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

95 JAN -9 PM 3:46

Date December 29, 1994
Project ~~0805-123.01~~

To:

STID 3855

Mr. Barney Chan
Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

VES still shutdown ~1 yr!

We are enclosing:

Copies	Description
1	Third quarter 1994 groundwater monitoring report for ARCO service station 2035, Albany, California
	94700

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

Comments:

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

David Larsen

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 # 2035 • 1001 San Pablo Avenue • Albany, 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

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 0805-123.01

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 2035, Albany, California

Dear Mr. Whelan:

This letter presents the results of the third quarter 1994 groundwater monitoring program at ARCO Products Company (ARCO) service station 2035, 1001 San Pablo Avenue, Albany, California (Figure 1). The quarterly monitoring program complies with Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

BACKGROUND

In 1977, a 550-gallon waste oil tank was removed during conversion of the site to a mini-mart. In June 1991, soil borings were drilled by RESNA in the area of a proposed new tank pit location. In July and August 1991, four USTs were removed and replaced by WF Lewis Construction. The tank removal operation was observed by RESNA.

In October and November 1991, an initial phase of subsurface environmental investigation was conducted by RESNA which included installation of three groundwater monitoring wells, MW-1 through MW-3, and one recovery well RW-1, in October 1991, and an aquifer pump test in November 1991.

In August 1992, a second phase of investigation was conducted by RESNA which included installation of six vadose wells, VW-1 through VW-6, and soil-vapor extraction (SVE) pilot testing.

Between June and August 1993, a third phase of investigation was conducted by RESNA which included construction of three additional vadose wells, VW-7 through VW-9 and two combination air sparge/vapor extraction wells, AS-1 and AS-2, and air sparge (AS) pilot testing.

Construction of SVE, AS, and groundwater extraction systems was completed in November 1993. Initial startup of the SVE system was conducted in December 1993. The SVE system operated until February 1994.

Restartup of the SVE, AS and groundwater remediation systems is pending minor repairs and maintenance to SVE systems by the equipment manufacturer (ThermTech, Inc.). Restartup of the system is anticipated to occur by January 1995.

Groundwater monitoring and sampling at this site was initiated in October 1991. Currently, six groundwater monitoring wells, eleven vadose wells and two air sparge wells exist on site. For additional background information, please refer to "Report of Findings, Air Sparge Pilot Test at ARCO Station 2035, 1001 San Pablo Avenue, Albany, California," RESNA Report 69036.10, dated April 13, 1994.

Wells MW-1 through MW-6 and RW-1 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 July 29, 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-6 and RW-1, (2) purging and subsequently sampling groundwater monitoring wells MW-1 through MW-6 and RW-1 for laboratory analysis, and (3) directing a state-certified laboratory to analyze the groundwater samples. The results of IWM's field work were transmitted to EMCON in a report dated August 19, 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-3 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 and BTEX analyses. Table 4 summarizes additional historical laboratory data for well MW-3. Historical floating product recovery data for well RW-1 are summarized in Table 5. 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 July 29, 1994, illustrate that groundwater beneath the site flows west-southwest at an approximate hydraulic gradient of 0.016 foot per foot. Figure 2 illustrates groundwater contours and analytical data for the third quarter of 1994.

Groundwater samples collected from wells MW-2 through MW-6 did not contain detectable concentrations of TPHG or BTEX. Groundwater samples collected from well MW-1 contained 760 parts per billion (ppb) TPHG and 280 ppb benzene. Groundwater samples collected from well MW-3 contained 600 ppb TRPH. Similar analytical results were reported for these wells during previous monitoring events. Well RW-1 contained 0.02 foot of floating product and was not sampled during third quarter 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.

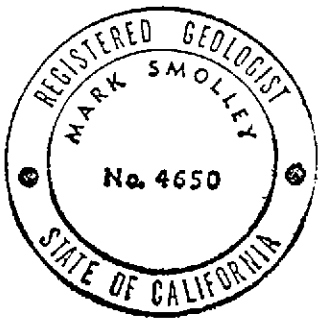
Third Quarter 1994 Activities

- 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.
- Perform startup of the soil-vapor extraction and groundwater extraction systems.

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 and BTEX)
- Table 4 - Historical Groundwater Analytical Data (Well MW-3)
- Table 5 - Approximate Cumulative Floating Product Recovered (Well RW-1)
- Figure 1 - Site Location
- Figure 2 - Groundwater Data, Third Quarter 1994
- Appendix A - Field Data Report, Integrated Wastestream Management, August 19, 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 2035
1001 San Pablo Avenue, Albany, California

Date: 12-06-94
Project Number: 0805-123.01

Well Desig-nation	Water Level Field Date	TOC Elevation	Depth to Water	Ground-Water Elevation	Floating Product Thickness	Ground-Water Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot		ppb	ppb	ppb	ppb	ppb
MW-1	07-29-94	41.41	9.87	31.54	ND	WSW	0.016	07-29-94	760	280	<2.5	7.1	<2.5
MW-2	07-29-94	40.38	10.61	29.77	ND	WSW	0.016	07-29-94	<50	<0.5	<0.5	<0.5	<0.5
MW-3	07-29-94	41.44	10.65	30.79	ND	WSW	0.016	07-29-94	<50	<0.5	<0.5	<0.5	<0.5
MW-4	07-29-94	40.33	10.02	30.31	ND	WSW	0.016	07-29-94	<50	<0.5	<0.5	<0.5	<0.5
MW-5	07-29-94	41.84	10.54	31.30	ND	WSW	0.016	07-29-94	<50	<0.5	<0.5	<0.5	<0.5
MW-6	07-29-94	40.13	12.16	27.97	ND	WSW	0.016	07-29-94	<50	<0.5	<0.5	<0.5	<0.5
RW-1	07-29-94	40.33	9.91	** 30.43	0.02	WSW	0.016	07-29-94	Not sampled: well contained floating product				

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
ppb = Parts per billion or micrograms per liter (µg/l)
ND = None detected
WSW = West-southwest
** [Corrected elevation (Z')] = Z + (h * 0.73) where: Z = measured elevation, h = floating product thickness, 0.73 = density ratio of oil to water

esj/h:\2035\2035mdb.xls\Table 1:dcl
0805-123.01

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 12-06-94
Project Number: 0805-123.01

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-1	10-29-91	41.41	11.86	29.55	ND	NR	NR
MW-1	11-07-91	41.41	10.94	30.47	ND	NR	NR
MW-1	11-14-91	41.41	10.97	30.44	ND	NR	NR
MW-1	01-19-92	41.41	10.06	31.35	ND	NR	NR
MW-1	02-19-92	41.41	8.65	32.76	ND	NR	NR
MW-1	03-19-92	41.41	8.33	33.08	ND	NR	NR
MW-1	04-21-92	41.41	9.32	32.09	ND	NR	NR
MW-1	05-12-92	41.41	9.82	31.59	ND	NR	NR
MW-1	06-12-92	41.41	10.50	30.91	ND	NR	NR
MW-1	07-15-92	41.41	10.69	30.72	ND	NR	NR
MW-1	08-07-92	41.41	10.53	30.88	ND	NR	NR
MW-1	09-08-92	41.41	11.04	30.37	ND	NR	NR
MW-1	10-26-92	41.41	11.24	30.17	ND	NR	NR
MW-1	11-23-92	41.41	10.90	30.51	ND	NR	NR
MW-1	12-16-92	41.41	9.40	32.01	ND	NR	NR
MW-1	01-13-93	41.41	7.73	33.68	ND	NR	NR
MW-1	02-22-93	41.41	7.56	33.85	ND	NR	NR
MW-1	03-25-93	41.41	8.48	32.93	ND	NR	NR
MW-1	04-13-93	41.41	8.91	32.50	ND	NR	NR
MW-1	05-22-93	41.41	9.68	31.73	ND	NR	NR
MW-1	06-17-93	41.41	9.68	31.73	ND	NR	NR
MW-1	07-27-93	41.41	10.09	31.32	ND	NR	NR
MW-1	08-24-93	41.41	10.51	30.90	ND	NR	NR
MW-1	12-08-93	41.41	10.39	31.02	ND	NR	NR
MW-1	02-01-94	41.41	9.29	32.12	ND	NR	NR
MW-1	04-26-94	41.41	9.25	32.16	ND	NR	NR
MW-1	07-29-94	41.41	9.87	31.54	ND	WSW	0.016

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 12-06-94
Project Number: 0805-123.01

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-2	10-29-91	40.38	11.10	29.28	ND	NR	NR
MW-2	11-07-91	40.38	11.20	29.18	ND	NR	NR
MW-2	11-14-91	40.38	11.21	29.17	ND	NR	NR
MW-2	01-19-92	40.38	10.44	29.94	ND	NR	NR
MW-2	02-19-92	40.38	8.70	31.68	ND	NR	NR
MW-2	03-19-92	40.38	8.84	31.54	ND	NR	NR
MW-2	04-21-92	40.38	9.80	30.58	ND	NR	NR
MW-2	05-12-92	40.38	10.29	30.09	ND	NR	NR
MW-2	06-12-92	40.38	10.95	29.43	ND	NR	NR
MW-2	07-15-92	40.38	11.15	29.23	ND	NR	NR
MW-2	08-07-92	40.38	11.01	29.37	ND	NR	NR
MW-2	09-08-92	40.38	11.41	28.97	ND	NR	NR
MW-2	10-26-92	40.38	11.60	28.78	ND	NR	NR
MW-2	11-23-92	40.38	7.31	33.07	ND	NR	NR
MW-2	12-16-92	40.38	9.82	30.56	ND	NR	NR
MW-2	01-13-93	40.38	8.25	32.13	ND	NR	NR
MW-2	02-22-93	40.38	8.25	32.13	ND	NR	NR
MW-2	03-25-93	40.38	8.82	31.56	ND	NR	NR
MW-2	04-13-93	40.38	9.30	31.08	ND	NR	NR
MW-2	05-22-93	40.38	10.57	29.81	ND	NR	NR
MW-2	06-17-93	40.38	10.25	30.13	ND	NR	NR
MW-2	07-27-93	40.38	10.48	29.90	ND	NR	NR
MW-2	08-24-93	40.38	10.82	29.56	ND	NR	NR
MW-2	12-08-93	40.38	10.68	29.70	ND	NR	NR
MW-2	02-01-94	40.38	9.66	30.72	ND	NR	NR
MW-2	04-26-94	40.38	9.60	30.78	ND	NR	NR
MW-2	07-29-94	40.38	10.61	29.77	ND	WSW	0.016

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 12-06-94
Project Number: 0805-123.01

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	10-29-91	41.44	11.62	29.82	ND	NR	NR
MW-3	11-07-91	41.44	11.52	29.92	ND	NR	NR
MW-3	11-14-91	41.44	11.50	29.94	ND	NR	NR
MW-3	01-19-92	41.44	10.56	30.88	ND	NR	NR
MW-3	02-19-92	41.44	9.52	31.92	ND	NR	NR
MW-3	03-19-92	41.44	9.01	32.43	ND	NR	NR
MW-3	04-21-92	41.44	9.70	31.74	ND	NR	NR
MW-3	05-12-92	41.44	10.29	31.15	ND	NR	NR
MW-3	06-12-92	41.44	11.26	30.18	ND	NR	NR
MW-3	07-15-92	41.44	11.28	30.16	ND	NR	NR
MW-3	08-07-92	41.44	11.15	30.29	ND	NR	NR
MW-3	09-08-92	41.44	11.70	29.74	ND	NR	NR
MW-3	10-26-92	41.44	12.15	29.29	ND	NR	NR
MW-3	11-23-92	41.44	12.55	28.89	ND	NR	NR
MW-3	12-16-92	41.44	10.15	31.29	ND	NR	NR
MW-3	01-13-93	41.44	9.12	32.32	ND	NR	NR
MW-3	02-22-93	41.44	8.18	33.26	ND	NR	NR
MW-3	03-25-93	41.44	8.57	32.87	ND	NR	NR
MW-3	04-13-93	41.44	9.55	31.89	ND	NR	NR
MW-3	05-22-93	41.44	10.56	30.88	ND	NR	NR
MW-3	06-17-93	41.44	10.41	31.03	ND	NR	NR
MW-3	07-27-93	41.44	10.53	30.91	ND	NR	NR
MW-3	08-24-93	41.44	10.86	30.58	ND	NR	NR
MW-3	12-08-93	41.44	10.91	30.53	ND	NR	NR
MW-3	02-01-94	41.44	9.71	31.73	ND	NR	NR
MW-3	04-26-94	41.44	9.56	31.88	ND	NR	NR
MW-3	07-29-94	41.44	10.65	30.79	ND	WSW	0.016

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 12-06-94
Project Number: 0805-123.01

Well Desig-nation	Water Level Field Date	TOC Elevation	Depth to Water	Ground-Water Elevation	Floating Product Thickness	Ground-Water Flow Direction	Hydraulic Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-4	01-13-93	40.33	8.05	32.28	ND	NR	NR
MW-4	02-22-93	40.33	7.58	32.75	ND	NR	NR
MW-4	03-25-93	40.33	8.27	32.06	ND	NR	NR
MW-4	04-13-93	40.33	8.54	31.79	ND	NR	NR
MW-4	05-22-93	40.33	9.52	30.81	ND	NR	NR
MW-4	06-17-93	40.33	9.53	30.80	ND	NR	NR
MW-4	07-27-93	40.33	10.14	30.19	ND	NR	NR
MW-4	08-24-93	40.33	10.42	29.91	ND	NR	NR
MW-4	12-08-93	40.33	10.31	30.02	ND	NR	NR
MW-4	02-01-94	40.33	9.10	31.23	ND	NR	NR
MW-4	04-26-94	40.33	8.94	31.39	ND	NR	NR
MW-4	07-29-94	40.33	10.02	30.31	ND	WSW	0.016
MW-5	01-13-93	41.84	8.22	33.62	ND	NR	NR
MW-5	02-22-93	41.84	7.92	33.92	ND	NR	NR
MW-5	03-25-93	41.84	8.67	33.17	ND	NR	NR
MW-5	04-13-93	41.84	9.18	32.66	ND	NR	NR
MW-5	05-22-93	41.84	10.12	31.72	ND	NR	NR
MW-5	06-17-93	41.84	10.03	31.81	ND	NR	NR
MW-5	07-27-93	41.84	10.74	31.10	ND	NR	NR
MW-5	08-24-93	41.84	11.02	30.82	ND	NR	NR
MW-5	12-08-93	41.84	10.92	30.92	ND	NR	NR
MW-5	02-01-94	41.84	9.74	32.10	ND	NR	NR
MW-5	04-26-94	41.84	9.51	32.33	ND	NR	NR
MW-5	07-29-94	41.84	10.54	31.30	ND	WSW	0.016
MW-6	01-13-93	40.13	9.84	30.29	ND	NR	NR
MW-6	02-22-93	40.13	9.94	30.19	ND	NR	NR
MW-6	03-25-93	40.13	10.68	29.45	ND	NR	NR
MW-6	04-13-93	40.13	11.12	29.01	ND	NR	NR
MW-6	05-22-93	40.13	11.74	28.39	ND	NR	NR
MW-6	06-17-93	40.13	11.75	28.38	ND	NR	NR
MW-6	07-27-93	40.13	12.20	27.93	ND	NR	NR
MW-6	08-24-93	40.13	12.41	27.72	ND	NR	NR
MW-6	12-08-93	40.13	10.11	30.02	ND	NR	NR
MW-6	02-01-94	40.13	11.80	28.33	ND	NR	NR
MW-6	04-26-94	40.13	11.33	28.80	ND	NR	NR
MW-6	07-29-94	40.13	12.16	27.97	ND	WSW	0.016

Table 2
Historical Groundwater Elevation Data
Summary Report

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 12-06-94
Project Number: 0805-123.01

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
RW-1	10-29-91	40.33	10.85	29.48	Sheen	NR	NR
RW-1	11-07-91	40.33	11.97	28.36	0.01	NR	NR
RW-1	11-14-91	40.33	11.03	29.30	0.01	NR	NR
RW-1	01-19-92	40.33	^10.22	^30.11	3.26	NR	NR
RW-1	02-19-92	40.33	^8.49	^31.84	2.14	NR	NR
RW-1	03-19-92	40.33	^8.50	^31.83	0.50	NR	NR
RW-1	04-21-92	40.33	^9.68	^30.65	0.03	NR	NR
RW-1	05-12-92	40.33	10.47	29.86	NR	NR	NR
RW-1	06-12-92	40.33	11.41	28.92	NR	NR	NR
RW-1	07-15-92	40.33	11.35	28.98	ND	NR	NR
RW-1	08-07-92	40.33	^10.80	^29.53	0.02	NR	NR
RW-1	09-08-92	40.33	^10.80	^29.53	0.62	NR	NR
RW-1	10-26-92	40.33	^11.42	^28.91	0.04	NR	NR
RW-1	11-23-92	40.33	10.94	29.39	Sheen	NR	NR
RW-1	12-16-92	40.33	^9.78	^30.55	0.51	NR	NR
RW-1	01-13-93	40.33	8.35	31.98	Skimmer	NR	NR
RW-1	02-22-93	40.33	^7.94	^32.39	0.01	NR	NR
RW-1	03-25-93	40.33	8.81	31.52	ND	NR	NR
RW-1	04-13-93	40.33	^9.67	NR	NR	NR	NR
RW-1	05-22-93	40.33	10.04	30.29	Sheen	NR	NR
RW-1	06-17-93	40.33	^10.26	^30.07	0.01	NR	NR
RW-1	07-27-93	40.33	10.58	29.75	Sheen	NR	NR
RW-1	08-24-93	40.33	^10.80	^29.53	0.05	NR	NR
RW-1	12-08-93	40.33	^10.46	^29.87	0.30	NR	NR
RW-1	02-01-94	40.33	1.00	39.33	ND	NR	NR
RW-1	04-26-94	40.33	9.30	** 31.06	0.04	NR	NR
RW-1	07-29-94	40.33	9.91	** 30.43	0.02	WSW	0.016

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
WSW = West-southwest
^ = 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)]
** [Corrected elevation (Z')] = Z + (h * 0.73) where: Z = measured elevation, h = floating product thickness, 0.73 = density ratio of oil to water

Table 3
Historical Groundwater Analytical Data
Summary Report

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 11-16-94
Project Number: 0805-123.01

Well Designation	Water Sample Field Date	TPHG ppb	Benzene ppb	Toluene ppb	Ethyl-benzene ppb	Total Xylenes ppb
MW-1	10-29-91	620	76	69	15	60
MW-1	03-19-92	6500	2600	89	42	290
MW-1	06-12-92	2900	1100	2.5	21	15
MW-1	09-08-92	820	350	<5	<5	<5
MW-1	10-26-92	190	68	<0.5	0.6	<0.5
MW-1	01-13-93	430	130	5.3	5	9
MW-1	04-13-93	5300	2100	<20	63	36
MW-1	08-24-93	630	230	<2.5	3.1	3.3
MW-1	12-08-93	81	20	<0.5	0.9	<0.5
MW-1	02-01-94	<50	13	<0.5	0.5	0.6
MW-1	04-26-94	990	290	3.5	18	14
MW-1	07-29-94	760	280	<2.5	7.1	<2.5
MW-2	10-29-91	<60	2.4	4.6	0.48	2.3
MW-2	03-19-92	<50	6.8	0.9	<0.5	1.1
MW-2	06-12-92	<50	<0.5	<0.5	<0.5	<0.5
MW-2	09-08-92	<50	<0.5	<0.5	<0.5	<0.5
MW-2	10-26-92	<50	<0.5	<0.5	<0.5	<0.5
MW-2	01-13-93	<50	<0.5	<0.5	<0.5	<0.5
MW-2	04-13-93	<50	<0.5	<0.5	<0.5	<0.5
MW-2	08-24-93	<50	<0.5	<0.5	<0.5	<0.5
MW-2	12-08-93	<50	<0.5	<0.5	<0.5	<0.5
MW-2	02-01-94	<50	<0.5	<0.5	<0.5	<0.5
MW-2	04-26-94	<50	<0.5	<0.5	<0.5	<0.5
MW-2	07-29-94	<50	<0.5	<0.5	<0.5	<0.5
MW-3	10-29-91	32	2.1	2.8	0.35	1.8
MW-3	03-19-92	2100	780	8.8	16	58
MW-3	06-12-92	720	210	<2.5	23	4
MW-3	09-08-92	<50	5.3	<0.5	<0.5	<0.5
MW-3	10-26-92	<50	0.6	<0.5	<0.5	<0.5
MW-3	01-13-93	<50	1.1	<0.5	<0.5	<0.5
MW-3	04-13-93	68	13	<0.5	1.6	1.1
MW-3	08-24-93	<50	<0.5	<0.5	<0.5	<0.5
MW-3	12-08-93	<50	<0.5	<0.5	<0.5	<0.5
MW-3	02-01-94	<50	1.9	<0.5	2.1	<0.5
MW-3	04-26-94	<50	1.1	<0.5	2.4	0.9
MW-3	07-29-94	<50	<0.5	<0.5	<0.5	<0.5

Table 3
Historical Groundwater Analytical Data
Summary Report

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 11-16-94
Project Number: 0805-123.01

Well Designation	Water Sample Field Date	TPHG ppb	Benzene ppb	Toluene ppb	Ethyl-benzene ppb	Total Xylenes ppb
MW-4	01-13-93	<50	<0.5	1.3	<0.5	1.6
MW-4	04-13-93	<50	<0.5	<0.5	<0.5	<0.5
MW-4	08-24-93	<50	<0.5	<0.5	<0.5	<0.5
MW-4	12-08-93	<50	<0.5	<0.5	<0.5	<0.5
MW-4	02-01-94	<50	<0.5	<0.5	<0.5	<0.5
MW-4	04-26-94	<50	<0.5	<0.5	<0.5	<0.5
MW-4	07-29-94	<50	<0.5	<0.5	<0.5	<0.5
MW-5	01-13-93	<50	<0.5	<0.5	<0.5	<0.5
MW-5	04-13-93	<50	<0.5	<0.5	<0.5	<0.5
MW-5	08-24-93	<50	<0.5	<0.5	<0.5	<0.5
MW-5	12-08-93	<50	<0.5	<0.5	<0.5	<0.5
MW-5	02-01-94	<50	<0.5	<0.5	<0.5	<0.5
MW-5	04-26-94	<50	<0.5	<0.5	<0.5	<0.5
MW-5	07-29-94	<50	<0.5	<0.5	<0.5	<0.5
MW-6	01-13-93	<50	<0.5	<0.5	<0.5	<0.5
MW-6	04-13-93	<50	<0.5	<0.5	<0.5	<0.5
MW-6	08-24-93	<50	<0.5	<0.5	<0.5	<0.5
MW-6	12-08-93	<50	<0.5	<0.5	<0.5	<0.5
MW-6	02-01-94	<50	<0.5	<0.5	<0.5	<0.5
MW-6	04-26-94	<50	<0.5	<0.5	<0.5	<0.5
MW-6	07-29-94	<50	<0.5	<0.5	<0.5	<0.5
RW-1	10-29-91	Not sampled: well contained floating product				
RW-1	03-19-92	Not sampled: well contained floating product				
RW-1	06-12-92	Not sampled: well contained floating product				
RW-1	09-08-92	Not sampled: well contained floating product				
RW-1	10-23-92	Not sampled: well contained floating product				
RW-1	01-13-93	Not sampled: skimmer contained floating product				
RW-1	04-13-93	Not sampled: well contained floating product				
RW-1	08-24-93	Not sampled: well contained floating product				
RW-1	12-08-93	Not sampled: well contained floating product				
RW-1	02-01-94	Not sampled: well connected to the remediation system				
RW-1	04-26-94	Not sampled: well contained floating product				
RW-1	07-29-94	Not sampled: well contained floating product				

TPHG = Total petroleum hydrocarbons as gasoline
ppb = parts per billion or micrograms per liter (µg/l)

Table 4
Historical Groundwater Analytical Data
Summary Report

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 11-16-94
Project Number: 0805-123.01

Well Designation	Water Sample Field Date	TPHD	TOG or TRPH	VOCs	BNAs	PCBs	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	ppb	ppb	ppb
MW-3	10-29-91	NA	<5000a	NDe	NA	NA	<10	<10	<5	45	<50
MW-3	03-19-92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	06-12-92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	09-08-92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	10-26-92	<50	600b, 600c	NDf	NA	NA	NA	NA	NA	NA	NA
MW-3	12-01-92	NA	NA	NA	NDg	NDh	NA	NA	NA	NA	NA
MW-3	01-13-93	NA	780b, 1100c	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	04-13-93	NA	<500b, <500c	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	08-24-93	NA	<500b, <500c	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	12-08-93	NA	900b, 500c	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	02-01-94	NA	<500b, <500c	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	04-26-94	NA	<600d	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	07-29-94	NA	600d	NA	NA	NA	NA	NA	NA	NA	NA

TPHD = Total petroleum hydrocarbons as diesel by EPA Method 3510/California DHS LUFT Method
TOG = Total oil and grease analyzed using Standard Method: a) 5520B&F or, b) 5520C and c) 5520F
TRPH = Total recoverable petroleum hydrocarbons analyzed using: d) EPA Method 418.1
VOCs = Volatile organic compounds analyzed using EPA Method 624
BNAs = Semi-volatile organic compounds analyzed using EPA Method 3510/8270
PCBs = Polychlorinated biphenyls analyzed using EPA Method 3510/8080
ppb = parts per billion or micrograms per liter (µg/l)
NA = Not analyzed
ND = Not detected (31 compounds tested for VOCs were nondetectable)
e = All 37 compounds analyzed were nondetectable except for toluene (3.0 ppb)
f = All 41 compounds analyzed were nondetectable
g = All 34 compounds analyzed were nondetectable
h = All 7 compounds analyzed were nondetectable

esj/h:\2035\2035mdb.xls\Table 4:dcl
0805-123.01

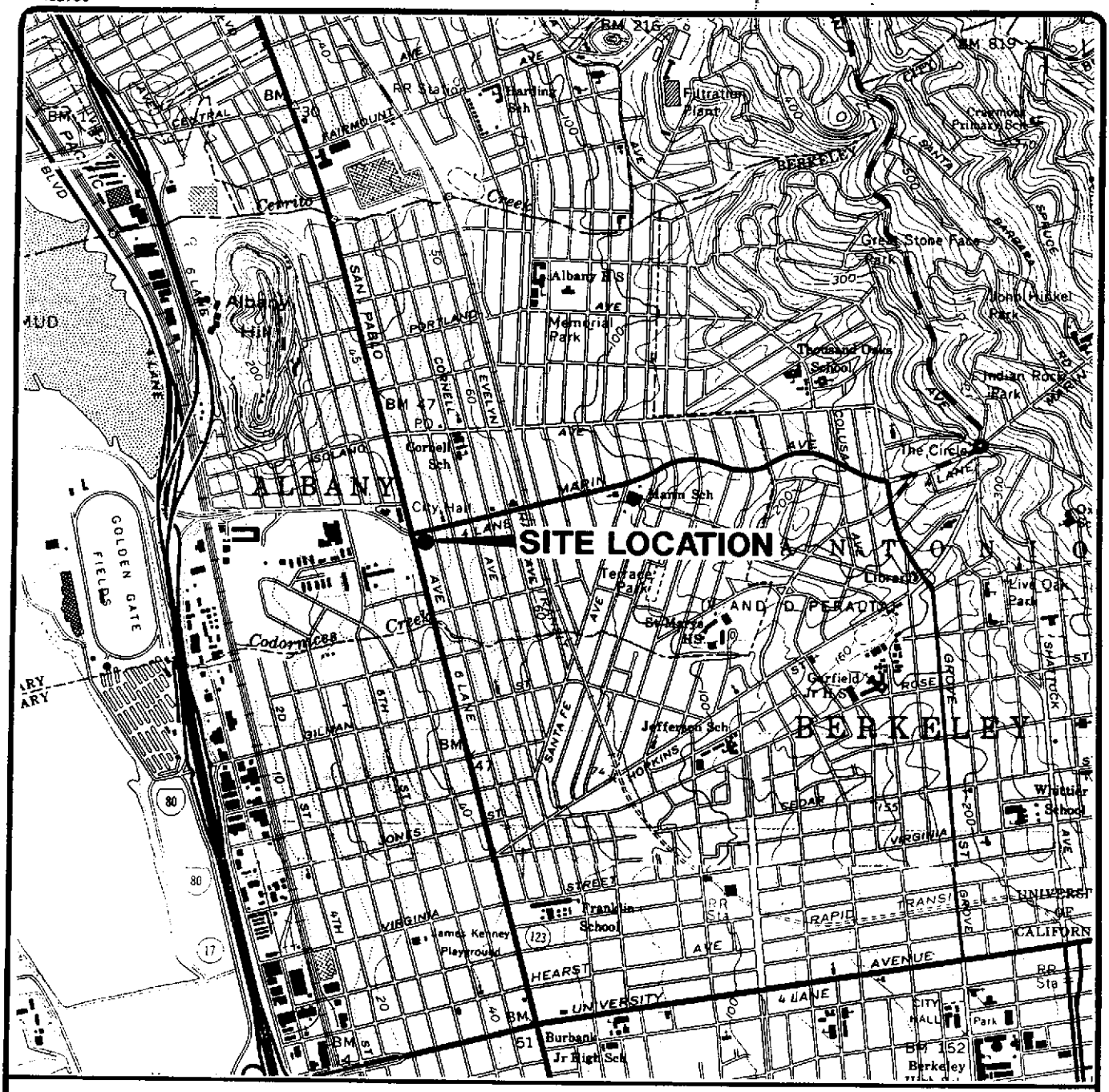
Table 5
Approximate Cumulative Floating Product Recovered
Summary Report

ARCO Service Station 2035
1001 San Pablo Avenue, Albany, California

Date: 11-16-94
Project Number: 0805-123.01

Well Designation	Date	Floating Product Recovered gallons
RW-1	1992	22.3
RW-1	1993	1.0
RW-1	1994	0.0
	1992 to 1994 Total:	23.3

152753



Base map from USGS 7.5' Quad. Maps:
Oakland West and Richmond, California.
Photorevised 1980.

N

Scale : 0 2000 4000 Feet

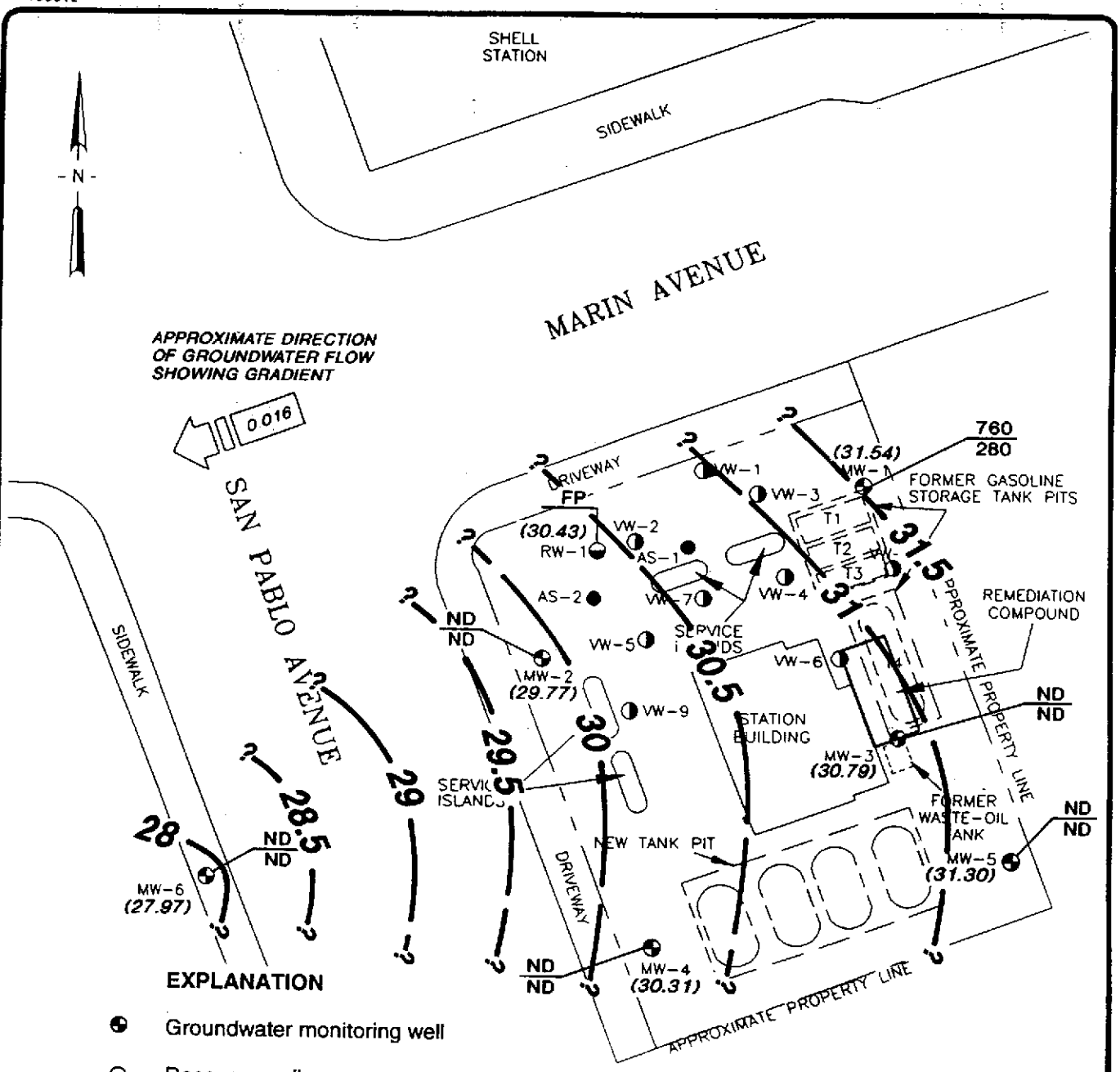
EMCON Associates

ARCO PRODUCTS COMPANY
SERVICE STATION 2035, 1001 SAN PABLO AVENUE
QUARTERLY GROUNDWATER MONITORING
ALBANY, CALIFORNIA

SITE LOCATION

FIGURE
1
PROJECT NO.
805-123.01

155812



EXPLANATION

- Groundwater monitoring well
- Recovery well
- Vapor extraction well
- Air sparge well

(31.54) Groundwater elevation (Ft.-MSL); measured 7/29/94

760 / 280 — TPHG concentration in groundwater (ppb) / Benzene concentration in groundwater (ppb)

ND = Not detected

FP Floating product

? Groundwater elevation contour (Ft. -MSL)

SCALE: 0 40 FEET (Approximate)

12/94

Base map modified from RESNA, 1994.

EMCON Associates

ARCO PRODUCTS COMPANY
SERVICE STATION 2035, 1001 SAN PABLO AVENUE
QUARTERLY GROUNDWATER MONITORING
ALBANY, CALIFORNIA

GROUNDWATER DATA
THIRD QUARTER 1994

FIGURE 2

PROJECT NO. 805-123.01

APPENDIX A

FIELD DATA REPORT, INTEGRATED WASTESTREAM MANAGEMENT, AUGUST 19, 1994

I NTEGRATED
W ASTESTREAM
M ANAGEMENT, INC.

August 19, 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. A-2035 in Albany, California. Integrated Wastestream Management measured the depth to water and collected samples from wells at this site on July 29, 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

A2035Q3.XLS

Summary of Ground Water Sample Analyses for ARCO Facility A-2035, Albany, California

WELL NUMBER	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	RW-1
DATE SAMPLED	7/29/94	7/29/94	7/29/94	7/29/94	7/29/94	7/29/94	7/29/94
DEPTH TO WATER	9.87	10.61	10.65	10.02	10.54	12.16	9.91
SHEEN	NONE	NONE	NONE	NONE	NONE	NONE	FP
PRODUCT THICKNESS	NA	NA	NA	NA	NA	NA	0.02
TPHg	760	ND	ND	ND	ND	ND	ND
BTEX							
BENZENE	280	ND	ND	ND	ND	ND	ND
TOLUENE	<2.5	ND	ND	ND	ND	ND	ND
ETHLYBENZENE	7.1	ND	ND	ND	ND	ND	ND
XYLENES	<2.5	ND	ND	ND	ND	ND	ND
EPA 418.1							
PETROLEUM HYDROCARBONS	**	**	0.6	**	**	**	**

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

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

FIELD REPORT

Depth To Water / Floating Product Survey

Site Arrival Time: 955
Site Departure Time: 1200
Weather Conditions: Sunny Clear

DTW: Well Box or Well Casing (circle one)

Project No.: _____ **Location:** 1001 San Pablo ave Albany **Date:** July 29, 1994

Client / Station#: Arco 2035 **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
	mw-1	OK	Yes	OK	OK	OK	30.10	9.87	9.87	N/A	N/A	N	4"	15/16
	mw-2	OK	Yes	OK	OK	OK	29.10	10.61	10.61	N/A	N/A	N	4"	15/16
	mw-3	OK	Yes	OK	OK	OK	33.55	10.65	10.65	N/A	N/A	N	4"	15/16
	mw-4	OK	Yes	OK	OK	OK	25.80	10.02	10.02	N/A	N/A	N	4"	15/16
	mw-5	OK	Yes	OK	OK	OK	25.10	10.54+	10.54+	N/A	N/A	N	4"	15/16
	mw-6	OK	Yes	OK	OK	OK	24.80	12.16	12.16	N/A	N/A	N	2" sidewalk	15/16
	RW-1	OK	Yes	OK	OK	OK	25.40	9.91	9.91	9.89	0.02	YES	6"	3/4

PAGE 2 OF 3 DATE: 7-29-94 CLIENT/STATION #: ARCO 2035 ADDRESS: 1001 San Pablo Ave Albany

WELL ID: MW-6 | 24.80 TD | 12.16 DTW | 0.17 Gal./Linear Ft. | 3 Casing Volume | 6.44 Calculated Purge

DATE PURGED: 7-29-94 START (2400 HR): 1100 END (2400 HR) 1102
DATE SAMPLED: 7-29-94 TIME (2400 HR): 1107 DTW: 14.1

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1101	1	6.79	0.76	71.7	CLEAR
1101	3	6.84	0.37	70.8	CLEAR
1102	6	6.85	0.36	70.7	CLEAR

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

WELL ID: MW-2 | TD 29.10 | 10.61 DTW | 0.66 Gal./Linear Ft. | 3 Casing Volume | 36.61 Calculated Purge

DATE PURGED: 7-29-94 START (2400 HR): 1116 END (2400 HR) 1122
DATE SAMPLED: 7-29-94 TIME (2400 HR): 1125 DTW: 12.9

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1117	5	6.82	0.35	71.5	CLEAR
1118	10	6.83	0.34	70.9	CLEAR
1120	20	6.85	0.34	70.6	CLEAR
1122	31	6.86	0.35	70.7	CLEAR

Total purge: 31
PURGING EQUIP.: Centrifugal Pump Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS:

WELL ID: MW-4 | 25.80 TD | 10.02 DTW | 0.66 Gal./Linear Ft. | 3 Casing Volume | 31.24 Calculated Purge

DATE PURGED: 7-29-94 START (2400 HR): 1145 END (2400 HR) 1152
DATE SAMPLED: 7-29-94 TIME (2400 HR): 1200 DTW: 23.3

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1146	5	6.60	0.24	72.1	CLEAR
1147	13	6.64	0.25	71.7	CLEAR
1150	22	6.66	0.25	71.1	CLEAR
1152	31	6.67	0.27	70.8	CLOUDY

Total purge: 31
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 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 3 OF 3 DATE: 7-29-94 CLIENT/STATION #: Arco 2035 ADDRESS: 1001 San Pablo Ave. Albany

WELL ID: MW-5 TD 25.10 DTW 10.54 x 0.66 (Gal./Linear Ft.) x 3 (Casing/Volume) = 23.82 (Calculated/Purge)

DATE PURGED: 7-29-94 START (2400 HR): 1030 END (2400 HR) 1139
DATE SAMPLED: 7-29-94 TIME (2400 HR): 1144 DTW: 22.8

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1133	2	7.37	0.43	69.4	clear
1134	12	7.33	0.31	67.9	clear
1136	21	7.08	0.32	66.8	clear
1139	23	7.07	0.31	66.7	clear

Total purge: 23
PURGING EQUIP.: Centrifugal Pump / Bailer Disp. SAMPLING EQUIP: Bailer Disp.
REMARKS: well pumped dry at 22 and again at 23 gallons

WELL ID: MW-3 TD 33.55 DTW 10.65 x 0.66 (Gal./Linear Ft.) x 3 (Casing/Volume) = 45.54 (Calculated/Purge)

DATE PURGED: 7-29-94 START (2400 HR): 1150 END (2400 HR) 1204
DATE SAMPLED: 7-29-94 TIME (2400 HR): 1209 DTW: 15

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1152	3	6.82	0.37	67.8	clear
1154	16	6.78	0.37	67.5	clear
1159	35	6.77	0.48	67.3	cloudy
1204	45	6.77	0.37	67.0	cloudy

Total purge: 45
PURGING EQUIP.: Centrifugal Pump / Bailer Disp. SAMPLING EQUIP: Bailer Disp
REMARKS:

WELL ID: MW-1 TD 30.10 DTW 9.87 x 0.66 (Gal./Linear Ft.) x 3 (Casing/Volume) = 40.05 (Calculated/Purge)

DATE PURGED: 7-29-94 START (2400 HR): 1222 END (2400 HR) 1237
DATE SAMPLED: 7-29-94 TIME (2400 HR): 1240 DTW: 26

TIME (2400 HR)	VOLUME (GAL)	pH (UNITS)	(E.C. X 1,000) (UMHOS/CM@25 C)	TEMP. (F)	COLOR (VISUAL)
1225	5	6.91	0.36	69.3	clear
1227	18	6.88	0.35	69.1	clear
1232	31	6.83	0.36	69.0	clear
1237	40	6.82	0.37	68.9	clear

Total purge: 40
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: ____

APPENDIX B

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

Columbia Analytical Services, Inc.

August 15, 1994

Service Request No. S940849

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

Re: **ARCO Facility No. 2035**

Dear Ms. Austin/Mr. DeLon:

Attached are the results of the water samples submitted to our lab on August 2, 1994. For your reference, these analyses have been assigned our service request number S940849.

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

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

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

ASTM	American Society for Testing and Materials
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
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:**	S940849
Project:	ARCO Facility No 2035	**Date Collected:**	7/29/94
Sample Matrix:	Water	**Date Received:**	8/2/94
		Date Extracted:	8/11/94
		Date Analyzed:	8/12/94

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

Sample Name	Lab Code	MRL	Result
MW-3 (15)	S940849-004	0.5	0.6
Method Blank	S940811-WB	0.5	ND

Approved By: _____ Date: August 15, 1994

1AMRL/060194

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: IWM
Project: ARCO Facility No 2035
Sample Matrix: Water

Service Request: S940849
Date Collected: 7/29/94
Date Received: 8/2/94
Date Extracted: NA
Date Analyzed: 8/3/94

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 (26)	S940849-002	760	280	<2.5 *	7.1	<2.5 *
MW-2 (12.9)	S940849-003	ND	ND	ND	ND	ND
MW-3 (15)	S940849-004	ND	ND	ND	ND	ND
MW-4 (23.3)	S940849-005	ND	ND	ND	ND	ND
MW-5 (22.8)	S940849-006	ND	ND	ND	ND	ND
MW-6 (14.1)	S940849-007	ND	ND	ND	ND	ND
Method Blank	S940803-WB	ND	ND	ND	ND	ND

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

Approved By: _____ Date: August 15, 1994

5ABTXGAS/061694

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APPENDIX A

LABORATORY QC RESULTS

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No 2035

Service Request: S940849
Date Analyzed: 8/12/94

Initial Calibration Verification (ICV) Summary
Total Recoverable Petroleum Hydrocarbons
EPA Method 418.1
Units: ppm

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Hydorcarbon Mixture	40	43.1	108	90-110

Approved By: Terri A Murphy Date: August 15, 1994

ICV25AL/060194

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No 2035
Sample Matrix: Water

Service Request: S940849
Date Collected: 7/29/94
Date Received: 8/2/94
Date Extracted: 8/11/94
Date Analyzed: 8/12/94

Matrix Spike/Duplicate Matrix Spike Summary
Total Recoverable Petroleum Hydrocarbons
EPA Method 418.1
Units: mg/L (ppm)

Sample Name: Batch QC
Lab Code: S940871-006

Analyte	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference
Hydrocarbon Mixture	8.0	8.0	0.7	6.69	7.28	75	82	57-127	8

Approved By: _____ Date: August 15, 1994

DMS1S/060194

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	IWM	**Service Request:**	S940849
Project:	ARCO Facility No 2035	**Date Collected:**	7/29/94
Sample Matrix:	Water	**Date Received:**	8/2/94
		Date Extracted:	NA
		Date Analyzed:	8/3/94

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 (26)	S940849-002	99
MW-2 (12.9)	S940849-003	97
MW-3 (15)	S940849-004	96
MW-4 (23.3)	S940849-005	94
MW-5 (22.8)	S940849-006	96
MW-6 (14.1)	S940849-007	98
MS	S940848-003MS	95
DMS	S940848-003DMS	96
Method Blank	S940803-WB	99

CAS Acceptance Limits: 69-116

Approved By: _____ Date: August 15, 1994

SUR1/062994

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No 2035

Service Request: S940849
Date Analyzed: 8/3/94

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	27.7	111	85-115
Toluene	25	26.5	106	85-115
Ethylbenzene	25	26.5	106	85-115
Xylenes, Total	75	76.6	102	85-115
Gasoline	250	237	95	90-110

Approved By: _____ Date: August 15, 1994

ICV25AL/060194

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: IWM
Project: ARCO Facility No 2035
Sample Matrix: Water

Service Request: S940849
Date Collected: 7/29/94
Date Received: 8/2/94
Date Extracted: NA
Date Analyzed: 8/3/94

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

Sample Name: Batch QC
Lab Code: S940848-003

Analyte	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference
Benzene	25	25	ND	28.1	27.7	112	111	75-135	1
Toluene	25	25	ND	26.5	26.0	106	104	73-136	2
Ethylbenzene	25	25	ND	26.6	26.2	106	105	69-142	2

Approved By: _____ Date: August 15 1994

DMS1S/060194

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APPENDIX B

CHAIN OF CUSTODY

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

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. IWM-94-SCC

Chain of Custody

ARCO Facility no. A2035 | City (Facility) Albany | Project manager (Consultant) TOM De Fon
ARCO engineer M.W. | Telephone no. (ARCO) 4155712434 | Telephone no. (Consultant) 4155712434 | Fax no. (Consultant) 408/4421499
Consultant name IWM / Rosna | Address (Consultant) 950 Ames av Milp CA 95035

Laboratory name: Columbia
Contract number: 07077
Method of shipment: CAS COURIER

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 ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
FB1	1	2		✓		✓	✓	7.29.94	1000		✓	✓										
MW-1	2	2		✓		✓	✓	〃	1240		✓	✓										
MW-2	3	2		✓		✓	✓	〃	1125		✓	✓										
MW-3	4	2+2		✓		✓	✓	〃	1209		✓	✓	✓									
MW 4	5	2		✓		✓	✓	〃	1200		✓	✓										
MW-5	6	2		✓		✓	✓	〃	1144		✓	✓										
MW-6	7	2		✓		✓	✓	〃	1107		✓	✓										

Special detection Limit/reporting

Special QA/QC

Remarks: Hold on FB 1
418.1 instead of 413.1 per S Austin 8/3/94

Lab number: 5940849

Turnaround time
Priority Rush 1 Business Day ☐
Rush 2 Business Days ☐
Expedited 5 Business Days ☐
Standard 10 Business Days ☑

Condition of sample: Good | Temperature received: Cool
Relinquished by sampler: [signature] Date 8-2-94 Time 13:00 | Received by: [signature] 8-2-94 13:00
Relinquished by | Date | Time | Received by
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)