0.1	NA	NA	1.2	0.3
	mg/m3 as benzene	<0.5	NA	NA	3.8	0.8
System Effluent:	ppmv as gasoline	<15	NA	NA	<15	<15
	mg/m3 as gasoline	<60	NA	NA	<60	<60
	ppmv as benzene	<0.1	NA	NA	<0.1	<0.1
	mg/m3 as benzene	<0.5	NA	NA	<0.5	<0.5
Average Well Field Flow Rate (4), scfm (5):		27.3	13.0	0.0	83.3	104.3
Average System Influent Flow Rate (4), scfm:		201.7	180.7	0.0	163.4	170.9
Average Destruction Efficiency (6), percent (7):		NA (13)	NA	NA	70.0 (14)	31.0 (14)
Average Emission Rates (8), pounds per day (9)						
Gasoline:		1.09	0.97	0.00	0.88	0.92
Benzene:		0.01	0.01	0.00	0.01	0.01
Operating Hours This Period:		275.50	269.23	0.00	195.40	342.12
Operating Hours To Date:		275.5	544.7	544.7	740.1	1082.3
Pounds/ Hour Removal Rate, as gasoline (10):		0.03	0.00	0.00	0.07	0.05
Pounds Removed This Period, as gasoline (11):		8.4	0.8	0.0	13.3	16.0
Pounds Removed To Date, as gasoline:		8.4	9.2	9.2	22.5	38.5
Gallons Removed This Period, as gasoline (12):		1.4	0.1	0.0	2.1	2.6
Gallons Removed To Date, as gasoline:		1.4	1.5	1.5	3.6	6.2

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number:	771	Vapor Treatment Unit:	King Buck / 200 cfm Model MMC-6A/E catalytic oxidizer
Location:	899 Rincon Avenue Livermore, California		
Consultant:	EMCON 1921 Ringwood Avenue San Jose, California	Start-Up Date:	12-20-94
		Reporting Period From:	12-01-94
		To:	01-01-96

Date Begin:		09-01-95	10-01-95
Date End:		10-01-95	01-01-96
Mode of Oxidation:		Catalytic	Catalytic
Days of Operation:		27.29	0.00
Days of Downtime:		2.71	92.00
Average Vapor Concentrations (1)			
Well Field Influent:	ppmv (2) as gasoline	20	NA
	mg/m3 (3) as gasoline	89	NA
	ppmv as benzene	<0.1	NA
	mg/m3 as benzene	<0.5	NA
System Influent:	ppmv as gasoline	18	NA
	mg/m3 as gasoline	79	NA
	ppmv as benzene	<0.1	NA
	mg/m3 as benzene	<0.5	NA
System Effluent:	ppmv as gasoline	<15	NA
	mg/m3 as gasoline	<60	NA
	ppmv as benzene	<0.1	NA
	mg/m3 as benzene	<0.5	NA
Average Well Field Flow Rate (4), scfm (5):		84.0	0.0
Average System Influent Flow Rate (4), scfm:		84.0	0.0
Average Destruction Efficiency (6), percent (7):		24.1 (14)	NA
Average Emission Rates (8), pounds per day (9)			
Gasoline:		0.45	0.00
Benzene:		0.00	0.00
Operating Hours This Period:		654.88	0.00
Operating Hours To Date:		1737.1	1737.1
Pounds/ Hour Removal Rate, as gasoline (10):		0.03	0.00
Pounds Removed This Period, as gasoline (11):		18.3	0.0
Pounds Removed To Date, as gasoline:		56.9	56.9
Gallons Removed This Period, as gasoline (12):		3.0	0.0
Gallons Removed To Date, as gasoline:		9.2	9.2

Table 5
Soil-Vapor Extraction System
Operation and Performance Data

Facility Number: 771	Vapor Treatment Unit: King Buck / 200 cfm
Location: 899 Rincon Avenue	Model MMC-6A/E
Livermore, California	catalytic oxidizer
Consultant: EMCON	Start-Up Date: 12-20-94
1921 Ringwood Avenue	Reporting Period From: 12-01-94
San Jose, California	To: 01-01-96

CURRENT REPORTING PERIOD:	10-01-95	to	01-01-96
DAYS / HOURS IN PERIOD:	92.0	2208.0	
DAYS / HOURS OF OPERATION:	0.0	0.0	
DAYS / HOURS OF DOWN TIME:	92.0	2208.0	
PERCENT OPERATIONAL:		0.0 %	
PERIOD POUNDS REMOVED:	0.0		
PERIOD GALLONS REMOVED:	0.0		
AVERAGE SYSTEM INFLUENT FLOW RATE (scfm):		0.0	

1. Average concentrations are based on discrete sample results reported during the month; refer to Appendix C for discrete sample results.
2. ppmv: parts per million by volume
3. mg/m3: milligrams per cubic meter
4. Average flow rates (time weighted average) are based on instantaneous flow rates recorded during the month; refer to Appendix C for instantaneous flow data.
5. scfm: flow in standard cubic feet per minute at one atmosphere and 70 degrees Fahrenheit
6. Average destruction efficiencies are calculated using monthly average concentrations; refer to Appendix C for instantaneous destruction efficiency data.
7. 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
8. Average emission rates are calculated using monthly average concentrations and flow rates; refer to Appendix C for instantaneous emission rate data.
9. 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
10. pounds/ hour removal rate (as gasoline) = well field influent concentration (as gasoline in mg/m3) x well field influent flow rate (scfm) x 0.02832 m3/ft3 x 60 minutes/hour x 1 pound/454,000 mg
11. pounds removed this period (as gasoline) = pounds/ hour removal rate x hours of operation
12. gallons removed this period (as gasoline) = pounds removed this period (as gasoline) x 0.1613 gallons/pound of gasoline
13. NA: not analyzed, not available, or not applicable
14. Although the destruction efficiency appeared to be less than 90 percent, laboratory analytical results collected during this period indicate the effluent TVHG and benzene concentrations in off-gas discharged to the atmosphere were below laboratory detection limits, indicating compliance with BAAQMD discharge requirements.

Table 6
Soil-Vapor Extraction Well Data

ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-28-96

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
01-17-95	System shut down											
07-12-95	System was restarted											
07-12-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
08-01-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
08-29-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
09-18-95	open	44.8 PID	53.7	open	10.7 PID	56.9	open	12.0 PID	52.8	open	13.3 PID	54.7
09-18-95	open(b)	66.8 PID	56.0	open(b)	113 PID	58.2	open(b)	25.9 PID	55.1	open(b)	21.8 PID	56.9
10-10-95	open	NA	NA	open	NA	NA	open	NA	NA	open	NA	NA
10-10-95	System shut down											

TVHG: concentration of total volatile hydrocarbons as gasoline
ppmv: parts per million by volume
in-H2O: inches of water
open: open to the system
open(b): open to the system and bubbling air
passive: open to the atmosphere
closed: closed to the system and atmosphere
NA: not analyzed or not measured
PID: 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

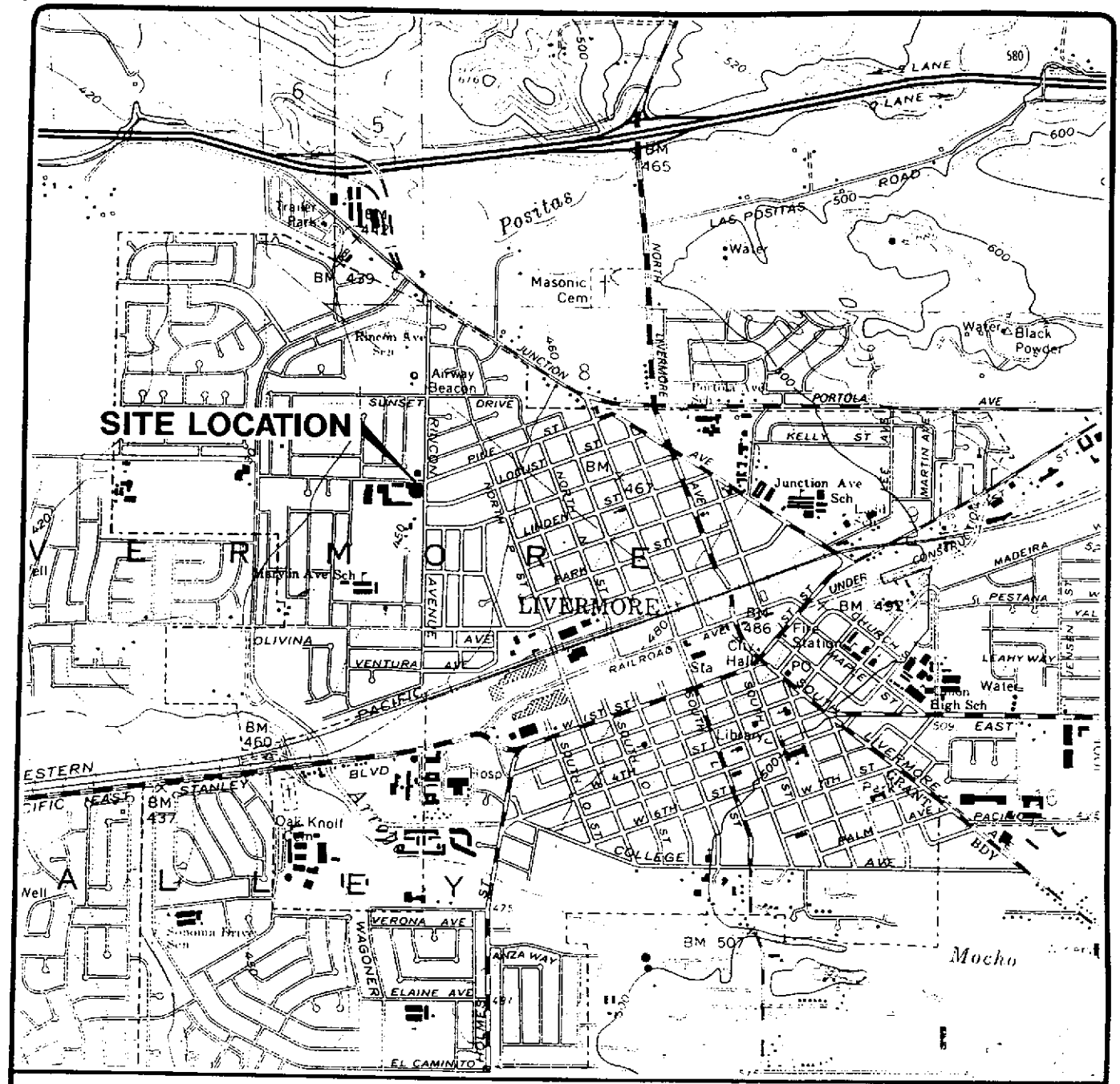
ARCO Service Station 771
899 Rincon Avenue, Livermore, California

Date: 02-28-96

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						
01-17-95	System shut down											
07-12-95	System was restarted											
07-12-95	open	NA	NA	open	NA	NA						
08-01-95	open	NA	NA	open	NA	NA						
08-29-95	open	NA	NA	open	NA	NA						
09-18-95	open	11.2 PID	55.9	open	19.0 PID	53.9						
09-18-95	open(b)	117 PID	58.0	open(b)	20.0 PID	56.2						
10-10-95	open	NA	NA	open	NA	NA						
10-10-95	System shut down											

TVHG: concentration of total volatile hydrocarbons as gasoline
ppmv: parts per million by volume
in-H2O: inches of water
open: open to the system
open(b): open to the system and bubbling air
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

152753



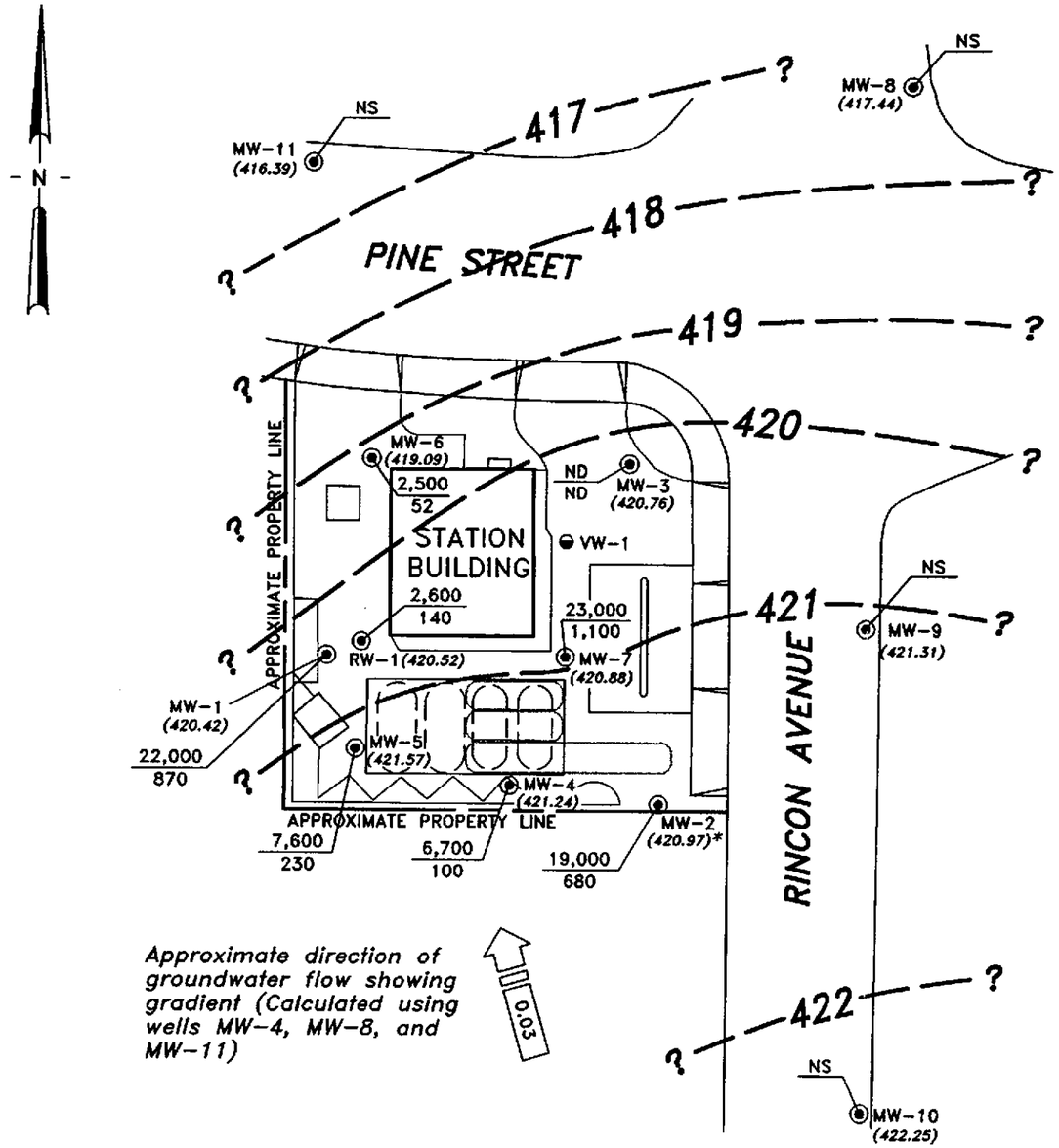
Base map from USGS 7.5' Quad. Map:
Livermore, California. (Photorevised 1980).

EMCON

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

SITE LOCATION

FIGURE
1
PROJECT NO.
805-122.02



EXPLANATION

- Groundwater monitoring well
- Vapor extraction well
- Former underground gasoline storage tank
- Existing underground gasoline storage tank
- (420.88) Groundwater elevation (Ft.–MSL) measured 12/4/95
- ? Groundwater elevation contour (Ft.–MSL)
- 23,000 / 1,100 TPHG concentration in groundwater (ug/L); sampled 12/4/95
- Benzene concentration in groundwater (ug/L); sampled 12/4/95
- ND Not detected at or above the method reporting limit for TPHG (50 ug/L) and benzene (0.5 ug/L)
- NS Not sampled
- * Groundwater elevation not used in contouring

EMCON

SCALE: 0 40 80 FEET
(Approximate)

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

GROUNDWATER DATA
FOURTH QUARTER 1995

FIGURE NO.
2
PROJECT NO.
805–122.02

G:\805-122\G00 REV 0 02/29/96 14:00:31 Kmm DJ

APPENDIX A

FIELD DATA SHEETS, FOURTH QUARTER 1995 GROUNDWATER MONITORING EVENT

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 1775-213.01 STATION ADDRESS : 899 Rincon Avenue DATE : 12-4-95

ARCO STATION # : 771 FIELD TECHNICIAN : M. Ross DAY : MONDAY

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-8	OK	Yes	Yes	Yes	Yes	31.99	31.97	NA	NA	41.8	
2	MW-9	OK	Yes	Yes	Yes	Yes	27.90	27.90	NA	NA	39.2	
4	MW-10	OK	Yes	Yes	Yes	Yes	26.97	26.97	NA	NA	36.1	
4	MW-11	OK	Yes	Yes	Yes	Yes	31.63	31.63	NA	NA	38.6	
5	MW-3	OK	Yes	Yes	Yes	Yes	29.52	29.59	NA	NA	39.7	
1	MW-6	OK	Yes	Yes	Yes	Yes	32.28	32.28	NA	NA	43.3	
7	MW-4	OK	Yes	Yes	Yes	Yes	29.85	29.85	NA	NA	41.3	
8	RW-1	OK	Yes	Yes	NO	NO	31.15	31.15	NA	NA	39.8	SLIP CAP
9	MW-5	OK	Yes	Yes	NO	Yes	29.83	29.83	NA	NA	40.2	
10	MW-7	OK	Yes	Yes	NONE	SLIP CAP	29.45	29.45	NA	NA	39.7	
11	MW-2	OK	Yes	OK	NONE	OK	28.52	28.52	NA	NA	34.3	
12	MW-1	OK	Yes	OK	NONE	Yes	31.31	31.31	NA	NA	36.8	
13	VW-1	OK	Yes	OK	NONE	OK	26.48	26.48	NA	NA	28.2	

SURVEY POINTS ARE TOP OF WELL CASINGS

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-213-01 SAMPLE ID: MW-1 (3)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 771

SAMPLED BY: J LOCATION: LIVERMORE CA

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ✓ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL) :	NA	VOLUME IN CASING (gal.) :	3.58
DEPTH TO WATER (feet) :	31.31	CALCULATED PURGE (gal.) :	10.76
DEPTH OF WELL (feet) :	36.8	ACTUAL PURGE VOL. (gal.) :	8

DATE PURGED: 12-04-95 Start (2400 Hr) 1410 End (2400 Hr) 1415

DATE SAMPLED: 12-04-95 Start (2400 Hr) — End (2400 Hr) 1422

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1414	4	7.38	1048	69.7	GRAY	1100
1415	8	7.18	1089	70.2	GRAY	1100
	DRIED 8 GALLONS					
1426	Recharge	7.07	1105	69.9	CLEAR	CLEAR

D. O. (ppm): 3-4 ODOR: STRONG

COLOR: NR (COBALT 0 - 500) TURBIDITY: NR (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: dup

Parameters field filtered at this well: NF

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
___ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
✓ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY : OK LOCK # : LD

REMARKS :

Meter Calibration: Date: 12-4-95 Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: [signature] Page 1 of 8

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET 1.96

EMCON ASSOCIATES

PROJECT NO: 1775-213.001 SAMPLE ID: MW-2 (34)

PURGED BY: M. ROSS CLIENT NAME: ARCO 721

SAMPLED BY: M. ROSS LOCATION: Livermore, CA

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ✓ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL):	NA	VOLUME IN CASING (gal.):	3.27
DEPTH TO WATER (feet):	28.52	CALCULATED PURGE (gal.):	10.32
DEPTH OF WELL (feet):	34.3	ACTUAL PURGE VOL. (gal.):	7.5

DATE PURGED: 12-4-95 Start (2400 Hr) 1425 End (2400 Hr) 1430

DATE SAMPLED: 12-4-95 Start (2400 Hr) 1440 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1428	4.0	6.84	1169	70.4	clr	clr
1430	DRY out	7.5				
1437	DTW → 32.21					
1443	Recharge	6.88	1137	68.9	clr	clr

D. O. (ppm): 1-2 ODOR: NONE

NA (COBALT 0 - 500) NA (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
___ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
✓ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: Good LOCK #: ARCO

REMARKS: Dry at 7.5 gallons

Meter Calibration: Date: 12-4-95 Time: 1150 Meter Serial #: 9210 Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-3

Signature: Mike Ross Reviewed By: [illegible] Page 2 of 9

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-213.001 SAMPLE ID: MW-3(39)

PURGED BY: M. ROSS CLIENT NAME: ARCO 771

SAMPLED BY: M. ROSS LOCATION: LIVERMORE, CA

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ✓ 3 ___ 4 ✓ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL):	NA	VOLUME IN CASING (gal.):	6.60
DEPTH TO WATER (feet):	29.59	CALCULATED PURGE (gal.):	19.81
DEPTH OF WELL (feet):	39.7	ACTUAL PURGE VOL. (gal.):	19.0

DATE PURGED: 12-4-95 Start (2400 Hr) 1206 End (2400 Hr) 1217

DATE SAMPLED: 12-4-95 Start (2400 Hr) 1230 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1210	7.0	6.76	1033	71.2	clr	clr
1213	13.5	6.77	1072	70.8	"	"
1217	DRY at		19.0 gallons			
1228	DTW →	35.81				
1233	Recharge	6.94	1048	69.2	clr	clr

D. O. (ppm): NA ODOR: NONE

COLOR: NA (COBALT 0 - 500)

TURBIDITY: NA (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
___ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
✓ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: Good LOCK #: Arco

REMARKS: 19.0 gallons - DRY

Meter Calibration: Date: 12-4-95 Time: 1150 Meter Serial #: 9210 Temperature °F: 69.5

(EC 1000 979 / 1009) (DI —) (pH 7 711 / 700) (pH 10 1013 / 1000) (pH 4 397 / —)

Location of previous calibration: —

Signature: Mike Ross Reviewed By: SA Page 3 of 8

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-213.01 SAMPLE ID: MW-4(41)

PURGED BY: M. ROSS CLIENT NAME: ARCO 771

SAMPLED BY: M. ROSS LOCATION: Livermore, CA

TYPE: Ground Water ___ Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ✓ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL): NA VOLUME IN CASING (gal.): 7.48

DEPTH TO WATER (feet): 29.85 CALCULATED PURGE (gal.): 22.44

DEPTH OF WELL (feet): 41.3 ACTUAL PURGE VOL. (gal.): 20.0

DATE PURGED: 12-4-95 Start (2400 Hr) 1246 End (2400 Hr) 1300

DATE SAMPLED: 12-4-95 Start (2400 Hr) 1315 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (Visual)	TURBIDITY (visual)
1252	7.5	6.72	1190	71.3	clr	clr
1257	15.0	6.75	1185	71.5	"	4
1300	DRY	at 20.0 gallons				
1312	DTW	→ 35.72				
1317	Recharge	6.77	1159	69.9	Light Grey	MOD

D. O. (ppm): 1-2 ODOR: None

NA (COBALT 0 - 500) NA (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
___ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
✓ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: Good LOCK #: ARCO

REMARKS: Dry at 20.0 gallons

Meter Calibration: Date: 12-4-95 Time: 1150 Meter Serial #: 9210 Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-3

Signature: Mike Ross Reviewed By: SA Page 4 of 8

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-213-01 SAMPLE ID: MW-5 (40)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 771

SAMPLED BY: " LOCATION: LIVERMORE CA

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ✓ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL):	N/A	VOLUME IN CASING (gal.):	6.77
DEPTH TO WATER (feet):	29.83	CALCULATED PURGE (gal.):	20.32
DEPTH OF WELL (feet):	40.2	ACTUAL PURGE VOL. (gal.):	16

DATE PURGED: 12-04-95 Start (2400 Hr) 1338 End (2400 Hr) 1346

DATE SAMPLED: " Start (2400 Hr) ___ End (2400 Hr) 1352

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1342	7	7.19	1171	70.4	CLEAR	CLEAR
1345	14	7.05	1210	70.7	CLEAR	CLEAR
	DRIED 16 GALLONS 1346					
1353	Recharge	7.26	1170	71.0	CLEAR	CLEAR

D. O. (ppm): 0.45 ODOR: STRONG

COLOR (visual): NR (COBALT 0 - 500)

TURBIDITY (visual): NR (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
___ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
✓ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: [illegible]

REMARKS: ___

Meter Calibration: Date: 12-4-95 Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: SW Page 5 of 8

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-213-01 SAMPLE ID: MW-6 (43)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 771

SAMPLED BY: ✓ LOCATION: LIVERMORE CA

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ✓ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	7.19
DEPTH TO WATER (feet):	32.28	CALCULATED PURGE (gal.):	21.57
DEPTH OF WELL (feet):	43.3	ACTUAL PURGE VOL. (gal.):	15

DATE PURGED: 12-04-95 Start (2400 Hr) 1214 End (2400 Hr) 1223

DATE SAMPLED: ✓ Start (2400 Hr) — End (2400 Hr) 1235

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1219	7.5	6.99	917	69.4	CLEAR	CLEAR
1222	15	7.05	1125	69.4	CLEAR	CLEAR
	DRIED	15 GALLONS	1223			
1238	Recharge	7.12	1153	68.2	GRAY	HEAVY

D. O. (ppm): 3-4 ODOR: STRONG

NR (COBALT 0 - 500) NR (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: MS

Parameters field filtered at this well: NR

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
___ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
✓ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: ___

REMARKS: ___

Meter Calibration: Date: 12-4-95 Time: 1154 Meter Serial #: ___ Temperature °F: 67.8

(EC 1000 969 / 1000) (DI ___) (pH 7 6.92 / 7.00) (pH 10 10.05 / 10.00) (pH 4 4.01 / —)

Location of previous calibration: ___

Signature: ✓ Reviewed By: ✓ Page 6 of 8

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-213.001 SAMPLE ID: MW-7 (39)

PURGED BY: M. Ross CLIENT NAME: ARCO 771

SAMPLED BY: M. Ross LOCATION: Livermore, CA

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 1 ✓ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL): NA VOLUME IN CASING (gal.): 6.69

DEPTH TO WATER (feet): 29.45 CALCULATED PURGE (gal.): 20.09

DEPTH OF WELL (feet): 39.7 ACTUAL PURGE VOL. (gal.): 160

DATE PURGED: 12-4-95 Start (2400 Hr) 1342 End (2400 Hr) 1355

DATE SAMPLED: 12-4-95 Start (2400 Hr) 1405 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (Visual)	TURBIDITY (Visual)
1347	7.0	6.73	1118	70.1	clr	clr
1352	14.0	6.81	1074	70.6	"	"
~~1355~~ 1355 DRY	at	16.0 gallons				
1403 DTW →	37.84					
1410 Recharge	6.75	1120	69.6	clr	clr	

D. O. (ppm): 4-5 ODOR: NONE

Field QC samples collected at this well: NA

Parameters field filtered at this well: NA

NA (COBALT 0 - 500) NA (NTU 0 - 200 or 0 - 1000)

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	___ Bailer (Teflon®)
___ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
✓ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: Good LOCK #: ARCO

REMARKS: DRY at 16.0 gallons

Meter Calibration: Date: 12-4-95 Time: 1150 Meter Serial #: 9210 Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-3

Signature: Mike Ross Reviewed By: ___ Page 7 of 8

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-213-01 SAMPLE ID: RW-1 (39)

PURGED BY: J WILLIAMS CLIENT NAME: ARCO 771-

SAMPLED BY: ↓ LOCATION: LIVERMORE CA

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ✓ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 12.71

DEPTH TO WATER (feet): 31.15 CALCULATED PURGE (gal.): 38.14

DEPTH OF WELL (feet): 39.8 ACTUAL PURGE VOL. (gal.): 23

DATE PURGED: 12-04-95 Start (2400 Hr) 1258 End (2400 Hr) 1306

DATE SAMPLED: ↓ Start (2400 Hr) — End (2400 Hr) 1315

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1303	13	6.86	1006	70.0	CLEAR	CLEAR
	DRIED 23 GALLONS					
1316	Recharge	6.94	1040	70.1	GRAY	HEAVY

D. O. (ppm): 2-3 ODOR: STRONG (COBALT 0 - 500): — (NTU 0 - 200 or 0 - 1000): NT

Field QC samples collected at this well: NT

Parameters field filtered at this well: ___

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
___ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
✓ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: LID MISSING

REMARKS: ~~BTEX~~

Meter Calibration: Date: 12-4-95 Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: ___

Signature: Joe D. Tito Reviewed By: SAT Page 4 of 9

APPENDIX B

ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY DOCUMENTATION, GROUNDWATER MONITORING, FOURTH QUARTER 1995

Columbia Analytical Services, Inc.

December 18, 1995

Service Request No: S9501540

John Young
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: **0805-122.02 / TO# 17075.00 / 771 Livermore**

Dear Mr. Young:

The following pages contain analytical results for sample(s) received by the laboratory on December 4, 1995. Results of sample analyses are followed by Appendix A which contains sample custody documentation and quality assurance deliverables requested for this project. The work requested has been assigned the Service Request No. listed above - to help expedite our service please refer to this number when contacting the laboratory.

Analytical results were produced by procedures consistent with Columbia Analytical Services' (CAS) Quality Assurance Manual (with any deviations noted). Signature of this CAS Analytical Report below confirms that pages 2 through 16, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

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

Sincerely:

Steven L. Green
Project Chemist

Annelise J. Bazar
Regional QA Coordinator

SLG/ajbn

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

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

A2LA	American Association for Laboratory Accreditation
ASTM	American Society for Testing and Materials
BOD	Biochemical Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CAM	California Assessment Metals
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
COD	Chemical Oxygen Demand
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank sample
ICP	Inductively Coupled Plasma atomic emission spectrometry
ICV	Initial Calibration Verification sample
J	Estimated concentration. The value is less than the MRL, but greater than or equal to the MDL. If the value is equal to the MRL, the result is actually <MRL before rounding.
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified
MBAS	Methylene Blue Active Substances
MCL	Maximum Contaminant Level. The highest permissible concentration of a substance allowed in drinking water as established by the U. S. EPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl tert-Butyl Ether
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the paper industry for Air and Stream Improvement
ND	Not Detected at or above the method reporting/detection limit (MRL/MDL)
NIOSH	National Institute for Occupational Safety and Health
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992
STLC	Solubility Threshold Limit Concentration
SW	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Ed., 1986 and as amended by Updates I, II, IIA, and IIB.
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
tr	Trace level. The concentration of an analyte that is less than the PQL but greater than or equal to the MDL. If the value is equal to the PQL, the result is actually <PQL before rounding.
TRPH	Total Recoverable Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)

ACRONLST.DOC 7/14/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9501540
Project:	0805-122.02 /TO# 17075.00/ 771 Livermore	**Date Collected:**	12/4/95
Sample Matrix:	Water	**Date Received:**	12/4/95
		Date Extracted:	NA
		Date Analyzed:	12/14,15/95

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-3 (39)	S9501540-001	ND	ND	ND	ND	ND
MW-6 (43)	S9501540-002	2,500	52	5.8	59	13
MW-4 (41)	S9501540-003	6,700	100	<10*	90	38
RW-1 (39)	S9501540-004	2,600	140	59	83	210
MW-5 (40)	S9501540-005	7,600	230	13	61	80
MW-7 (39)	S9501540-006	23,000	1,100	74	490	720
MW-2 (34)	S9501540-007	19,000	680	150	410	1,600
MW-1 (36)	S9501540-008	22,000	870	660	390	2,200
Method Blank	S951214-WB	ND	ND	ND	ND	ND
Method Blank	S951215-WB	ND	ND	ND	ND	ND

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON	**Service Request:**	L9504210
Project:	ARCO Products Company #771/#0805-122.02	**Date Collected:**	12/4/95
Sample Matrix:	Water	**Date Received:**	12/4/95
		Date Extracted:	12/7/95
		Date Analyzed:	12/7/95

Total Recoverable Petroleum Hydrocarbons (TRPH)
EPA Method 418.1
Units: mg/L (ppm)

Sample Name	Lab Code	MRL	Result
MW-6 (43)	L9504210-001	0.5	1.5
Method Blank	L9504210-MB	0.5	ND

LAMRL/120594

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-122.02 /TO# 17075.00/ 771 Livermore
Sample Matrix: Water

Service Request: S9501540
Date Collected: 12/4/95
Date Received: 12/4/95
Date Extracted: NA

Volatile Organic Compounds
EPA Method 8240
Units: ug/L (ppb)

		Sample Name:	**MW-1 (36)**	**Method Blank**
		Lab Code:	S9501540-008	S951212-WB
		Date Analyzed:	12/12/95	12/12/95
Analyte	**MRL**			
Methyl-tert-butyl ether	1		100	ND

3S44/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9501540
Project:	0805-122.02 /TO# 17075.00/ 771 Livermore	**Date Collected:**	12/4/95
Sample Matrix:	Water	**Date Received:**	12/4/95
		Date Extracted:	12/12/95
		Date Analyzed:	12/13/95

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

Sample Name	Lab Code	MRL	Result
MW-6 (43)	S950154-002	50	1,100 *
Method Blank	S951212-WB	50	ND

* This sample contains lower boiling point hydrocarbons, quantified as diesel. The chromatogram does not match the typical diesel fingerprint.

1AMRL/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9501540
Project:	0805-122.02 /TO# 17075.00/ 771 Livermore	**Date Collected:**	12/4/95
Sample Matrix:	Water	**Date Received:**	12/4/95
		Date Extracted:	NA
		Date Analyzed:	12/14,15/95

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

Sample Name	Lab Code	PID Detector Percent Recovery 4-Bromofluorobenzene	FID Detector Percent Recovery α,α,α-Trifluorotoluene
MW-3 (39)	S9501540-001	94	100
MW-6 (43)	S9501540-002	79	106*
MW-4 (41)	S9501540-003	80	107*
RW-1 (39)	S9501540-004	103	100
MW-5 (40)	S9501540-005	84	115
MW-7 (39)	S9501540-006	93	109
MW-2 (34)	S9501540-007	101	94
MW-1 (36)	S9501540-008	98	98
MW-4 (41) MS	S9501540-003MS	90	107*
MW-4 (41) DMS	S9501540-003DMS	88	111*
Method Blank	S951214-WB	91	101
Method Blank	S951215-WB	96	103
	CAS Acceptance Limits:	69-116	69-116

* The surrogate used for this sample was 4-bromofluorobenzene.

SUR2/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9501540
Project:	0805-122.02 /TO# 17075.00/ 771 Livermore	**Date Analyzed:**	12/14/95

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	22.5	90	85-115
Toluene	25	22.3	89	85-115
Ethylbenzene	25	22.4	90	85-115
Xylenes, Total	75	68.4	91	85-115
Gasoline	250	254	102	90-110

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9501540
Project:	0805-122.02 /TO# 17075.00/ 771 Livermore	**Date Collected:**	12/4/95
Sample Matrix:	Water	**Date Received:**	12/4/95
		Date Extracted:	NA
		Date Analyzed:	12/14,15/95

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Gasoline
EPA Methods 5030/California DHS LUFT Method
Units: ug/L (ppb)

Sample Name: MW-4 (41)
Lab Code: S9501540-003

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**
Gasoline	5,000	5,000	6,700	11,000	11,000	86	86	67-121	<1

DMS1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON	**Service Request:**	L9504210
Project:	ARCO Products Company #771/#0805-122.02	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	12/7/95

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary*
Total Recoverable Petroleum Hydrocarbons (TRPH)
EPA Method 418.1
Units: mg/L (ppm)

	True Value		Result		Percent Recovery			
Analyte	LCS	DLCS	LCS	DLCS	LCS	DLCS	CAS Acceptance Limits	**Relative Percent Difference**
TRPH	2.05	2.05	1.82	1.89	89	92	75-125	4

* Sample quantity was insufficient to perform matrix spike and matrix spike duplicate. Three separate, replicate one liter samples are required to analyze sample and spikes.

DLCS/032395

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-122.02 /TO# 17075.00/ 771 Livermore
Sample Matrix: Water

Service Request: S9501540
Date Collected: 12/4/95
Date Received: 12/4/95
Date Extracted: NA
Date Analyzed: 12/12/95

Surrogate Recovery Summary
Volatile Organic Compounds
EPA Method 8240

		Percent Recovery		
Sample Name	**Lab Code**	1,2-Dichloroethane-D_4	Toluene-D_8	4-Bromofluorobenzene
MW-1 (36)	S9501540-008	107	108	105
Method Blank	S951212-WB	105	101	103
CAS Acceptance Limits:		76-114	88-110	86-115

SUR3/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-122.02 /TO# 17075.00/ 771 Livermore

Service Request: S9501540
Date Analyzed: 11/28/95

Initial Calibration Verification (ICV) Summary
Volatile Organic Compounds
EPA Method 8240
Units: ppb

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Methyl-tert-butyl ether	50	63.7	127	70-130

ICV41/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9501540
Project:	0805-122.02 /TO# 17075.00/ 771 Livermore	**Date Collected:**	12/4/95
Sample Matrix:	Water	**Date Received:**	12/4/95
		Date Extracted:	12/12/95
		Date Analyzed:	12/13/95

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

Sample Name	Lab Code	Percent Recovery p-Terphenyl
MW-6 (43)	S9501540-002	85
MS	S9501541-001MS	69
DMS	S9501541-001DMS	65
Method Blank	S951212-WB	71

CAS Acceptance Limits: 66-123

SUR1/062994

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9501540
Project:	0805-122.02 /TO# 17075.00/ 771 Livermore	**Date Analyzed:**	12/13/95

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	920	92	90-110

ICV25AL/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9501540
Project:	0805-122.02 /TO# 17075.00/ 771 Livermore	**Date Collected:**	12/4/95
Sample Matrix:	Water	**Date Received:**	12/4/95
		Date Extracted:	12/12/95
		Date Analyzed:	12/13/95

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: S9501541-001

	Spike Level		Sample	Spike Result		Percent Recovery		CAS	Relative
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Acceptance Limits	**Percent Difference**
TPH as Diesel	5,240	5,240	ND	7,500	7,530	143	144	61-141	<1

DMS1S/060194

L9504210

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 17075.00

Chain of Custody

ARCO Facility no. 771	City (Facility) Livermore	Project manager (Consultant) John Young	Laboratory name: CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) (408) 453-7300 / Fax no. (Consultant) (408) 453-0452	Contract number:
Consultant name EMCON		Address (Consultant) 1921 Ringwood Ave. San Jose, CA 95131	

Sample I.D.	Lab no. L9504210	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240 MTBE only (Do not report full scan)	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org/DHS ☐ Lead EPA 7420/7421 ☐	TPH - Diesel	
MW-3(39)		2		X		X	HCL	12-4-95	1230		X											
MW-6(43)		6		X		X	HCL	↓	1235		X			X							X	
MW-4(41)		2		X		X	HCL	↓	1315		X											
RW-1(39)		2		X		X	HCL	↓	1350		X											
MW-5(40)		2		X		X	HCL	↓	1352		X											
MW-7(39)		2		X		X	HCL	↓	1405		X											
MW-2(34)		2		X		X	HCL	↓	1440		X											
MW-1(36)		4		X		X	HCL	↓	1422		X					X						

Method of shipment: Sampler will deliver

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: #0805-122.02
MW-1 for MTBE only by EPA 8240 do not report any other compounds

Lab number: S95-1540

Turnaround time

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

Condition of sample: ok		Temperature received: Cool	
Relinquished by sampler: Mike [signature]	Date 12-4-95 Time 1655	Received by: Joanne Brown	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory: Catherine Huangpan	Date 12-5-95 Time 11:00am

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

CAS-L: 418.1 DUE: 12/18/95

APPENDIX C

SVE SYSTEM MONITORING DATA LOG SHEETS

ARCO 771
SVE SYSTEM
MONITORING DATA

Reporting Period:
12/01/94 00:00
01/01/95 00:00

Hours in Period: 744.00
Days in Period: 31.00

Operation + Down Hours: 744.00
Operation + Down Days: 31.00

	Field Monitoring Data							Laboratory Monitoring Data																
	Flow Rates		FID or PID Results					Well Field Influent				System Influent				System Effluent								
Reading Date & Time	Well Field Flow Rate	System Influent Flow Rate	Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	Gasoline		Benzene		Gasoline		Benzene		Gasoline		Benzene		Destruction Efficiency	Gasoline Emission Rate	Benzene Emission Rate	Period Hours	Meter Hours	Hours of Operation	Days of Operation	Down Hours	Down Days
	scfm	scfm	ppm	ppm	ppm	%		ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	%	lb/day	lb/day						
12/01/94 00:00																												
12/20/94 12:30	15.1	177.9	59.8	14.5	1.6	89.0	15:00	100	300	<0.1	<0.5	<15	<60	<0.1	<0.5	<15	<60	<0.1	<0.5	NR	0.96	0.01	468.50		0.00	0.00	468.50	19.52
01/01/95 00:00	27.3	201.7	37.3	13.8	0	100.0																	275.50		275.50	11.48	0.00	0.00
Period Totals:																							744.00		275.50	11.48	468.50	19.52
Period Averages:	27.3	201.71	48.6	14.2	0.8			100	300	<0.1	<0.5	<15	<60	<0.1	<0.5	<15	<60	<0.1	<0.5	NR	1.09	0.01						

ARCO 771
SVE SYSTEM
MONITORING DATA

Reporting Period:
01/01/95 00:00
02/01/95 00:00

Hours in Period: 744.00
Days in Period: 31.00

Operation + Down Hours: 744.00
Operation + Down Days: 31.00

	Field Monitoring Data							Laboratory Monitoring Data														
	Flow Rates		FID or PID Results					Well Field Influent				System Influent				System Effluent						
Reading Date & Time	Well Field Flow Rate	System Influent Flow Rate	Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	Gasoline		Benzene		Gasoline		Benzene		Gasoline		Benzene		Destruction Efficiency	Gasoline Emission Rate	Benzene Emission Rate	Period Hours	Meter Hours	Hours of Operation	Days of Operation	Down Hours	Down Days
	scfm	scfm	ppm	ppm	ppm	%		ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	%	lb/day	lb/day						
01/01/95 00:00																												
01/03/95 13:56	27.3	201.7	37.3	13.8	0	100.0																	61.93	61.30	61.93	2.58	0.00	0.00
01/03/95 14:52	16.5	180.6	33.1	13	0	100.0																	0.93	62.20	0.90	0.04	0.03	0.00
01/09/95 13:05	16.5	180.6																					142.22	75.80	13.60	0.57	128.62	5.36
01/09/95 13:38	16.4	173.9																					0.55	76.40	0.60	0.03	-0.05	0.00
01/17/95 13:52	8.2	173.9	5.1	0	0	NR	13:34	<15	<60	<0.1	<0.5												192.23	268.60	192.20	8.01	0.03	0.00
02/01/95 00:00	0.0	0.0																					346.13	268.60	0.00	0.00	346.13	14.42
Period Totals:																							744.00		269.23	11.22	474.77	19.78
Period Averages:	13.0	180.66	25.2	8.9	0.0			<15	<60	<0.1	<0.5																	

ARCO 771
SVE SYSTEM
MONITORING DATA

Reporting Period:
02/01/95 00:00
07/01/95 00:00

Hours in Period: 3600
Days in Period: 150

Operation + Down Hours: 3600
Operation + Down Days: 150

	Field Monitoring Data							Laboratory Monitoring Data														
	Flow Rates		FID or PID Results					Well Field Influent		System Influent		System Effluent										
Reading Date & Time	Well Field Flow Rate	System Influent Flow Rate	Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	Gasoline	Benzene	Gasoline	Benzene	Gasoline	Benzene	Destruction Efficiency	Gasoline Emission Rate	Benzene Emission Rate	Period Hours	Meter Hours	Hours of Operation	Days of Operation	Down Hours	Down Days
	scfm	scfm	ppm	ppm	ppm	%		ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	%	lb/day	lb/day						
02/01/95 00:00	0.0	0.0																268.60				
03/01/95 00:00	0.0	0.0															672.00	268.60	0.00	0.00	672.00	28.00
04/01/95 00:00	0.0	0.0															744.00	268.60	0.00	0.00	744.00	31.00
05/01/95 00:00	0.0	0.0															720.00	268.60	0.00	0.00	720.00	30.00
06/01/95 00:00	0.0	0.0															744.00	268.60	0.00	0.00	744.00	31.00
07/01/95 00:00	0.0	0.0															720.00	268.60	0.00	0.00	720.00	30.00
Period Totals:																	3600		0.00	0.00	3600	150.00
Period Averages:	0.0	0.0																				

ARCO 771
SVE SYSTEM
MONITORING DATA

Reporting Period:
07/01/95 00:00
08/01/95 00:00

Hours In Period: 744.00
Days In Period: 31.00

Operation + Down Hours: 744.00
Operation + Down Days: 31.00

	Field Monitoring Data							Laboratory Monitoring Data															
	Flow Rates		FID or PID Results					Well Field Influent				System Influent				System Effluent							
Reading Date & Time	Well Field Flow Rate	System Influent Flow Rate	Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	Gasoline		Benzene		Gasoline		Benzene		Gasoline		Benzene		Destruction Efficiency	Gasoline Emission Rate	Benzene Emission Rate	Period Hours	Meter Hours	Hours of Operation	Days of Operation	Down Hours	Down Days
	scfm	scfm	ppm	ppm	ppm	%		ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	%	lb/day	lb/day						
07/01/95 00:00																								268.60				
07/12/95 10:57	64.4	158.7					11:52	16	65	0.2	0.5												274.95	270.80	2.20	0.09	272.75	11.36
07/12/95 12:22	66.3	158.7					12:12	91	370	2.1	6.7	48	200	1.2	3.8	<15	<60	<0.1	<0.5	70.0	0.86	0.01	1.42	272.20	1.40	0.06	0.02	0.00
08/01/95 00:00	83.6	163.5																					467.63	464.00	191.80	7.99	275.83	11.49
Period Totals:																							744.00		195.40	8.14	548.60	22.86
Period Averages:	83.3	163.42						54	218	1.2	3.6	48	200	1.2	3.8	<15	<60	<0.1	<0.5	70.0	0.88	0.01						

ARCO 771
SVE SYSTEM
MONITORING DATA

Reporting Period:
08/01/95 00:00
09/01/95 00:00

Hours In Period: 744.00
Days In Period: 31.00

Operation + Down Hours: 744.00
Operation + Down Days: 31.00

	Field Monitoring Data							Laboratory Monitoring Data														
	Flow Rates		FID or PID Results					Well Field Influent				System Influent				System Effluent						
Reading Date & Time	Well Field Flow Rate	System Influent Flow Rate	Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	Gasoline		Benzene		Gasoline		Benzene		Gasoline		Benzene		Destruction Efficiency	Gasoline Emission Rate	Benzene Emission Rate	Period Hours	Meter Hours	Hours of Operation	Days of Operation	Down Hours	Down Days
	scfm	scfm	ppm	ppm	ppm	%		ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	%	lb/day	lb/day						
08/01/95 00:00																								464.00				
08/01/95 15:18	83.6	163.5					15:26	29	110	0.3	1.0	24	87	0.3	0.8	<15	<60	<0.1	<0.5	31.0	0.88	0.01	15.30	464.00	0.00	0.00	15.30	0.64
08/29/95 12:41	107.1	187.7					14:15	37	130	0.4	1.3												669.38	746.80	282.80	11.78	386.58	16.11
09/01/95 00:00	90.7	90.7																					59.32	806.12	59.32	2.47	0.00	0.00
Period Totals:																							744.00		342.12	14.25	401.88	16.75
Period Averages:	104.3	170.9						33	120	0.4	1.2	24	87	0.3	0.8	<15	<60	<0.1	<0.5	31.0	0.92	0.01						

ARCO 771
SVE SYSTEM
MONITORING DATA

Reporting Period:
09/01/95 00:00
10/01/95 00:00

Hours in Period: 720.00
Days in Period: 30.00

Operation + Down Hours: 720.00
Operation + Down Days: 30.00

	Field Monitoring Data							Laboratory Monitoring Data																	
	Flow Rates		FID or PID Results					Well Field Influent				System Influent				System Effluent									
Reading Date & Time	Well Field Flow Rate	System Influent Flow Rate	Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	Gasoline		Benzene		Gasoline		Benzene		Gasoline		Benzene		Destruction Efficiency	Gasoline Emission Rate	Benzene Emission Rate	Period Hours	Meter Hours	Hours of Operation	Days of Operation	Down Hours	Down Days
	scfm	scfm	ppm	ppm	ppm	%		ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	ppmv	mg/m3	%	lb/day	lb/day						
09/01/95 00:00																								806.12				
09/18/95 13:12	90.7	90.7	32.8			NR	13:29	18	79	<0.1	<0.5	18	79	<0.1	<0.5	<15	<60	<0.1	<0.5	24.1	0.49	0.00	421.20	1224.60	418.48	17.44	2.72	0.11
09/18/95 15:49	72.3	72.3	50.1			NR	15:46	21	98	<0.1	<0.5												2.62	1227.20	2.60	0.11	0.02	0.00
10/01/95 00:00	72.3	72.3																					296.18	1461.00	233.80	9.74	62.38	2.60
Period Totals:																							720.00		654.88	27.29	65.12	2.71
Period Averages:	84.0	84.0	41.5					20	89	<0.1	<0.5	18	79	<0.1	<0.5	<15	<60	<0.1	<0.5	24.1	0.45	0.00						

ARCO 771
SVE SYSTEM
MONITORING DATA

Reporting Period:
10/01/95 00:00
01/01/96 00:00

Hours In Period: 2208
Days In Period: 92.00

Operation + Down Hours: 2208
Operation + Down Days: 92.00

	Field Monitoring Data							Laboratory Monitoring Data													
	Flow Rates		FID or PID Results					Well Field Influent		System Influent		System Effluent									
Reading Date & Time	Well Field Flow Rate	System Influent Flow Rate	Well Field	System Influent	System Effluent	Destruction Efficiency	Laboratory Sample Time	Gasoline	Benzene	Gasoline	Benzene	Gasoline	Benzene	Destruction Efficiency	Gasoline Emission Rate	Benzene Emission Rate	Period Hours	Meter Hours	Hours of Operation	Days of Operation	Down Hours	Down Days
	scfm	scfm	ppm	ppm	ppm	%		ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	ppmv mg/m3	%	lb/day	lb/day						
10/01/95 00:00																		1461.00				
10/10/95 13:30	0.0	0.0															229.50	1461.00	0.00	0.00	229.50	9.56
11/01/95 00:00	0.0	0.0															514.50	1461.00	0.00	0.00	514.50	21.44
12/01/95 00:00	0.0	0.0															720.00	1461.00	0.00	0.00	720.00	30.00
01/01/96 00:00	0.0	0.0															744.00	1461.00	0.00	0.00	744	31.00
Period Totals:																	2208		0.00	0.00	2208	92.00
Period Averages:	0.0	0.0																				