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

Date December 29, 1994
Project 0805-134.01

To:

Ms. Susan Hugo
Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

We are enclosing:

Copies	Description
1	Third quarter 1994 groundwater monitoring report for ARCO service station 6113, Livermore, California

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

Comments:

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

David Larsen

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

Date:
December 29, 1994

Re: ARCO Station #
6113 • 785 East Stanley Boulevard • Livermore, CA
Third Quarter 1994 Groundwater Monitoring Report

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

Submitted by:

Michael R. Whelan
Environmental Engineer

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

December 20, 1994
Project 0805-134.01

Mr. Michael Whelan
ARCO Products Company
P.O. Box 5811
San Mateo, California 94402

Re: Third quarter 1994 groundwater monitoring program results, ARCO service station 6113, Livermore, California

Dear Mr. Whelan:

This letter presents the results of the third quarter 1994 groundwater monitoring program at ARCO Products Company (ARCO) service station 6113, 785 East Stanley Boulevard, Livermore, California (Figure 1). The quarterly monitoring program complies with Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

BACKGROUND

Between January and February 1989, one 280-gallon waste-oil tank was removed by Crosby and Overton. In September 1989, the initial phase of subsurface environmental investigation was conducted by RESNA and included installation of groundwater monitoring wells MW-1 through MW-3. In February 1991, a limited surface investigation was conducted by RESNA which included installation of an additional groundwater monitoring well MW-4.

Between June and August 1992, an additional subsurface investigation was conducted by RESNA which included installation of five additional groundwater monitoring wells, MW-5 through MW-9, two vadose wells, VW-1 and VW-2, and a soil-vapor extraction (SVE) pilot test. Between December 1992 and March 1993, removal and replacement of all product lines, vapor return and vent lines was conducted by Wilkey's Engineering under the supervision of Roux Associates. During this phase of work, subgrade remediation piping for the interim SVE and groundwater remediation systems was also installed.

RESNA submitted a remedial action plan (RAP) in July 1993 for installation of the proposed soil and groundwater remediation systems. The proposed SVE system was designed and construction was completed in December 1993.

Between March and June 1993, RESNA installed three additional groundwater monitoring wells, MW-10 through MW-12 and two additional vadose wells, VW-3 and VW-4.

The SVE system has not been activated as yet because a phase converter needs to be installed to provide three phase power to the system.

Startup of the SVE system is anticipated to occur in the first quarter of 1995 after installation of the phase converter, and evaluation of fourth quarter 1994 groundwater monitoring data.

Groundwater monitoring and sampling at this site was initiated in June 1990. Currently, twelve groundwater monitoring wells, and four vadose wells exist on site. For additional background information, please refer to letter report "Results of Vapor Extraction Well Installation at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California," RESNA Report 69028.11, dated June 2, 1994.

Wells MW-1 through MW-12 are monitored quarterly.

MONITORING PROGRAM FIELD PROCEDURES AND RESULTS

The third quarter 1994 groundwater monitoring event was performed by Integrated Wastestream Management, Inc. (IWM), on September 16, 1994. Field work performed by IWM during this quarter included (1) measuring depths to groundwater and subjectively analyzing groundwater for the presence of floating product in wells MW-1 through MW-12, (2) purging and subsequently sampling groundwater monitoring wells MW-1 through MW-12 for laboratory analysis, and (3) directing a state-certified laboratory to analyze the groundwater samples. The results of IWM's field work were transmitted to EMCON in a report dated October 7, 1994. These data are presented in Appendix A.

ANALYTICAL PROCEDURES

Groundwater samples collected during third quarter monitoring were analyzed for total petroleum hydrocarbons as gasoline (TPHG), and benzene, toluene, ethylbenzene, and total xylenes (BTEX). Groundwater samples were prepared for analysis by U.S. Environmental Protection Agency (EPA) method 5030 (purge and trap). Groundwater was analyzed for TPHG by the methods accepted by the Department of Toxic Substances Control, California EPA (Cal-EPA), and referenced in the *Leaking Underground Fuel Tank (LUFT) Field Manual* (State Water Resources Control Board, May 1988, revised October 1989). Samples were analyzed for BTEX by EPA method 8020, as described in

Test Methods for Evaluating Solid Waste: Physical/Chemical Methods (EPA, SW-846, November 1986, Third Edition). Groundwater samples collected from well MW-1 were also analyzed for total recoverable petroleum hydrocarbons (TRPH) by EPA method 418.1. These methods are recommended for samples from petroleum-hydrocarbon-impacted sites in the *Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites* (August 10, 1990).

MONITORING PROGRAM RESULTS

Results of the third quarter 1994 groundwater monitoring event are summarized in Table 1 and illustrated in Figure 2. Historical groundwater elevation data, including top-of-casing elevations, depth-to-water measurements, calculated groundwater elevations, floating-product thickness measurements, and groundwater flow direction and gradient data, are summarized in Table 2. Table 3 summarizes historical laboratory data for TPHG, BTEX, and TRPH analyses. Table 4 summarizes historical laboratory data for halogenated volatile organic compound (VOC), total petroleum hydrocarbons as diesel (TPHD), and metals analyses. Copies of the third quarter 1994 certified analytical report and chain-of-custody documentation are included in Appendix B.

MONITORING PROGRAM EVALUATION

Groundwater elevation data collected on September 16, 1994, illustrate that groundwater beneath the site flows north at an approximate hydraulic gradient of 0.014 foot per foot. Figure 2 illustrates groundwater contours and analytical data for the third quarter of 1994.

Groundwater samples collected from wells MW-1, MW-2, MW-3, and MW-6 through MW-12 did not contain detectable concentrations of TPHG or BTEX. Groundwater samples collected from wells MW-4 and MW-5 contained 250 and 1,500 parts per billion (ppb) TPHG, and 1 and 370 ppb benzene, respectively. Groundwater samples collected from well MW-1 did not contain detectable concentrations of TRPH (<500 ppb). Similar analytical results were reported for these wells during previous monitoring events. Well MW-6 contained floating product from the third quarter of 1992 through the fourth quarter of 1993. TPHG and BTEX concentrations in MW-6 have dropped to nondectectable levels during the second and third quarters of 1994.

LIMITATIONS

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

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

SITE STATUS UPDATE

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

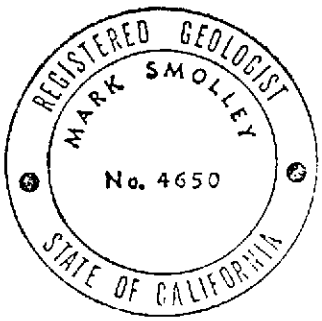
Third Quarter 1994 Activities

- Prepared and submitted quarterly groundwater monitoring report for second quarter 1994.
- Performed quarterly groundwater monitoring for third quarter 1994.

Work Anticipated Fourth Quarter 1994

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

Project 0805-134.01



Please call if you have questions.

Sincerely,

EMCON Associates

David Larsen
Sampling Coordinator

Mark Smolley, R.G. 4650
Senior Project Geologist

Attachment:
- Table 1 - Groundwater Monitoring Data, Third Quarter 1994
- Table 2 - Historical Groundwater Elevation Data
- Table 3 - Historical Groundwater Analytical Data (TPHG, BTEX, and TRPH)
- Table 4 - Historical Groundwater Analytical Data (VOCs, TPHD, and Metals)
- Figure 1 - Site Location
- Figure 2 - Groundwater Data, Third Quarter 1994
- Appendix A - Field Data Report, Integrated Wastestream Management, October 7, 1994
- Appendix B - Certified Analytical Report and Chain-of-Custody Documentation, Third Quarter 1994

Table 1
Groundwater Monitoring Data
Third Quarter 1994
Summary Report

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 12-06-94
Project Number: 0805-134.01

Well Designation	Water Level Field Date	TOC Elevation	Depth to Water	Ground-Water Elevation	Floating Product Thickness	Ground-Water Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TOG or TRPH
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot		ppb	ppb	ppb	ppb	ppb	ppb
MW-1	09-16-94	457.04	19.98	437.06	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	<500
MW-2	09-16-94	457.74	19.64	438.10	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-3	09-16-94	456.97	20.03	436.94	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-4	09-16-94	456.55	20.51	436.04	ND	N	0.014	09-16-94	250	1	<0.5	<0.6	<1	NA
MW-5	09-16-94	455.84	20.41	435.43	ND	N	0.014	09-16-94	1500	370	28	110	120	NA
MW-6	09-16-94	454.93	19.62	435.31	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-7	09-16-94	454.92	19.47	435.45	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-8	09-16-94	456.97	17.02	439.95	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	09-16-94	456.18	17.84	438.34	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-10	09-16-94	456.85	21.25	435.60	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-11	09-16-94	455.07	20.98	434.09	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-12	09-16-94	455.04	21.62	433.42	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA

TOC = Top of casing
ft-MSL = Elevation in feet, relative to mean sea level
MWN = Ground-water flow direction and gradient apply to the entire monitoring well network
TPHG = Total petroleum hydrocarbons as gasoline
TOG = Total oil and grease measured by EPA Method 5520 C&F
TRPH = Total recoverable petroleum hydrocarbons measured by EPA Method 418.1
ppb = Parts per billion or micrograms per liter (µg/l)
ND = None detected
N = North
NA = Not analyzed

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Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 12-06-94
Project Number: 0805-134.01

Well Designation	Water Level Field Date	TOC Elevation	Depth to Water	Ground-Water Elevation	Floating Product Thickness	Ground-Water Flow Direction	Hydraulic Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-1	09-20-89	457.04	21.03	436.01	ND	NR	NR
MW-1	10-12-89	457.04	19.64	437.40	ND	NR	NR
MW-1	06-21-90	457.04	21.72	435.32	ND	NR	NR
MW-1	09-20-90	457.04	19.79	437.25	ND	NR	NR
MW-1	12-18-90	457.04	19.28	437.76	ND	NR	NR
MW-1	02-21-91	457.04	22.45	434.59	ND	NR	NR
MW-1	03-20-91	457.04	19.87	437.17	ND	NR	NR
MW-1	04-10-91	457.04	19.42	437.62	ND	NR	NR
MW-1	05-20-91	457.04	25.95	431.09	ND	NR	NR
MW-1	06-20-91	457.04	32.55	424.49	ND	NR	NR
MW-1	07-25-91	457.04	38.22	418.82	ND	NR	NR
MW-1	08-13-91	457.04	40.74	416.30	ND	NR	NR
MW-1	09-12-91	457.04	43.16	413.88	ND	NR	NR
MW-1	10-22-91	457.04	DRY	DRY	ND	DRY	DRY
MW-1	11-13-91	457.04	DRY	DRY	ND	DRY	DRY
MW-1	12-21-91	457.04	DRY	DRY	ND	DRY	DRY
MW-1	01-18-92	457.04	DRY	DRY	ND	DRY	DRY
MW-1	02-21-92	457.04	DRY	DRY	ND	DRY	DRY
MW-1	03-19-92	457.04	36.16	420.88	ND	NR	NR
MW-1	04-24-92	457.04	38.14	418.90	ND	NR	NR
MW-1	05-20-92	457.04	40.74	416.30	ND	NR	NR
MW-1	06-29-92	457.04	DRY	DRY	ND	DRY	DRY
MW-1	07-28-92	457.04	DRY	DRY	ND	DRY	DRY
MW-1	08-26-92	457.04	DRY	DRY	ND	DRY	DRY
MW-1	09-11-92	457.04	DRY	DRY	ND	DRY	DRY
MW-1	10-29-92	457.04	DRY	DRY	ND	DRY	DRY
MW-1	11-11-92	457.04	DRY	DRY	ND	DRY	DRY
MW-1	12-14-92	457.04	Not surveyed: inaccessible due to construction activities				
MW-1	01-27-93	457.04	30.10	426.94	ND	NR	NR
MW-1	02-26-93	457.04	24.72	432.32	ND	NR	NR
MW-1	03-30-93	457.04	20.87	436.17	ND	NR	NR
MW-1	04-30-93	457.04	19.46	437.58	ND	NR	NR
MW-1	05-14-93	457.04	19.27	437.77	ND	NR	NR
MW-1	06-17-93	457.04	19.21	437.83	ND	NR	NR
MW-1	07-27-93	457.04	19.95	437.09	ND	NR	NR
MW-1	08-30-93	457.04	20.72	436.32	ND	NR	NR
MW-1	11-04-93	457.04	20.61	436.43	ND	NR	NR
MW-1	03-25-94	457.04	17.54	439.50	ND	NR	NR
MW-1	06-02-94	457.04	21.30	435.74	ND	NR	NR
MW-1	09-16-94	457.04	19.98	437.06	ND	N	0.014

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 12-06-94
Project Number: 0805-134.01

Well Designation	Water Level Field Date	TOC Elevation	Depth to Water	Ground-Water Elevation	Floating Product Thickness	Ground-Water Flow Direction	Hydraulic Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-2	09-20-89	457.74	20.67	437.07	ND	NR	NR
MW-2	10-12-89	457.74	18.98	438.76	ND	NR	NR
MW-2	06-21-90	457.74	21.88	435.86	ND	NR	NR
MW-2	09-20-90	457.74	19.90	437.84	ND	NR	NR
MW-2	12-18-90	457.74	19.32	438.42	ND	NR	NR
MW-2	02-21-91	457.74	23.02	434.72	ND	NR	NR
MW-2	03-20-91	457.74	20.01	437.73	ND	NR	NR
MW-2	04-10-91	457.74	19.81	437.93	ND	NR	NR
MW-2	05-20-91	457.74	26.62	431.12	ND	NR	NR
MW-2	06-20-91	457.74	33.15	424.59	ND	NR	NR
MW-2	07-25-91	457.74	37.10	420.64	ND	NR	NR
MW-2	08-13-91	457.74	37.20	420.54	ND	NR	NR
MW-2	09-12-91	457.74	DRY	DRY	ND	DRY	DRY
MW-2	10-22-91	457.74	DRY	DRY	ND	DRY	DRY
MW-2	11-13-91	457.74	DRY	DRY	ND	DRY	DRY
MW-2	12-21-91	457.74	DRY	DRY	ND	DRY	DRY
MW-2	01-18-92	457.74	DRY	DRY	ND	DRY	DRY
MW-2	02-21-92	457.74	DRY	DRY	ND	DRY	DRY
MW-2	03-19-92	457.74	35.82	421.92	ND	NR	NR
MW-2	04-24-92	457.74	36.64	421.10	ND	NR	NR
MW-2	05-20-92	457.74	37.23	420.51	ND	NR	NR
MW-2	06-29-92	457.74	DRY	DRY	ND	DRY	DRY
MW-2	07-28-92	457.74	DRY	DRY	ND	DRY	DRY
MW-2	08-26-92	457.74	DRY	DRY	ND	DRY	DRY
MW-2	09-11-92	457.74	DRY	DRY	ND	DRY	DRY
MW-2	10-29-92	457.74	DRY	DRY	ND	DRY	DRY
MW-2	11-11-92	457.74	DRY	DRY	ND	DRY	DRY
MW-2	12-14-92	457.74	Not surveyed: inaccessible due to construction activities				
MW-2	01-27-93	457.74	32.87	424.87	ND	NR	NR
MW-2	02-26-93	457.74	Not surveyed: inaccessible due to construction activities				
MW-2	03-30-93	457.74	20.47	437.27	ND	NR	NR
MW-2	04-30-93	457.74	19.02	438.72	ND	NR	NR
MW-2	05-14-93	457.74	18.65	439.09	ND	NR	NR
MW-2	06-17-93	457.74	18.21	439.53	ND	NR	NR
MW-2	07-27-93	457.74	17.95	439.79	ND	NR	NR
MW-2	08-30-93	457.74	18.43	439.31	ND	NR	NR
MW-2	11-04-93	457.74	19.73	438.01	ND	NR	NR
MW-2	03-25-94	457.74	17.26	440.48	ND	NR	NR
MW-2	06-02-94	457.74	21.23	436.51	ND	NR	NR
MW-2	09-16-94	457.74	19.64	438.10	ND	N	0.014

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 12-06-94
Project Number: 0805-134.01

Well Designation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Ground-Water Elevation ft-MSL	Floating Product Thickness feet	Ground-Water Flow Direction MWN	Hydraulic Gradient foot/foot
MW-3	09-20-89	456.97	20.98	435.99	ND	NR	NR
MW-3	10-12-89	456.97	19.66	437.31	ND	NR	NR
MW-3	06-21-90	456.97	21.72	435.25	ND	NR	NR
MW-3	09-20-90	456.97	19.72	437.25	ND	NR	NR
MW-3	12-18-90	456.97	19.21	437.76	ND	NR	NR
MW-3	02-21-91	456.97	22.36	434.61	ND	NR	NR
MW-3	03-20-91	456.97	19.79	437.18	ND	NR	NR
MW-3	04-10-91	456.97	19.35	437.62	ND	NR	NR
MW-3	05-20-91	456.97	25.86	431.11	ND	NR	NR
MW-3	06-20-91	456.97	32.45	424.52	ND	NR	NR
MW-3	07-25-91	456.97	38.06	418.91	ND	NR	NR
MW-3	08-13-91	456.97	38.40	418.57	ND	NR	NR
MW-3	09-12-91	456.97	DRY	DRY	ND	DRY	DRY
MW-3	10-22-91	456.97	DRY	DRY	ND	DRY	DRY
MW-3	11-13-91	456.97	DRY	DRY	ND	DRY	DRY
MW-3	12-21-91	456.97	DRY	DRY	ND	DRY	DRY
MW-3	01-18-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	02-21-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	03-19-92	456.97	36.03	420.94	ND	NR	NR
MW-3	04-24-92	456.97	37.92	419.05	ND	NR	NR
MW-3	05-20-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	06-29-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	07-28-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	08-26-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	09-11-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	10-29-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	11-11-92	456.97	DRY	DRY	ND	DRY	DRY
MW-3	12-14-92	456.97	Not surveyed: inaccessible due to construction activities				
MW-3	01-27-93	456.97	30.36	426.61	ND	NR	NR
MW-3	02-26-93	456.97	24.96	432.01	ND	NR	NR
MW-3	03-30-93	456.97	21.45	435.52	ND	NR	NR
MW-3	04-30-93	456.97	19.43	437.54	ND	NR	NR
MW-3	05-14-93	456.97	19.37	437.60	ND	NR	NR
MW-3	06-17-93	456.97	19.38	437.59	ND	NR	NR
MW-3	07-27-93	456.97	20.10	436.87	ND	NR	NR
MW-3	08-30-93	456.97	20.98	435.99	ND	NR	NR
MW-3	11-04-93	456.97	20.91	436.06	ND	NR	NR
MW-3	03-25-94	456.97	17.57	439.40	ND	NR	NR
MW-3	06-02-94	456.97	21.30	435.67	ND	NR	NR
MW-3	09-16-94	456.97	20.03	436.94	ND	N	0.014

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 12-06-94
Project Number: 0805-134.01

Well Designation	Water Level Field Date	TOC Elevation	Depth to Water	Ground-Water Elevation	Floating Product Thickness	Ground-Water Flow Direction	Hydraulic Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-4	02-21-91	456.55	22.01	434.54	ND	NR	NR
MW-4	03-20-91	456.55	20.31	436.24	ND	NR	NR
MW-4	04-10-91	456.55	19.55	437.00	ND	NR	NR
MW-4	05-20-91	456.55	25.24	431.31	ND	NR	NR
MW-4	06-20-91	456.55	DRY	DRY	ND	DRY	DRY
MW-4	07-25-91	456.55	DRY	DRY	ND	DRY	DRY
MW-4	08-13-91	456.55	DRY	DRY	ND	DRY	DRY
MW-4	09-12-91	456.55	DRY	DRY	ND	DRY	DRY
MW-4	10-22-91	456.55	DRY	DRY	ND	DRY	DRY
MW-4	11-13-91	456.55	DRY	DRY	ND	DRY	DRY
MW-4	12-21-91	456.55	DRY	DRY	ND	DRY	DRY
MW-4	01-18-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	02-21-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	03-19-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	04-24-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	05-20-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	06-29-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	07-28-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	08-26-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	09-11-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	10-29-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	11-11-92	456.55	DRY	DRY	ND	DRY	DRY
MW-4	12-14-92	456.55	Not surveyed: inaccessible due to construction activities				
MW-4	01-27-93	456.55	DRY	DRY	ND	DRY	DRY
MW-4	02-26-93	456.55	23.60	432.95	ND	NR	NR
MW-4	03-30-93	456.55	20.87	435.68	ND	NR	NR
MW-4	04-30-93	456.55	19.73	436.82	ND	NR	NR
MW-4	05-14-93	456.55	19.75	436.80	ND	NR	NR
MW-4	06-17-93	456.55	19.69	436.86	ND	NR	NR
MW-4	07-27-93	456.55	20.40	436.15	ND	NR	NR
MW-4	08-30-93	456.55	21.10	435.45	ND	NR	NR
MW-4	11-04-93	456.55	21.60	434.95	ND	NR	NR
MW-4	03-25-94	456.55	18.59	437.96	ND	NR	NR
MW-4	06-02-94	456.55	21.41	435.14	ND	NR	NR
MW-4	09-16-94	456.55	20.51	436.04	ND	N	0.014

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 12-06-94
Project Number: 0805-134.01

Well Designation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Ground-Water Elevation ft-MSL	Floating Product Thickness feet	Ground-Water Flow Direction MWN	Hydraulic Gradient foot/foot
MW-5	06-29-92	455.84	50.53	405.31	ND	NR	NR
MW-5	07-28-92	455.84	54.92	400.92	ND	NR	NR
MW-5	08-26-92	455.84	59.58	396.26	ND	NR	NR
MW-5	09-11-92	455.84	60.88	394.96	ND	NR	NR
MW-5	10-29-92	455.84	DRY	DRY	ND	DRY	DRY
MW-5	11-11-92	455.84	DRY	DRY	ND	DRY	DRY
MW-5	12-14-92	455.84	Not surveyed: inaccessible due to construction activities				
MW-5	01-27-93	455.84	29.08	426.76	ND	NR	NR
MW-5	02-26-93	455.84	23.56	432.28	ND	NR	NR
MW-5	03-30-93	455.84	20.32	435.52	ND	NR	NR
MW-5	04-30-93	455.84	19.57	436.27	ND	NR	NR
MW-5	05-14-93	455.84	19.29	436.55	ND	NR	NR
MW-5	06-17-93	455.84	18.66	437.18	ND	NR	NR
MW-5	07-27-93	455.84	20.16	435.68	ND	NR	NR
MW-5	08-30-93	455.84	Not surveyed:				
MW-5	11-04-93	455.84	21.05	434.79	ND	NR	NR
MW-5	03-25-94	455.84	17.95	437.89	ND	NR	NR
MW-5	06-02-94	455.84	21.32	434.52	ND	NR	NR
MW-5	09-16-94	455.84	20.41	435.43	ND	N	0.014
MW-6	06-29-92	454.93	49.72	405.21	ND	NR	NR
MW-6	07-28-92	454.93	54.63	400.30	ND	NR	NR
MW-6	08-26-92	454.93	59.45	395.48	ND	NR	NR
MW-6	09-11-92	454.93	^60.73	^394.20	0.04	NR	NR
MW-6	10-29-92	454.93	62.14	392.79	ND	NR	NR
MW-6	11-11-92	454.93	^62.42	^392.51	0.03	NR	NR
MW-6	12-14-92	454.93	Not surveyed: inaccessible due to construction activities				
MW-6	01-27-93	454.93	Not surveyed: inaccessible due to construction activities				
MW-6	02-26-93	454.93	22.73	432.20	ND	NR	NR
MW-6	03-30-93	454.93	19.53	435.40	ND	NR	NR
MW-6	04-30-93	454.93	18.76	436.17	ND	NR	NR
MW-6	05-14-93	454.93	^19.19	^435.74	0.01	NR	NR
MW-6	06-17-93	454.93	18.54	436.39	ND	NR	NR
MW-6	07-27-93	454.93	19.47	435.46	ND	NR	NR
MW-6	08-30-93	454.93	^20.33	^434.60	0.01	NR	NR
MW-6	11-04-93	454.93	^20.33	^434.60	0.01	NR	NR
MW-6	03-25-94	454.93	17.13	437.80	ND	NR	NR
MW-6	06-02-94	454.93	20.45	434.48	ND	NR	NR
MW-6	09-16-94	454.93	19.62	435.31	ND	N	0.014

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 12-06-94
Project Number: 0805-134.01

Well Desig-nation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Ground-Water Elevation ft-MSL	Floating Product Thickness feet	Ground-Water Flow Direction MWN	Hydraulic Gradient foot/foot
MW-7	06-29-92	454.92	49.57	405.35	ND	NR	NR
MW-7	07-28-92	454.92	54.60	400.32	ND	NR	NR
MW-7	08-26-92	454.92	59.60	395.32	ND	NR	NR
MW-7	09-11-92	454.92	60.74	394.18	ND	NR	NR
MW-7	10-29-92	454.92	62.23	392.69	ND	NR	NR
MW-7	11-11-92	454.92	62.69	392.23	ND	NR	NR
MW-7	12-14-92	454.92	Not surveyed: inaccessible due to construction activities				
MW-7	01-27-93	454.92	27.97	426.95	ND	NR	NR
MW-7	02-26-93	454.92	22.57	432.35	ND	NR	NR
MW-7	03-30-93	454.92	19.29	435.63	ND	NR	NR
MW-7	04-30-93	454.92	18.79	436.13	ND	NR	NR
MW-7	05-14-93	454.92	18.35	436.57	ND	NR	NR
MW-7	06-17-93	454.92	18.36	436.56	ND	NR	NR
MW-7	07-27-93	454.92	19.49	435.43	ND	NR	NR
MW-7	08-30-93	454.92	20.26	434.66	ND	NR	NR
MW-7	11-04-93	454.92	20.33	434.59	ND	NR	NR
MW-7	03-25-94	454.92	16.91	438.01	ND	NR	NR
MW-7	06-02-94	454.92	20.31	434.61	ND	NR	NR
MW-7	09-16-94	454.92	19.47	435.45	ND	N	0.014
MW-8	06-29-92	456.97	50.40	406.57	ND	NR	NR
MW-8	07-28-92	456.97	55.79	401.18	ND	NR	NR
MW-8	08-26-92	456.97	60.79	396.18	ND	NR	NR
MW-8	09-11-92	456.97	61.97	395.00	ND	NR	NR
MW-8	10-29-92	456.97	63.51	393.46	ND	NR	NR
MW-8	11-11-92	456.97	64.21	392.76	ND	NR	NR
MW-8	12-14-92	456.97	Not surveyed: inaccessible due to construction activities				
MW-8	01-27-93	456.97	25.57	431.40	ND	NR	NR
MW-8	02-26-93	456.97	19.86	437.11	ND	NR	NR
MW-8	03-30-93	456.97	16.69	440.28	ND	NR	NR
MW-8	04-30-93	456.97	15.83	441.14	ND	NR	NR
MW-8	05-14-93	456.97	15.79	441.18	ND	NR	NR
MW-8	06-17-93	456.97	15.79	441.18	ND	NR	NR
MW-8	07-27-93	456.97	16.80	440.17	ND	NR	NR
MW-8	08-30-93	456.97	17.37	439.60	ND	NR	NR
MW-8	11-04-93	456.97	17.60	439.37	ND	NR	NR
MW-8	03-25-94	456.97	15.04	441.93	ND	NR	NR
MW-8	06-02-94	456.97	18.43	438.54	ND	NR	NR
MW-8	09-16-94	456.97	17.02	439.95	ND	N	0.014

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 12-06-94
Project Number: 0805-134.01

Well Designation	Water Level Field Date	TOC Elevation	Depth to Water	Ground-Water Elevation	Floating Product Thickness	Ground-Water Flow Direction	Hydraulic Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-9	06-29-92	456.18	50.29	405.89	ND	NR	NR
MW-9	07-28-92	456.18	55.53	400.65	ND	NR	NR
MW-9	08-26-92	456.18	60.62	395.56	ND	NR	NR
MW-9	09-11-92	456.18	61.67	394.51	ND	NR	NR
MW-9	10-29-92	456.18	63.17	393.01	ND	NR	NR
MW-9	11-11-92	456.18	63.68	392.50	ND	NR	NR
MW-9	12-14-92	456.18	Not surveyed: inaccessible due to construction activities				
MW-9	01-27-93	456.18	26.48	429.70	ND	NR	NR
MW-9	02-26-93	456.18	Not surveyed: inaccessible due to construction activities				
MW-9	03-30-93	456.18	17.77	438.41	ND	NR	NR
MW-9	04-30-93	456.18	17.01	439.17	ND	NR	NR
MW-9	05-14-93	456.18	16.55	439.63	ND	NR	NR
MW-9	06-17-93	456.18	16.68	439.50	ND	NR	NR
MW-9	07-27-93	456.18	17.77	438.41	ND	NR	NR
MW-9	08-30-93	456.18	18.74	437.44	ND	NR	NR
MW-9	11-04-93	456.18	18.72	437.46	ND	NR	NR
MW-9	03-25-94	456.18	15.78	440.40	ND	NR	NR
MW-9	06-02-94	456.18	19.03	437.15	ND	NR	NR
MW-9	09-16-94	456.18	17.84	438.34	ND	N	0.014
MW-10	03-30-93	456.85	21.33	435.52	ND	NR	NR
MW-10	04-30-93	456.85	20.51	436.34	ND	NR	NR
MW-10	05-14-93	456.85	20.26	436.59	ND	NR	NR
MW-10	06-17-93	456.85	20.30	436.55	ND	NR	NR
MW-10	07-27-93	456.85	20.29	436.56	ND	NR	NR
MW-10	08-30-93	456.85	22.19	434.66	ND	NR	NR
MW-10	11-04-93	456.85	22.11	434.74	ND	NR	NR
MW-10	03-25-94	456.85	18.84	438.01	ND	NR	NR
MW-10	06-02-94	456.85	22.40	434.45	ND	NR	NR
MW-10	09-16-94	456.85	21.25	435.60	ND	N	0.014

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 12-06-94
Project Number: 0805-134.01

Well Designation	Water Level Field Date	TOC Elevation ft-MSL	Depth to Water feet	Ground-Water Elevation ft-MSL	Floating Product Thickness feet	Ground-Water Flow Direction MWN	Hydraulic Gradient foot/foot
MW-11	03-30-93	455.07	20.78	434.29	ND	NR	NR
MW-11	04-30-93	455.07	20.71	434.36	ND	NR	NR
MW-11	05-14-93	455.07	20.01	435.06	ND	NR	NR
MW-11	06-17-93	455.07	20.18	434.89	ND	NR	NR
MW-11	07-27-93	455.07	21.31	433.76	ND	NR	NR
MW-11	08-30-93	455.07	21.09	433.98	ND	NR	NR
MW-11	11-04-93	455.07	21.40	433.67	ND	NR	NR
MW-11	03-25-94	455.07	18.28	436.79	ND	NR	NR
MW-11	06-02-94	455.07	21.78	433.29	ND	NR	NR
MW-11	09-16-94	455.07	20.98	434.09	ND	N	0.014
MW-12	03-30-93	455.04	21.33	433.71	ND	NR	NR
MW-12	04-30-93	455.04	20.23	434.81	ND	NR	NR
MW-12	05-14-93	455.04	19.97	435.07	ND	NR	NR
MW-12	06-17-93	455.04	20.00	435.04	ND	NR	NR
MW-12	07-27-93	455.04	20.94	434.10	ND	NR	NR
MW-12	08-30-93	455.04	21.79	433.25	ND	NR	NR
MW-12	11-04-93	455.04	21.95	433.09	ND	NR	NR
MW-12	03-25-94	455.04	18.74	436.30	ND	NR	NR
MW-12	06-02-94	455.04	22.21	432.83	ND	NR	NR
MW-12	09-16-94	455.04	21.62	433.42	ND	N	0.014

TOC = Top of casing
ft-MSL = Elevation in feet, relative to mean sea level
MWN = Ground-water flow direction and gradient apply to the entire monitoring well network
ND = None detected
NR = Not reported; data not available
DRY = Dry well; groundwater was not detected
N = North
^ = 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)]

Table 3
Historical Groundwater Analytical Data
Summary Report

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 11-07-94
Project Number: 0805-134.01

Well Designation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TOG or TRPH
		ppb	ppb	ppb	ppb	ppb	ppb
MW-1	09-20-89	80	3	1	0.7	1	<5000
MW-1	06-21-90	<20	<0.5	0.66	<0.5	<0.5	13000
MW-1	09-20-90	<50	<0.5	1	<0.5	1.8	<5000
MW-1	12-18-90	<50	<0.5	1.8	<0.5	1.7	NA
MW-1	02-21-91	<50	1.2	2.3	<0.5	2.2	NA
MW-1	05-20-91	<30	<0.3	<0.3	<0.3	<0.3	NA
MW-1	08-13-91	Not sampled: dry well					
MW-1	11-13-91	Not sampled: dry well					
MW-1	03-19-92	400	<3.5	<1.2	<0.8	<1.0	NA
MW-1	06-29-92	Not sampled: dry well					
MW-1	09-11-92	Not sampled: dry well					
MW-1	11-12-92	Not sampled: dry well					
MW-1	03-30-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-1	05-14-93	<50	<0.5	<0.5	<0.5	<0.5	120000
MW-1	08-30-93	<50	<0.5	<0.5	<0.5	<0.5	900
MW-1	11-04-93	<50	<0.5	<0.5	<0.5	<0.5	2900
MW-1	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	<600
MW-1	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	<500
MW-1	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	<500
MW-2	09-20-89	<50	<0.5	<0.5	<0.5	1	<5000
MW-2	06-21-90	<20	<0.5	<0.5	<0.5	<0.5	<5000
MW-2	09-20-90	<50	<0.5	0.7	<0.5	1.4	<5000
MW-2	12-18-90	<50	0.6	1.5	<0.5	1.9	<5000
MW-2	02-21-91	<50	<0.5	<0.5	<0.5	<0.5	<5000
MW-2	05-20-91	<30	<0.3	<0.3	<0.3	<0.3	<75000
MW-2	08-13-91	Not sampled: dry well					
MW-2	11-13-91	Not sampled: dry well					
MW-2	03-19-92	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-2	06-29-92	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-2	09-11-92	Not sampled: dry well					
MW-2	11-12-92	Not sampled: dry well					
MW-2	03-30-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-2	05-14-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-2	08-30-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-2	11-04-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-2	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-2	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-2	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA

Table 3
Historical Groundwater Analytical Data
Summary Report

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 11-07-94
Project Number: 0805-134.01

Well Designation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TOG or TRPH
		ppb	ppb	ppb	ppb	ppb	ppb
MW-3	09-20-89	170	8.9	0.6	1.1	<1	<5000
MW-3	06-21-90	<20	<0.5	1	<0.5	<0.5	10000
MW-3	09-20-90	<50	<0.5	1	<0.5	1.9	<5000
MW-3	12-18-90	<50	<0.5	1.7	<0.5	2	<5000
MW-3	02-21-91	<50	<0.5	<0.5	<0.5	<0.5	<5000
MW-3	05-20-91	97	1.3	1.1	6.2	8.4	<75000
MW-3	08-13-91	Not sampled: dry well					
MW-3	11-13-91	Not sampled: dry well					
MW-3	03-19-92	220	<1.1	<1.9	<0.6	<0.8	<5000
MW-3	06-29-92	Not sampled: dry well					
MW-3	09-11-92	Not sampled: dry well					
MW-3	11-12-92	Not sampled: dry well					
MW-3	03-30-93	200*	<4.0	<0.5	<0.5	<0.5	NA
MW-3	05-14-93	72*	<3.0	<0.5	<0.5	<0.5	NA
MW-3	08-30-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-3	11-04-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-3	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-3	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-3	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-4	02-21-91	3500	410	7.6	30	47	<5000
MW-4	05-20-91	1400	150	6	4.4	3.1	<75000
MW-4	08-13-91	Not sampled: dry well					
MW-4	11-13-91	Not sampled: dry well					
MW-4	03-19-92	Not sampled: dry well					
MW-4	06-29-92	Not sampled: dry well					
MW-4	09-11-92	Not sampled: dry well					
MW-4	11-12-92	Not sampled: dry well					
MW-4	03-31-93	680	110	5.2	3	7.4	NA
MW-4	05-14-93	1200	200	6.2	15	9.2	NA
MW-4	08-30-93	620	22	0.9	3.6	2.1	NA
MW-4	11-04-93	320	11	<0.5	1.3	0.9	NA
MW-4	03-25-94	480	5.4	<0.5	1.6	1.7	NA
MW-4	06-02-94	270	4.2	<0.5	1	<1.7	NA
MW-4	09-16-94	250	1	<0.5	<0.6	<1	NA

Table 3
Historical Groundwater Analytical Data
Summary Report

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 11-07-94
Project Number: 0805-134.01

Well Designation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TOG or TRPH
		ppb	ppb	ppb	ppb	ppb	ppb
MW-5	06-29-92	8900	1700	640	310	1100	NA
MW-5	09-11-92	13000	2200	1500	130	930	NA
MW-5	11-12-92	Not sampled: dry well					
MW-5	03-31-93	9700	1700	430	220	880	NA
MW-5	05-14-93	9800	1300	820	270	1100	NA
MW-5	08-30-93	Not sampled: well inaccessible					
MW-5	11-04-93	41000	3500	3100	890	5400	NA
MW-5	03-25-94	780	36	1.5	4.8	5.7	NA
MW-5	06-02-94	500	25	7.4	6	33	NA
MW-5	09-16-94	1500	370	28	110	120	NA
MW-6	06-29-92	8600	1800	460	52	450	NA
MW-6	09-11-92	Not sampled: well contained floating product					
MW-6	11-12-92	Not sampled: well contained floating product					
MW-6	03-31-93	Not sampled: well contained floating product					
MW-6	05-14-93	Not sampled: well contained floating product					
MW-6	08-30-93	Not sampled: well contained floating product					
MW-6	11-04-93	Not sampled: well contained floating product					
MW-6	03-25-94	530	<2.5	<2.5	<2.5	4.6	NA
MW-6	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-6	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-7	06-29-92	270	38	3.7	1.1	4.4	NA
MW-7	09-11-92	420	20	0.7	<0.5	<0.5	NA
MW-7	11-12-92	470	31	1	<0.5	0.8	NA
MW-7	03-31-93	190	20	1	<0.5	<0.5	NA
MW-7	05-14-93	170	17	0.6	<0.5	0.5	NA
MW-7	08-30-93	<50	1.8	<0.5	<0.5	0.5	NA
MW-7	11-04-93	<50	6.6	<0.5	<0.5	0.8	NA
MW-7	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-7	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-7	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA

Table 3
Historical Groundwater Analytical Data
Summary Report

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 11-07-94
Project Number: 0805-134.01

Well Designation	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TOG or TRPH
		ppb	ppb	ppb	ppb	ppb	ppb
MW-8	06-29-92	<50	<0.5	<0.5	<0.5	<0.5	<500
MW-8	09-11-92	<50	<0.5	<0.5	<0.5	<0.5	<500
MW-8	11-12-92	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-8	03-30-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-8	05-14-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-8	08-30-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-8	11-04-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-8	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-8	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-8	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	06-29-92	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	09-11-92	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	11-12-92	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	03-31-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	05-14-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	08-30-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	11-04-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-9	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-10	03-31-93	230*	<0.5	<0.5	<1	0.6	NA
MW-10	05-14-93	440*	<10	<0.6	<0.9	<0.5	NA
MW-10	08-30-93	280*	<4	<0.5	<1.3	0.6	NA
MW-10	11-04-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-10	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-10	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-10	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA

Table 3
Historical Groundwater Analytical Data
Summary Report

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 11-07-94
Project Number: 0805-134.01

Well Designation	Water Sample Field Date	TPHG ppb	Benzene ppb	Toluene ppb	Ethyl-benzene ppb	Total Xylenes ppb	TOG or TRPH ppb
MW-11	03-31-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-11	05-14-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-11	08-30-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-11	11-04-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-11	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-11	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-11	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-12	03-31-93	150	20	<0.5	<0.5	<0.5	NA
MW-12	05-14-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-12	08-30-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-12	11-04-93	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-12	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-12	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	NA
MW-12	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	NA

TPHG = Total petroleum hydrocarbons as gasoline
TOG = Total oil and grease measured by EPA Method 5520 C&F
TRPH = Total recoverable petroleum hydrocarbons measured by EPA Method 418.1
ppb = parts per billion or micrograms per liter (µg/l)
NA = Not analyzed
* = Chromatogram does not match the typical gasoline fingerprint.

Table 4
Historical Groundwater Analytical Data
Summary Report

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 11-07-94
Project Number: 0805-134.01

Well Designation	Water Sample Field Date	Total VOCs	TPHD	Cadmium by EPA 6010	Chromium by EPA 6010	Lead by EPA 7421	Zinc by EPA 6010	Nickel by EPA 6010
		ppb	ppb	ppb	ppb	ppb	ppb	ppb
MW-1	09-20-89	NA	<50	NA	NA	NA	NA	NA
MW-1	06-21-90	NA	<100	NA	NA	NA	NA	NA
MW-1	09-20-90	NA	<50	NA	NA	NA	NA	NA
MW-1	12-18-90	NA	<5000	NA	NA	NA	NA	NA
MW-1	02-21-91	NA	<5000	NA	NA	NA	NA	NA
MW-1	05-20-91	NA	<75000	NA	NA	NA	NA	NA
MW-1	08-13-91	Not sampled: dry well						
MW-1	11-13-91	Not sampled: dry well						
MW-1	03-19-92	NA	NA	NA	NA	NA	NA	NA
MW-1	06-29-92	Not sampled: dry well						
MW-1	09-11-92	Not sampled: dry well						
MW-1	11-12-92	Not sampled: dry well						
MW-1	03-30-93	NA	NA	NA	NA	NA	NA	NA
MW-1	05-14-93	NA	NA	NA	NA	NA	NA	NA
MW-1	08-30-93	NA	NA	NA	NA	NA	NA	NA
MW-1	11-04-93	NA	NA	NA	NA	NA	NA	NA
MW-1	03-25-94	NA	NA	NA	NA	NA	NA	NA
MW-1	06-02-94	NA	NA	NA	NA	NA	NA	NA
MW-2	09-20-89	NA	<50	NA	NA	NA	NA	NA
MW-2	06-21-90	NA	<100	NA	NA	NA	NA	NA
MW-2	09-20-90	NA	<50	NA	NA	NA	NA	NA
MW-2	12-18-90	NA	NA	NA	NA	NA	NA	NA
MW-2	02-21-91	NA	NA	NA	NA	NA	NA	NA
MW-2	05-20-91	NA	NA	NA	NA	NA	NA	NA
MW-2	08-13-91	Not sampled: dry well						
MW-2	11-13-91	Not sampled: dry well						
MW-2	03-19-92	NA	NA	NA	NA	NA	NA	NA
MW-2	06-29-92	NA	NA	NA	NA	NA	NA	NA
MW-2	09-11-92	Not sampled: dry well						
MW-2	11-12-92	Not sampled: dry well						
MW-2	03-30-93	NA	NA	NA	NA	NA	NA	NA
MW-2	05-14-93	NA	NA	NA	NA	NA	NA	NA

Table 4
Historical Groundwater Analytical Data
Summary Report

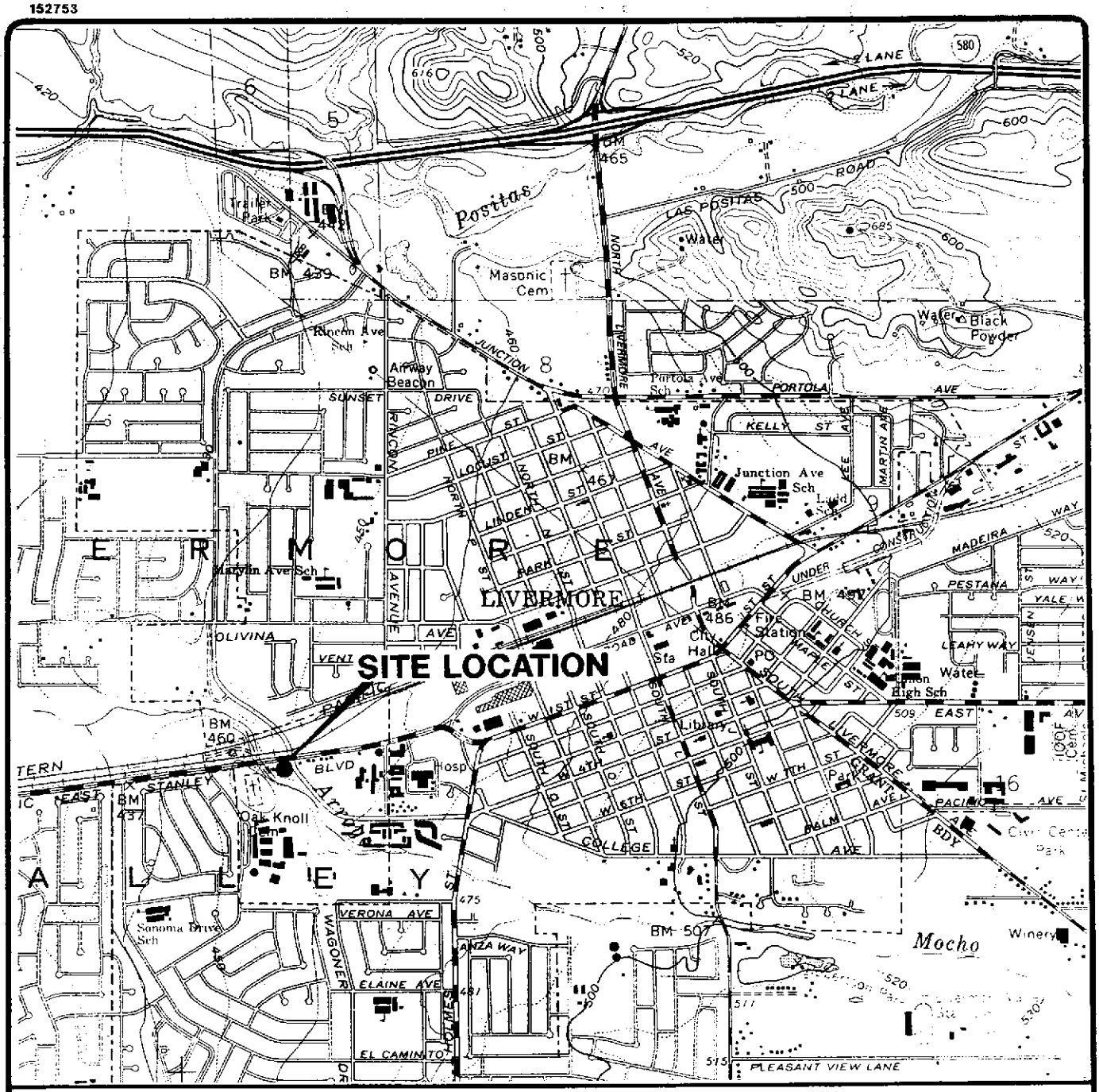
ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 11-07-94
Project Number: 0805-134.01

Well Designation	Water Sample Field Date	Total VOCs	TPHD	Cadmium by EPA 6010	Chromium by EPA 6010	Lead by EPA 7421	Zinc by EPA 6010	Nickel by EPA 6010
		ppb	ppb	ppb	ppb	ppb	ppb	ppb
MW-3	09-20-89	NA	<50	NA	NA	NA	NA	NA
MW-3	06-21-90	NA	<100	NA	NA	NA	NA	NA
MW-3	09-20-90	NA	<50	NA	NA	NA	NA	NA
MW-3	12-18-90	NA	NA	NA	NA	NA	NA	NA
MW-3	02-21-91	NA	NA	NA	NA	NA	NA	NA
MW-3	05-20-91	NA	NA	NA	NA	NA	NA	NA
MW-3	08-13-91	Not sampled: dry well						
MW-3	11-13-91	Not sampled: dry well						
MW-3	03-19-92	NA	<50	NA	NA	NA	NA	NA
MW-3	06-29-92	Not sampled: dry well						
MW-3	09-11-92	Not sampled: dry well						
MW-3	11-12-92	Not sampled: dry well						
MW-3	03-30-93	NA	NA	NA	NA	NA	NA	NA
MW-3	05-14-93	NA	NA	NA	NA	NA	NA	NA
MW-4	02-21-91	NA	NA	NA	NA	NA	NA	NA
MW-4	05-20-91	NA	NA	NA	NA	NA	NA	NA
MW-4	08-13-91	Not sampled: dry well						
MW-4	11-13-91	Not sampled: dry well						
MW-4	03-19-92	Not sampled: dry well						
MW-4	06-29-92	Not sampled: dry well						
MW-4	09-11-92	Not sampled: dry well						
MW-4	11-12-92	Not sampled: dry well						
MW-4	03-31-93	NA	NA	NA	NA	NA	NA	NA
MW-4	05-14-93	NA	NA	NA	NA	NA	NA	NA
MW-8	06-29-92	ND	<50	<3	1780	143	1310	5100
MW-8	09-11-92	NA	<50	13	3580	308	2620	10300
MW-8	11-12-92	NA	NA	28	3440	221	2550	9840
MW-8	03-30-93	NA	NA	NA	NA	NA	NA	NA
MW-8	05-14-93	NA	NA	NA	NA	NA	NA	NA
MW-9	11-12-92	NA	NA	10	1080	101	859	3070
MW-9	03-31-93	NA	NA	NA	NA	NA	NA	NA
MW-9	05-14-93	NA	NA	NA	NA	NA	NA	NA

VOCs = Halogenated volatile organic compounds by EPA Method 5030/601
TPHD = Total petroleum hydrocarbons as diesel by EPA Method 3510/California DHS LUFT Method
ppb = parts per billion or micrograms per liter (µg/l)
NA = Not analyzed
ND = Not detected (31 compounds tested for VOCs were nondetectable)

152753



EMCON Associates

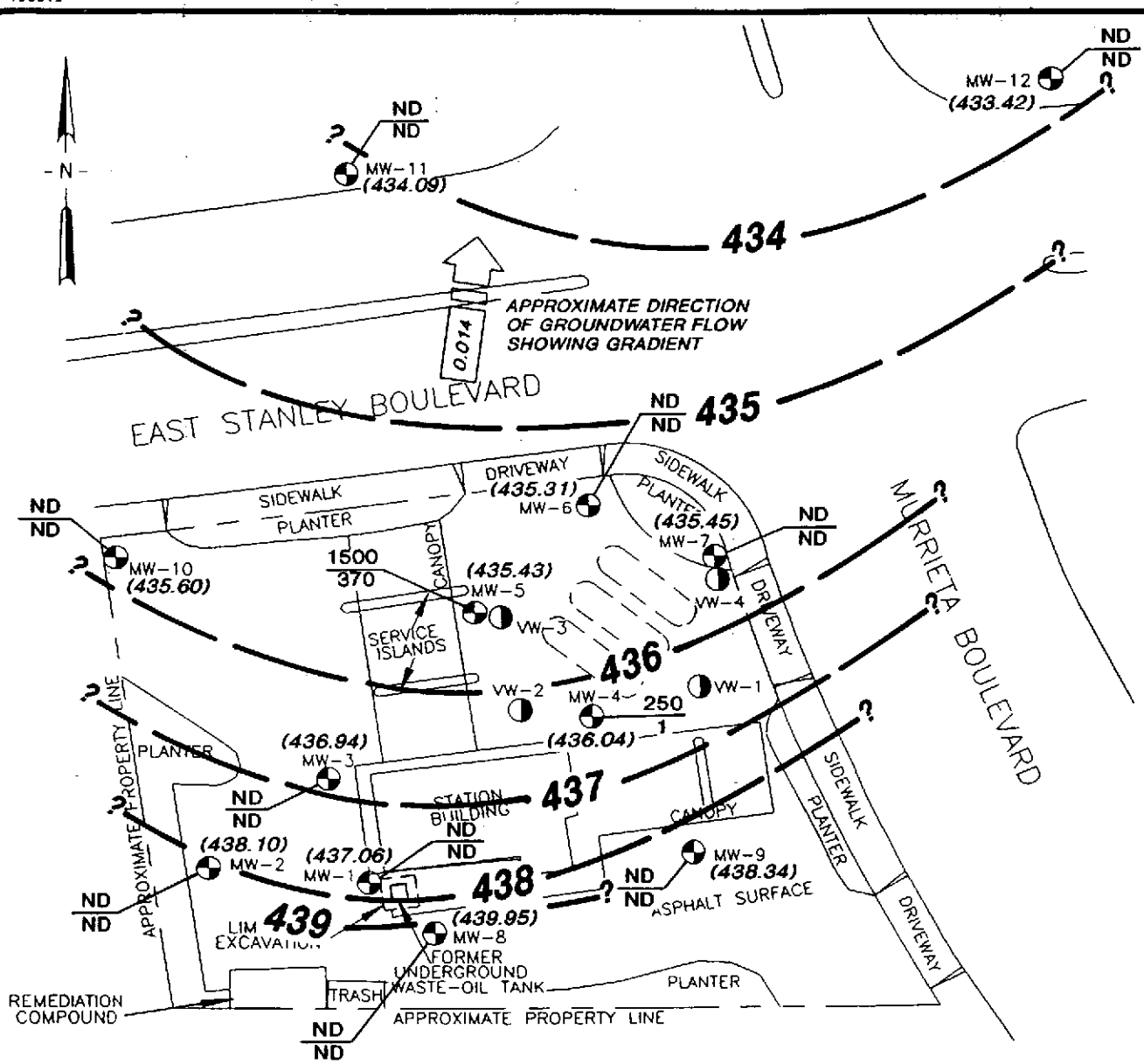
ARCO PRODUCTS COMPANY
SERVICE STATION 6113, 785 E. STANLEY BLVD.
QUARTERLY GROUNDWATER MONITORING
LIVERMORE, CALIFORNIA

SITE LOCATION

FIGURE 1

PROJECT NO. 805-134.01

155812



EXPLANATION

- Groundwater monitoring well
- Vapor extraction well
- Existing underground gasoline storage tank
- *(433.42)* Groundwater elevation (Ft.-MSL); measured 9/16/94
- 250 / 1 — TPHG concentration in groundwater (ppb) / Benzene concentration in groundwater (ppb)
- ND = Not detected
- ?——— Groundwater elevation contour (Ft. -MSL)

SCALE: 0 50 FEET (Approximate)

Base map modified from RESNA, 1994.

12/94

EMCON Associates

ARCO PRODUCTS COMPANY
SERVICE STATION 6113, 785 E. STANLEY BLVD.
QUARTERLY GROUNDWATER MONITORING
LIVERMORE, CALIFORNIA

GROUNDWATER DATA
THIRD QUARTER 1994

FIGURE 2

PROJECT NO. 805-134.01

APPENDIX A

FIELD DATA REPORT, INTEGRATED WASTESTREAM MANAGEMENT, OCTOBER 7, 1994

I NTEGRATED
W ASTESTREAM
M ANAGEMENT

October 7, 1994

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

Dear Mr. Young:

Attached are the field data sheets and analytical results for quarterly ground water sampling at ARCO Facility No. 6113 in Livermore, California. Integrated Wastestream Management measured the depth to water and collected samples from wells at this site on September 16, 1994.

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

Please call us if you have any questions.

Sincerely,
Integrated Wastestream Management

Tom DeLon
Project Manager

Walter H. Howe
Registered Geologist

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

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

I NTEGRATED
W ASTESTREAM
M ANAGEMENT

A6113Q3.XLS

Summary of Ground Water Sample Analyses for ARCO Facility A-6113, Livermore, California

WELL NUMBER	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12
DATE SAMPLED	9/16/94	9/16/94	9/16/94	9/16/94	9/16/94	9/16/94	9/16/94	9/16/94	9/16/94	9/16/94	9/16/94	9/16/94
DEPTH TO WATER	19.98	19.64	20.03	20.51	20.41	19.62	19.47	17.02	17.84	21.25	20.98	21.62
SHEEN	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
PRODUCT THICKNESS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPHg	ND	ND	ND	250	1,500	ND	ND	ND	ND	ND	ND	ND
BTEX												
BENZENE	ND	ND	ND	1.0	370	ND	ND	ND	ND	ND	ND	ND
TOLUENE	ND	ND	ND	ND	28	ND	ND	ND	ND	ND	ND	ND
ETHLYBENZENE	ND	ND	ND	<0.6#	110	ND	ND	ND	ND	ND	ND	ND
XYLENES	ND	ND	ND	<1#	120	ND	ND	ND	ND	ND	ND	ND
5520 F												
HYDROCARBONS	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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

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

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

FIELD REPORT

Depth To Water / Floating Product Survey

Site Arrival Time: 630

Site Departure Time: 1330

Weather Conditions: Sunny warm

DTW: Well Box or Well Casing (circle one)

Project No.: _____ **Location:** 785 E. Stanley Blvd. **Date:** Sept 16, 1994

Client / Station#: Arco 6113 **Field Technician:** Vince/Cisco **Day of Week:** Friday

DTW ORDER	WELL ID	SURFACE SEAL	LID SECURE	GASKET	LOCK	EXPANDING CAP	TOTAL DEPTH (Feet)	FIRST DEPTH TO WATER (Feet)	SECOND DEPTH TO WATER (Feet)	DEPTH TO FLOATING PRODUCT (Feet)	FLOATING PRODUCT THICKNESS (Feet)	SHEEN (Y=YES, N=NO) FP=FLOATING PRODUCT	COMMENTS	MATERIALS
7	MW-1	OK	Yes	OK	OK	OK	44.65	19.98+	19.98+	N/A	N/A	N	2"	HOLE IN HEX
8	MW-2	OK	Yes	OK	OK	OK	38.50	19.64-	19.64-	N/A	N/A	N	2"	HOLE IN HEX
9	MW-3	OK	Yes	OK	OK	OK	38.88	20.03	20.03	N/A	N/A	N	2"	HOLE IN HEX
11	MW-4	OK	Yes	OK	OK	OK	26.55	20.51	20.51	N/A	N/A	N	4"	15/16
12	MW-5	OK	Yes	OK	OK	OK	62.40	20.41-	20.41-	N/A	N/A	N	4"	ARCO TOOL
3	MW-6	OK	Yes	OK	OK	OK	66.40	19.62+	19.62+	N/A	N/A	N	4" EQ	15/16
4	MW-7	OK	Yes	OK	OK	OK	67.40	19.47-	19.47-	N/A	N/A	N	4"	15/16
6	MW-8	OK	Yes	OK	OK	OK	66.50	17.02	17.02	N/A	N/A	N	4"	15/16
5	MW-9	OK	Yes	OK	OK	OK	67.75	17.84	17.84	N/A	N/A	N	4" PARALLEL TO PUMP ISLANDS	15/16
10	MW-10	OK	Yes	OK	OK	OK	49.90	21.25	21.25	N/A	N/A	N	4"	15/16
1	MW-11	OK	Yes	OK	OK	OK	44.31	20.98	20.98	N/A	N/A	N	2" OFFSITE WELL ALLOW TO EQ	15/16
2	MW-12	OK	Yes	OK	OK	OK	32.78	21.62+	21.62+	N/A	N/A	N	2" OFFSITE well	15/16

 DATE: 9-16-94 CLIENT/STATION #: ARCO 6113 ADDRESS: 785 E. Stanley Rd Liv..

WELL ID: MW-4 TD 26.55 - DTW 20.51 X Gal./Linear Ft. 0.66 X Casing Volume 3 = Calculated Purge 11.95

DATE PURGED: 9-16-94 START (2400 HR): 1220 END (2400 HR) 1224

DATE SAMPLED: 9-16-94 TIME (2400 HR): 1227 DTW: 22.9

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1221	2	6.83	0.58	70.3	CLEAR
1223	7	6.80	0.58	69.7	CLEAR
1224	12	6.81	0.58	69.8	CLEAR

Total purge: 12

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

REMARKS:

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

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

DATE SAMPLED: TIME (2400 HR): DTW:

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

Total purge:

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

REMARKS:

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

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

DATE SAMPLED: TIME (2400 HR): DTW:

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

Total purge:

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

REMARKS:

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

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

DATE SAMPLED: TIME (2400 HR): DTW:

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

Total purge:

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

REMARKS:

PRINT NAME: Francisco Abuyan SIGNATURE: Francisco Abuyan

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

PAGE 3 OF 5 DATE: 9-16-94 CLIENT/STATION #: Arco 6013 ADDRESS: 785 E. Stanley Rd. Livi

WELL ID: MW-12 TD 32.78 DTW 21.62 X 0.17 (Gal. / Linear Ft.) X 3 (Casing Volume) = 5.69 (Calculated Purge)

DATE PURGED: 9-16-94 START (2400 HR): 830 END (2400 HR) 833
DATE SAMPLED: 9-16-94 TIME (2400 HR): 836 DTW: 21.7

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
832	1	7.48	0.50	73.5	cloudy
832	3	7.32	0.47	72.7	cloudy
833	6	7.30	0.46	72.1	clear

Total purge: 6
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP.: Bailer Disp.
REMARKS:

WELL ID: MW-6 TD 66.40 DTW 19.62 X 0.66 (Gal. / Linear Ft.) X 3 (Casing Volume) = 92.62 (Calculated Purge)

DATE PURGED: 9-16-94 START (2400 HR): 850 END (2400 HR) 935
DATE SAMPLED: 9-16-94 TIME (2400 HR): 940 DTW: 19.7

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
852	5	7.00	0.50	71.1	clear
911	40	7.12	0.48	72.0	clear
923	65	6.99	0.48	71.9	clear
935	92	6.98	0.48	71.7	clear

Total purge: 92
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP.: Bailer Disp.
REMARKS:

WELL ID: MW-7 TD 67.40 DTW 9.47 X 0.66 (Gal. / Linear Ft.) X 3 (Casing Volume) = 94.90 (Calculated Purge)

DATE PURGED: 9-16-94 START (2400 HR): 1000 END (2400 HR) 1043
DATE SAMPLED: 9-16-94 TIME (2400 HR): 1047 DTW: 21

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1002	5	7.06	0.48	70.8	clear
1019	40	7.16	0.48	70.1	clear
1030	65	7.13	0.47	69.8	clear
1043	95	7.12	0.47	69.7	clear

Total purge: 95
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP.: Bailer Disp.
REMARKS:

WELL ID: MW-9 TD 67.75 DTW 17.84 X 0.66 (Gal. / Linear Ft.) X 3 (Casing Volume) = 98.82 (Calculated Purge)

DATE PURGED: 9-16-94 START (2400 HR): 1035 END (2400 HR) 1206
DATE SAMPLED: 9-16-94 TIME (2400 HR): 1210 DTW: 19.8

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1056	5	7.06	0.45	70.2	clear
1123	45	7.05	0.46	69.9	clear
1141	70	7.04	0.46	69.4	clear
1206	99	7.03	0.46	69.3	clear

Total purge: 99
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP.: Bailer Disp.
REMARKS:

PRINT NAME: Francisco Abungan SIGNATURE: Francisco Abungan

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

PAGE 4 OF 5 DATE: 9-16-94 CLIENT/STATION #: Arco 6113 ADDRESS: 785 E. Stanley Rd. Livermore

WELL ID: MW-3 TD 38.88 - DTW 20.03 X Gal./Linear Ft. 0.17 X Casing Volume 3 = Calculated Purge 10.26

DATE PURGED: 9-16-94 START (2400 HR): 1109 END (2400 HR) 1115
DATE SAMPLED: 9-16-94 TIME (2400 HR): 1117 DTW: 21

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1111	1	6.84	0.36	65.4	clear
1113	5	6.88	0.35	65.3	clear
1114	8	6.86	0.35	65.1	clear
1115	10	6.85	0.35	65.0	clear

Total purge: 10
PURGING EQUIP.: Centrifugal Pump / Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

WELL ID: MW-10 TD 49.90 - DTW 21.25 X Gal./Linear Ft. 0.66 X Casing Volume 3 = Calculated Purge 56.72

DATE PURGED: 9-16-94 START (2400 HR): 1124 END (2400 HR) 1155
DATE SAMPLED: 9-16-94 TIME (2400 HR): 1159 DTW: 21.8

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1126	4	6.96	0.32	65.9	clear
1138	34	6.94	0.36	65.8	clear
1151	61	6.90	0.32	65.1	clear
1155	66	6.89	0.33	65.5	clear

Total purge: 66
PURGING EQUIP.: Centrifugal Pump / Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

WELL ID: MW-5 TD 62.40 - DTW 20.41 X Gal./Linear Ft. 0.66 X Casing Volume 3 = Calculated Purge 83.14

DATE PURGED: 9-16-94 START (2400 HR): 1218 END (2400 HR) 1304
DATE SAMPLED: 9-16-94 TIME (2400 HR): 1307 DTW: 26

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1221	5	6.77	0.40	66.5	clear
1236	31	6.73	0.40	66.2	clear
1248	61	7.06	0.47	66.1	clear
1304	85	7.05	0.45	66.0	clear

Total purge: 85
PURGING EQUIP.: Centrifugal Pump / Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

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

DATE PURGED: ____ START (2400 HR): ____ END (2400 HR) ____
DATE SAMPLED: ____ TIME (2400 HR): ____ DTW: ____

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

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

PRINT NAME: Vince Valdes SIGNATURE: Vince Valdes

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

PAGE 5 OF 5 DATE: 9-16-94 CLIENT/STATION #: Arco 6113 ADDRESS: 785 E. Stanley Rd. Livermore

WELL ID: MW-11 TD 44.31 DTW 20.98 x 0.17 Gal./Linear Ft. x 3 Casing Volume - 11.89 Calculated Purge

DATE PURGED: 9-16-94 START (2400 HR): 900 END (2400 HR) 909
DATE SAMPLED: 9-16-94 TIME (2400 HR): 912 DTW: 37.1

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
903	1	7.18	0.55	73.0	yellow
905	4	7.33	0.40	70.8	cloudy
907	9	7.22	0.39	67.6	cloudy
909	11	7.21	0.38	67.5	cloudy

Total purge: 11
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

WELL ID: MW-8 TD 66.50 DTW 17.02 x 0.66 Gal./Linear Ft. x 3 Casing Volume - 97.97 Calculated Purge

DATE PURGED: 9-16-94 START (2400 HR): 929 END (2400 HR) 1013
DATE SAMPLED: 9-16-94 TIME (2400 HR): 1015 DTW: 19.7

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
933	4	7.13	0.36	68.2	clear
944	32	7.13	0.36	67.7	clear
1000	63	6.98	0.37	67.6	clear
1013	95	6.97	0.35	67.3	clear

Total purge: 95
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

WELL ID: MW-1 TD 44.65 DTW 19.98 x 0.17 Gal./Linear Ft. x 3 Casing Volume - 12.58 Calculated Purge

DATE PURGED: 9-16-94 START (2400 HR): 1028 END (2400 HR) 1033
DATE SAMPLED: 9-16-94 TIME (2400 HR): 1036 DTW: 21.7

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1030	1	7.11	0.44	70.8	clear
1031	5	7.12	0.36	67.4	clear
1032	8	7.05	0.34	65.1	clear
1033	13	7.03	0.34	64.6	clear

Total purge: 13
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

WELL ID: MW-2 TD 38.50 DTW 19.64 x 0.17 Gal./Linear Ft. x 3 Casing Volume - 9.61 Calculated Purge

DATE PURGED: 9-16-94 START (2400 HR): 1051 END (2400 HR) 1058
DATE SAMPLED: 9-16-94 TIME (2400 HR): 1100 DTW: 22

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1053	1	7.09	0.39	71.0	clear
1055	5	7.15	0.37	66.0	clear
1057	8	7.08	0.36	64.8	clear
1058	12	7.07	0.36	64.4	clear

Total purge: 12
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

PRINT NAME: Vince Vallejos SIGNATURE: Vince Vallejos

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

APPENDIX B

CERTIFIED ANALYTICAL REPORT AND CHAIN-OF-CUSTODY DOCUMENTATION, THIRD QUARTER 1994

Columbia Analytical Services, Inc.

October 3, 1994 Service Request No. S941088

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

Re: **ARCO Facility No. 6113**

Dear Ms. Austin/Mr. DeLon:

Attached are the results of the water samples submitted to our lab on September 19, 1994. For your reference, these analyses have been assigned our service request number S941088.

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

Please call if you have any questions.

Respectfully submitted:

COLUMBIA ANALYTICAL SERVICES, INC.

Keoni A. Murphy
Laboratory Manager

Annelise J. Bazar
Regional QA Coordinator

KAM/ajb

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Acronyms

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

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	IWM	**Service Request:**	S941088
Project:	ARCO Facility 6113	**Date Collected:**	9/16/94
Sample Matrix:	Water	**Date Received:**	9/19/94
		Date Extracted:	9/30/94
		Date Analyzed:	10/3/94

Hydrocarbons, IR
Standard Methods 5520F
Units: mg/L (ppm)

Sample Name	Lab Code	MRL	Result
MW-1 (21.7)	S941088-002	0.5	ND
Method Blank	S940930-WB	0.5	ND

Approved By: Kevin A Murphy Date: October 3, 1994

1AMRL/060194

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	IWM	**Service Request:**	S941088
Project:	ARCO Facility 6113	**Date Collected:**	9/16/94
Sample Matrix:	Water	**Date Received:**	9/19/94
		Date Extracted:	NA
		Date Analyzed:	9/27,29/94

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

Analyte:	**TPH as Gasoline**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes, Total**
Units:	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)
Method Reporting Limit:	50	0.5	0.5	0.5	0.5
Sample Name	**Lab Code**				
MW-1 (21.7)	S941088-002	ND	ND	ND	ND	ND
MW-2 (22)	S941088-003	ND	ND	ND	ND	ND
MW-3 (21)	S941088-004	ND	ND	ND	ND	ND
MW-4 (22.9)	S941088-005	250	1.0	ND	<0.6 *	<1 *
MW-5 (26)	S941088-006	1,500	370	28	110	120
MW-6 (19.9)	S941088-007	ND	ND	ND	ND	ND
MW-7 (21)	S941088-008	ND	ND	ND	ND	ND
MW-8 (19.7)	S941088-009	ND	ND	ND	ND	ND
MW-9 (19.8)	S941088-010	ND	ND	ND	ND	ND
MW-10 (21.8)	S941088-011	ND	ND	ND	ND	ND
MW-11 (37.1)	S941088-012	ND	ND	ND	ND	ND
MW-12 (21.7)	S941088-013	ND	ND	ND	ND	ND
Method Blank	S940927-WB	ND	ND	ND	ND	ND
Method Blank	S940929-WB	ND	ND	ND	ND	ND

* Raised MRL due to matrix interference.

Approved By: _____ Date: October 3, 1994

5ABTXGAS/061694

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility 6113

Service Request: S941088
Date Analyzed: 10/3/94

Initial Calibration Verification (ICV) Summary
Hydrocarbons, IR
Standard Methods 5520F
Units: ppm

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Hydorcarbon Mixture	40	36	90	90-110

Approved By: Kevin A Murphy Date: October 3, 1994

ICV25AL/060194

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	IWM	**Service Request:**	S941088
Project:	ARCO Facility 6113	**Date Collected:**	9/16/94
Sample Matrix:	Water	**Date Received:**	9/16/94
		Date Extracted:	9/30/94
		Date Analyzed:	10/3/94

Matrix Spike/Duplicate Matrix Spike Summary
Hydrocarbons, IR
Standard Methods 5520F
Units: mg/L (ppm)

Sample Name: Batch QC
Lab Code: S941109-005

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**
Hydrocarbon Mixture	8.0	8.0	ND	7.96	7.76	100	97	57-127	2

Approved By: Kenneth Murphy Date: October 3, 1994

DMS1S/060194

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QA/QC Report

Client: IWM
Project: ARCO Facility 6113
Sample Matrix: Water

Service Request: S941088
Date Collected: 9/16/94
Date Received: 9/19/94
Date Extracted: NA
Date Analyzed: 9/27,29/94

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

Sample Name	Lab Code	Percent Recovery α,α,α-Trifluorotoluene
MW-1 (21.7)	S941088-002	78
MW-2 (22)	S941088-003	86
MW-3 (21)	S941088-004	91
MW-4 (22.9)	S941088-005	101
MW-5 (26)	S941088-006	93
MW-6 (19.9)	S941088-007	85
MW-7 (21)	S941088-008	86
MW-8 (19.7)	S941088-009	87
MW-9 (19.8)	S941088-010	91
MW-10 (21.8)	S941088-011	86
MW-11 (37.1)	S941088-012	84
MW-12 (21.7)	S941088-013	92
MW-3 (21) MS	S941088-004MS	100
MW-3 (21) DMS	S941088-004DMS	100
Method Blank	S940927-WB	92
Method Blank	S940929-WB	92

CAS Acceptance Limits: 69-116

Approved By: Robert Murphy Date: October 3, 1994

SUR1/062994

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility 6113

Service Request: S941088
Date Analyzed: 9/27/94

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

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	27.2	109	85-115
Toluene	25	26.1	104	85-115
Ethylbenzene	25	26.6	106	85-115
Xylenes, Total	75	77.2	103	85-115
Gasoline	250	240	96	90-110

Approved By: _____ Date: October 3, 1994

ICV25AL/060194

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility 6113
Sample Matrix: Water

Service Request: S941088
Date Collected: 9/16/94
Date Received: 9/19/94
Date Extracted: NA
Date Analyzed: 9/27/94

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

Sample Name: MW-3 (21)
Lab Code: S941088-004

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**
Gasoline	250	250	ND	226	215	90	86	67-121	5

Approved By: _____ Date: October 3, 1994

DMS1S/060194

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ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. IWM-94-5CC (R. DAVIS)

Chain of Custody

ARCO Facility no. A6113	City (Facility) Livermore	Project manager (Consultant) Tom DeSon / J. Young	Laboratory name Columbia
ARCO engineer M.W.	Telephone no. (ARCO) 4155712434	Telephone no. (Consultant) 408/942 8955	Fax no. (Consultant) 408/942 1499
Consultant name IWM / EMCON	Address (Consultant) 950 Ames av. Milp. - 1921 Ringwood Av.		Contract number 07077

	Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid HCl	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
	FB-1	1	2		✓		✓	✓	9-16-94	0941		✓	✓										
21.7	MW-1	2	2		✓		✓	✓		1036		✓	✓		✓								
22	MW-2	3	2		✓		✓	✓		1100		✓	✓										
21	MW-3	4	2		✓		✓	✓		1117		✓	✓										
22.9	MW-4	5	2		✓		✓	✓		1227		✓	✓										
26	MW-5	6	2		✓		✓	✓		1307		✓	✓										
19.9	MW-6	7	2		✓		✓	✓		940		✓	✓										
21	MW-7	8	2		✓		✓	✓		1047		✓	✓										
17.7	MW-8	9	2		✓		✓	✓		1015		✓	✓										
19.8	MW-9	10	2		✓		✓	✓		1210		✓	✓										
21.8	MW-10	11	2		✓		✓	✓		1159		✓	✓										
37.1	MW-11	12	2		✓		✓	✓		912		✓	✓										
21.7	MW12	13	2		✓		✓	✓		836		✓	✓										

Special detection Limit/reporting

Special QA/QC

Remarks: Hold on FB-1

Lab number: 5941088

Turnaround time

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

Method of shipment: sampler

Condition of sample: Good		Temperature received: Cool	
Relinquished by sampler: [signature]	Date 9-19-94	Time 1330	Received by [signature]
Relinquished by	Date	Time	Received by [signature] 9-19-94 13:30
Relinquished by	Date	Time	Received by laboratory / Date / Time

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