



EMCON

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

Date March 31, 1996
Project 20805-130.003

To:

3876

Mr. Barney Chan
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harborbay Parkway, Suite 250
Alameda, California 94502-6577

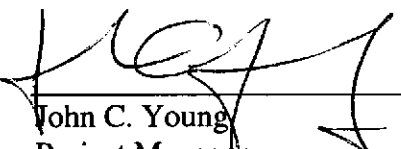
We are enclosing:

Copies	Description
<u>1</u>	<u>Fourth quarter 1995 groundwater monitoring results</u> <u>for ARCO service station 2185, Oakland, California</u>

For your:	<u> X </u>	Use	Sent by:	<u> </u>	Regular Mail
	<u> </u>	Approval		<u> </u>	Standard Air
	<u> </u>	Review		<u> </u>	Courier
	<u> </u>	Information		<u> X </u>	Other <u>Cert. Mail</u>

Comments:

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


John C. Young
Project Manager

cc: Kevin Graves, RWQCB - SFBR
Michael Whelan, ARCO Products Company
Ivy Inouye, EMCON
File

ENVIRONMENTAL
PROTECTION
96 MAR 20 PM 1:44





Date:

March 31, 1996

Re: ARCO Station #

2185 • 9800 East 14th Street • Oakland, CA
Fourth Quarter 1995 Groundwater Monitoring Results

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

Submitted by:

A handwritten signature in cursive script that reads "Michael R. Whelan". The signature is written in black ink and is positioned above the printed name.

Michael R. Whelan
Environmental Engineer



February 27, 1996
Project 20805-130.003

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

Re: Fourth quarter 1995 groundwater monitoring program results, ARCO service station 2185, Oakland, California

Dear Mr. Whelan:

This letter presents the results of the fourth quarter 1995 groundwater monitoring program at ARCO Products Company (ARCO) service station 2185, 9800 East 14th Street, Oakland, California (Figure 1). The quarterly monitoring program complies with Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

MONITORING PROGRAM FIELD PROCEDURES

A program of quarterly groundwater monitoring was initiated during the third quarter of 1992 to provide information concerning water quality, flow direction, and gradient consistent with ACHCSA and Regional Water Quality Control Board (RWQCB) requirements for underground fuel tank investigations. Water levels are measured quarterly in wells MW-1 through MW-10. Wells MW-1 and MW-4 are sampled annually, during the first quarter of the year. Wells MW-2, MW-3, and MW-5 through MW-10 are sampled quarterly.

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

EMCON performed the fourth quarter 1995 groundwater monitoring event on November 7, 1995. Field work this quarter included (1) measuring depths to groundwater and subjectively analyzing groundwater for the presence of floating product in wells MW-1 through MW-10, (2) purging and subsequently sampling groundwater monitoring wells MW-2, MW-3, and MW-5 through MW-10 for laboratory analysis, and (3) directing a state-certified laboratory to analyze the groundwater samples. Copies of all



field data sheets from the fourth quarter 1995 groundwater monitoring event are included in Appendix A.

MONITORING PROGRAM RESULTS

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

Groundwater elevation data collected on November 20, 1995, indicate that groundwater beneath the site flows west-southwest with an approximate hydraulic gradient of 0.004 foot per foot. Figure 2 illustrates groundwater contours and analytical data for the fourth quarter of 1995.

LIMITATIONS

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

SITE STATUS UPDATE

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

Fourth Quarter 1995 Activities

- Prepared and submitted *Third Quarter 1995 Groundwater Monitoring Program Results and Intrinsic Bioremediation Study, ARCO Service Station 2185, Oakland, California* (EMCON, December 14, 1995).
- Performed quarterly groundwater monitoring for fourth quarter 1995.
- Prepared and submitted *Off-site Well Installation Report, ARCO Service Station 2185, Oakland, California* (EMCON, January 8, 1996).


Work Anticipated for First Quarter 1996

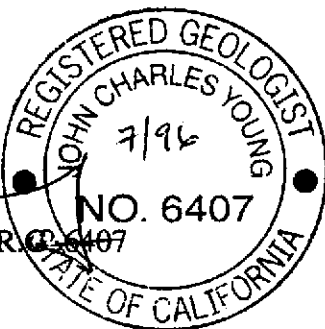
- Prepare and submit quarterly groundwater monitoring report for fourth quarter 1995.
- Perform quarterly groundwater monitoring for first quarter 1996.

Please call if you have questions.

Sincerely,

EMCON


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



Attachments: Table 1 - Groundwater Monitoring Data, Fourth Quarter 1995
Table 2 - Historical Groundwater Elevation Data
Table 3 - Historical Groundwater Analytical Data, Petroleum Hydrocarbons and Their Constituents
Figure 1 - Site Location
Figure 2 - Groundwater Data, Fourth Quarter 1995
Appendix A - Field Data Sheets, Fourth Quarter 1995 Groundwater Monitoring Event
Appendix B - Analytical Results and Chain-of-Custody Documentation, Fourth Quarter 1995

cc: Barney Chan, ACHCSA
Kevin Graves, RWQCB-SFBR

Table 1
Groundwater Monitoring Data
Fourth Quarter 1995

ARCO Service Station 2185
9800 East 14th Street, Oakland, California

Date: 02-12-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient ft/ft	Water Sample Field Date	TPHG LUFT Method µg/L	Benzene EPA 8020 µg/L	Toluene EPA 8020 µg/L	Ethylbenzene EPA 8020 µg/L	Total Xylenes EPA 8020 µg/L	MTBE EPA 8020 µg/L	MTBE EPA 8240 µg/L
MW-1	11-07-95	29.15	12.12	17.03	ND	WSW	0.004	11-07-95	Not sampled: not scheduled for chemical analysis						
MW-2	11-07-95	28.47	11.73	16.74	ND	WSW	0.004	11-07-95	1100	<3	<3	74	14	<20	--
MW-3	11-07-95	28.57	11.65	16.92	ND	WSW	0.004	11-07-95	3000	18	<3	120	62	--	430
MW-4	11-07-95	29.21	12.42	16.79	ND	WSW	0.004	11-07-95	Not sampled: not scheduled for chemical analysis						
MW-5	11-07-95	28.12	11.20	16.92	ND	WSW	0.004	11-07-95	140	4.5	<0.5	8.3	16	10	--
MW-6	11-07-95	27.79	11.06	16.73	ND	WSW	0.004	11-07-95	3500	33	<5	410	110	<30	--
MW-7	11-07-95	27.88	11.70	16.18	ND	WSW	0.004	11-07-95	<500	2	<1	<1	<1	<20	--
MW-8	11-07-95	28.08	11.40	16.68	ND	WSW	0.004	11-07-95	280	<0.5	<0.5	0.6	<0.5	94	--
MW-9	11-07-95	27.73	11.70	16.03	ND	WSW	0.004	11-07-95	<50	<0.5	<0.5	<0.5	<0.5	<4	--
MW-10	11-07-95	27.55	10.85	16.70	ND	WSW	0.004	11-07-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--

ft-MSL: elevation in feet, relative to mean sea level

MWN: ground-water flow direction and gradient apply to the entire monitoring well network

ft/ft: foot per foot

TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method

µg/L: micrograms per liter

EPA: United States Environmental Protection Agency

MTBE: methyl-tert-butyl ether

ND: none detected

WSW: west-southwest

--: not analyzed

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 2185
9800 East 14th Street, Oakland, California

Date: 02-12-96

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-1	07-24-92	29.15	13.38	15.77	ND	NR	NR
MW-1	08-26-92	29.15	13.92	15.23	ND	NR	NR
MW-1	09-22-92	29.15	14.18	14.97	ND	NR	NR
MW-1	10-19-92	29.15	14.52	14.63	ND	NR	NR
MW-1	11-23-92	29.15	14.54	14.61	ND	NR	NR
MW-1	12-16-92	29.15	12.20	16.95	ND	NR	NR
MW-1	01-14-93	29.15	9.32	19.83	ND	NR	NR
MW-1	02-26-93	29.15	9.38	19.77	ND	NR	NR
MW-1	03-26-93	29.15	10.04	19.11	ND	NR	NR
MW-1	04-09-93	29.15	10.50	18.65	ND	NR	NR
MW-1	05-19-93	29.15	11.26	17.89	ND	NR	NR
MW-1	06-17-93	29.15	11.53	17.62	ND	NR	NR
MW-1	07-28-93	29.15	12.00	17.15	ND	NR	NR
MW-1	08-23-93	29.15	12.31	16.84	ND	NR	NR
MW-1	09-28-93	29.15	12.60	16.55	ND	NR	NR
MW-1	10-11-93	29.15	12.74	16.41	ND	NR	NR
MW-1	11-16-93	29.15	12.96	16.19	ND	NR	NR
MW-1	12-16-93	29.15	11.68	17.47	ND	NR	NR
MW-1	02-08-94	29.15	11.29	17.86	ND	NR	NR
MW-1	03-04-94	29.15	10.61	18.54	ND	NR	NR
MW-1	05-10-94	29.15	11.12	18.03	ND	NR	NR
MW-1	08-12-94	29.15	12.55	16.60	ND	SW	0.004
MW-1	09-23-94	29.15	11.27	17.88	ND	NR	NR
MW-1	11-22-94	29.15	11.12	18.03	ND	SW	0.003
MW-1	03-15-95	29.15	8.50	20.65	ND	NW	0.01
MW-1	05-30-95	29.15	10.28	18.87	ND	SW	0.005
MW-1	09-20-95	29.15	11.70	17.45	ND	WSW	0.005
MW-1	11-07-95	29.15	12.12	17.03	ND	WSW	0.004

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 2185
9800 East 14th Street, Oakland, California

Date: 02-12-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient foot/foot
MW-2	07-24-92	28.47	12.95	15.52	ND	NR	NR
MW-2	08-26-92	28.47	13.55	14.92	ND	NR	NR
MW-2	09-22-92	28.47	13.78	14.69	ND	NR	NR
MW-2	10-19-92	28.47	14.09	14.38	ND	NR	NR
MW-2	11-23-92	28.47	14.06	14.41	ND	NR	NR
MW-2	12-16-92	28.47	11.70	16.77	ND	NR	NR
MW-2	01-14-93	28.47	8.87	19.60	ND	NR	NR
MW-2	02-26-93	28.47	8.98	19.49	ND	NR	NR
MW-2	03-26-93	28.47	9.57	18.90	ND	NR	NR
MW-2	04-09-93	28.47	10.02	18.45	ND	NR	NR
MW-2	05-19-93	28.47	10.81	17.66	ND	NR	NR
MW-2	06-17-93	28.47	11.08	17.39	ND	NR	NR
MW-2	07-28-93	28.47	11.60	16.87	ND	NR	NR
MW-2	08-23-93	28.47	11.90	16.57	ND	NR	NR
MW-2	09-28-93	28.47	12.17	16.30	ND	NR	NR
MW-2	10-11-93	28.47	12.31	16.16	ND	NR	NR
MW-2	11-16-93	28.47	12.54	15.93	Sheen	NR	NR
MW-2	12-16-93	28.47	11.29	17.18	ND	NR	NR
MW-2	02-08-94	28.47	10.85	17.62	ND	NR	NR
MW-2	03-04-94	28.47	10.16	18.31	ND	NR	NR
MW-2	05-10-94	28.47	10.70	17.77	ND	NR	NR
MW-2	08-12-94	28.47	12.12	16.35	ND	SW	0.004
MW-2	09-23-94	28.47	10.87	17.60	ND	NR	NR
MW-2	11-22-94	28.47	10.65	17.82	ND	SW	0.003
MW-2	03-15-95	28.47	8.37	20.10	ND	NW	0.01
MW-2	05-30-95	28.47	9.95	18.52	ND	SW	0.005
MW-2	09-20-95	28.47	11.37	17.10	ND	WSW	0.005
MW-2	11-07-95	28.47	11.73	16.74	ND	WSW	0.004

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 2185
9800 East 14th Street, Oakland, California

Date: 02-12-96

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	
MW-3	07-24-92	28.57	12.90	15.67	Sheen	NR	NR
MW-3	08-26-92	28.57	13.51	15.06	ND	NR	NR
MW-3	09-22-92	28.57	13.73	14.84	ND	NR	NR
MW-3	10-19-92	28.57	14.04	14.53	ND	NR	NR
MW-3	11-23-92	28.57	14.02	14.55	ND	NR	NR
MW-3	12-16-92	28.57	11.73	16.84	ND	NR	NR
MW-3	01-14-93	28.57	9.17	19.40	ND	NR	NR
MW-3	02-26-93	28.57	9.30	19.27	ND	NR	NR
MW-3	03-26-93	28.57	9.83	18.74	ND	NR	NR
MW-3	04-09-93	28.57	10.22	18.35	ND	NR	NR
MW-3	05-19-93	28.57	10.91	17.66	ND	NR	NR
MW-3	06-17-93	28.57	10.74	17.83	ND	NR	NR
MW-3	07-28-93	28.57	11.60	16.97	ND	NR	NR
MW-3	08-23-93	28.57	11.93	16.64	ND	NR	NR
MW-3	09-28-93	28.57	12.13	16.44	ND	NR	NR
MW-3	10-11-93	28.57	12.26	16.31	ND	NR	NR
MW-3	11-16-93	28.57	12.48	16.09	ND	NR	NR
MW-3	12-16-93	28.57	11.26	17.31	ND	NR	NR
MW-3	02-08-94	28.57	10.93	17.64	ND	NR	NR
MW-3	03-04-94	28.57	10.33	18.24	ND	NR	NR
MW-3	05-10-94	28.57	10.77	17.80	ND	NR	NR
MW-3	08-12-94	28.57	12.07	16.50	ND	SW	0.004
MW-3	09-23-94	28.57	10.94	17.63	ND	NR	NR
MW-3	11-22-94	28.57	10.76	17.81	ND	SW	0.003
MW-3	03-15-95	28.57	8.47	20.10	ND	NW	0.01
MW-3	05-30-95	28.57	10.03	18.54	ND	SW	0.005
MW-3	09-20-95	28.57	11.30	17.27	ND	WSW	0.005
MW-3	11-07-95	28.57	11.65	16.92	ND	WSW	0.004

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 2185
9800 East 14th Street, Oakland, California

Date: 02-12-96

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-4	07-24-92	29.21	13.68	15.53	ND	NR	NR
MW-4	08-26-92	29.21	14.12	15.09	ND	NR	NR
MW-4	09-22-92	29.21	14.46	14.75	ND	NR	NR
MW-4	10-19-92	29.21	14.74	14.47	ND	NR	NR
MW-4	11-23-92	29.21	14.75	14.46	ND	NR	NR
MW-4	12-16-92	29.21	12.45	16.76	ND	NR	NR
MW-4	01-14-93	29.21	9.46	19.75	ND	NR	NR
MW-4	02-26-93	29.21	9.54	19.67	ND	NR	NR
MW-4	03-26-93	29.21	10.19	19.02	ND	NR	NR
MW-4	04-09-93	29.21	10.67	18.54	ND	NR	NR
MW-4	05-19-93	29.21	11.52	17.69	ND	NR	NR
MW-4	06-17-93	29.21	11.79	17.42	ND	NR	NR
MW-4	07-28-93	29.21	12.30	16.91	ND	NR	NR
MW-4	08-23-93	29.21	12.60	16.61	ND	NR	NR
MW-4	09-28-93	29.21	12.88	16.33	ND	NR	NR
MW-4	10-11-93	29.21	13.03	16.18	ND	NR	NR
MW-4	11-16-93	29.21	13.24	15.97	ND	NR	NR
MW-4	12-16-93	29.21	11.96	17.25	ND	NR	NR
MW-4	02-08-94	29.21	11.54	17.67	ND	NR	NR
MW-4	03-04-94	29.21	10.84	18.37	ND	NR	NR
MW-4	05-10-94	29.21	11.38	17.83	ND	NR	NR
MW-4	08-12-94	29.21	12.82	16.39	ND	SW	0.004
MW-4	09-23-94	29.21	11.54	17.67	ND	NR	NR
MW-4	11-22-94	29.21	11.35	17.86	ND	SW	0.003
MW-4	03-15-95	29.21	8.69	20.52	ND	NW	0.01
MW-4	05-30-95	29.21	10.57	18.64	ND	SW	0.005
MW-4	09-20-95	29.21	12.02	17.19	ND	WSW	0.005
MW-4	11-07-95	29.21	12.42	16.79	ND	WSW	0.004

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 2185
9800 East 14th Street, Oakland, California

Date: 02-12-96

Well Designation	Water Level Field Date	Top of Casing	Depth	Groundwater	Floating Product	Groundwater	Hydraulic Gradient
		Elevation	to Water	Elevation	Thickness	Flow Direction	
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-5	02-26-93	28.12	9.00	19.12	ND	NR	NR
MW-5	03-26-93	28.12	9.41	18.71	ND	NR	NR
MW-5	04-09-93	28.12	9.80	18.32	ND	NR	NR
MW-5	05-19-93	28.12	10.50	17.62	ND	NR	NR
MW-5	06-17-93	28.12	10.73	17.39	ND	NR	NR
MW-5	07-28-93	28.12	11.15	16.97	ND	NR	NR
MW-5	08-23-93	28.12	11.43	16.69	ND	NR	NR
MW-5	09-28-93	28.12	11.66	16.46	ND	NR	NR
MW-5	10-11-93	28.12	11.80	16.32	ND	NR	NR
MW-5	11-16-93	28.12	12.00	16.12	ND	NR	NR
MW-5	12-16-93	28.12	10.81	17.31	ND	NR	NR
MW-5	02-08-94	28.12	10.53	17.59	ND	NR	NR
MW-5	03-04-94	28.12	9.89	18.23	ND	NR	NR
MW-5	05-10-94	28.12	10.37	17.75	ND	NR	NR
MW-5	08-12-94	28.12	11.60	16.52	ND	SW	0.004
MW-5	09-23-94	28.12	10.52	17.60	ND	NR	NR
MW-5	11-22-94	28.12	10.29	17.83	ND	SW	0.003
MW-5	03-15-95	28.12	8.47	19.65	ND	NW	0.01
MW-5	05-30-95	28.12	9.69	18.43	ND	SW	0.005
MW-5	09-20-95	28.12	10.90	17.22	ND	WSW	0.005
MW-5	11-07-95	28.12	11.20	16.92	ND	WSW	0.004
MW-6	02-26-93	27.79	8.47	19.32	ND	NR	NR
MW-6	03-26-93	27.79	9.07	18.72	ND	NR	NR
MW-6	04-09-93	27.79	9.53	18.26	ND	NR	NR
MW-6	05-19-93	27.79	10.23	17.56	ND	NR	NR
MW-6	06-17-93	27.79	10.51	17.28	ND	NR	NR
MW-6	07-28-93	27.79	10.98	16.81	ND	NR	NR
MW-6	08-23-93	27.79	11.28	16.51	ND	NR	NR
MW-6	09-28-93	27.79	11.50	16.29	ND	NR	NR
MW-6	10-11-93	27.79	11.65	16.14	ND	NR	NR
MW-6	11-16-93	27.79	11.87	15.92	ND	NR	NR
MW-6	12-16-93	27.79	10.63	17.16	ND	NR	NR
MW-6	02-08-94	27.79	10.28	17.51	ND	NR	NR
MW-6	03-04-94	27.79	9.67	18.12	ND	NR	NR
MW-6	05-10-94	27.79	10.13	17.66	ND	NR	NR
MW-6	08-12-94	27.79	11.44	16.35	ND	SW	0.004
MW-6	09-23-94	27.79	10.27	17.52	ND	NR	NR
MW-6	11-22-94	27.79	10.10	17.69	ND	SW	0.003
MW-6	03-15-95	27.79	7.75	20.04	ND	NW	0.01
MW-6	05-30-95	27.79	9.48	18.31	ND	SW	0.005
MW-6	09-20-95	27.79	10.75	17.04	ND	WSW	0.005
MW-6	11-07-95	27.79	11.06	16.73	ND	WSW	0.004

Table 2
Historical Groundwater Elevation Data

ARCO Service Station 2185
9800 East 14th Street, Oakland, California

Date: 02-12-96

Well Designation	Water Level Field Date	Top of Casing	Depth	Groundwater	Floating Product	Groundwater	Hydraulic Gradient
		Elevation	to Water	Elevation	Thickness	Flow Direction	
		ft-MSL	feet	ft-MSL	feet	MWN	foot/foot
MW-7	07-28-93	27.88	11.67	16.21	ND	NR	NR
MW-7	08-23-93	27.88	12.00	15.88	ND	NR	NR
MW-7	09-28-93	27.88	12.17	15.71	ND	NR	NR
MW-7	10-11-93	27.88	12.33	15.55	ND	NR	NR
MW-7	11-16-93	27.88	12.46	15.42	ND	NR	NR
MW-7	12-16-93	27.88	11.23	16.65	ND	NR	NR
MW-7	02-08-94	27.88	10.83	17.05	ND	NR	NR
MW-7	03-04-94	27.88	10.13	17.75	ND	NR	NR
MW-7	05-10-94	27.88	10.68	17.20	ND	NR	NR
MW-7	08-12-94	27.88	12.05	15.83	ND	SW	0.004
MW-7	09-23-94	27.88	10.85	17.03	ND	NR	NR
MW-7	11-22-94	27.88	10.60	17.28	ND	SW	0.003
MW-7	03-15-95	27.88	8.13	19.75	ND	NW	0.01
MW-7	05-30-95	27.88	10.14	17.74	ND	SW	0.005
MW-7	09-20-95	27.88	11.52	16.36	ND	WSW	0.005
MW-7	11-07-95	27.88	11.70	16.18	ND	WSW	0.004
MW-8	08-12-94	NR	11.43	NR	ND	NR	NR
MW-8	09-23-94	NR	10.99	NR	ND	NR	NR
MW-8	11-22-94	NR	10.42	NR	ND	NR	NR
MW-8	03-15-95	NR	8.43	NR	ND	NR	NR
MW-8	05-30-95	NR	9.86	NR	ND	NR	NR
MW-8	09-20-95	28.08	11.07	17.01	ND	WSW	0.005
MW-8	11-07-95	28.08	11.40	16.68	ND	WSW	0.004
MW-9	09-20-95	27.73	11.67	16.06	ND	WSW	0.005
MW-9	11-07-95	27.73	11.70	16.03	ND	WSW	0.004
MW-10	09-20-95	27.55	10.65	16.90	ND	WSW	0.005
MW-10	11-07-95	27.55	10.85	16.70	ND	WSW	0.004

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 or not measurable
SW: southwest
NW: northwest
WSW: west-southwest

Table 3
 Historical Groundwater Analytical Data
 Petroleum Hydrocarbons and Their Constituents

ARCO Service Station 2185
 9800 East 14th Street, Oakland, California

Date: 12-13-95

Well Designation	Water Sample Field Date	TPHG LUFT Method µg/L	Benzene EPA 8020 µg/L	Toluene EPA 8020 µg/L	Ethylbenzene EPA 8020 µg/L	Total Xylenes EPA 8020 µg/L	MTBE EPA 8020 µg/L	MTBE EPA 8240 µg/L
MW-1	07-24-92	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-1	10-19-92	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-1	01-14-93	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-1	04-09-93	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-1	08-23-93	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-1	10-11-93	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-1	03-04-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-1	05-10-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-1	08-12-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-1	11-22-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-1	03-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-1	05-30-95	Not sampled: not scheduled for chemical analysis						
MW-1	09-20-95	Not sampled: not scheduled for chemical analysis						
MW-1	11-07-95	Not sampled: not scheduled for chemical analysis						
MW-2	07-24-92	5900	510	<10	370	430	--	--
MW-2	10-19-92	4100	110	<10	100	62	--	--
MW-2	01-14-93	12000	700	10	720	680	--	--
MW-2	04-09-93	8400	220	<10	480	320	--	--
MW-2	08-23-93	3700	89	<5	230	150	--	--
MW-2	10-11-93	2700	50	<2.5	<140	68	--	--
MW-2	03-04-94	3100	49	<2.5	180	98	--	--
MW-2	05-10-94	3100	39	<2.5	220	99	--	--
MW-2	08-12-94	1800	13	<2.5	120	35	--	--
MW-2	11-22-94	2300	45	<0.5	190	93	--	--
MW-2	03-15-95	2100	7.4	<2.5	130	39	--	--
MW-2	05-30-95	1700	3.3	<2.5	120	31	--	--
MW-2	09-21-95	1200	1	<1	68	16	<5	--
MW-2	11-07-95	1100	<3	<3	74	14	<20	--
MW-3	07-24-92	Not sampled: well contained floating product						
MW-3	10-19-92	42000	740	1100	1500	5700	--	--
MW-3	01-14-93	44000	1100	840	2200	9600	--	--
MW-3	04-09-93	21000	33	69	350	1600	--	--
MW-3	08-23-93	13000	63	21	530	1300	--	--
MW-3	10-11-93	11000	56	13	530	1200	--	--
MW-3	03-04-94	17000	50	<10	790	1600	--	--
MW-3	05-10-94	14000	32	<10	710	1200	--	--
MW-3	08-12-94	13000	37	<10	640	970	--	--
MW-3	11-22-94	15000	150	<10	1300	2000	--	--
MW-3	03-15-95	2000	<2.5	<2.5	88	82	--	--
MW-3	05-30-95	2000	3.2	<2.5	70	46	--	--
MW-3	09-21-95	2100	12	<3	77	38	280	--
MW-3	11-07-95	3000	18	<3	120	62	--	430

Table 3
 Historical Groundwater Analytical Data
 Petroleum Hydrocarbons and Their Constituents

ARCO Service Station 2185
 9800 East 14th Street, Oakland, California

Date: 12-13-95

Well Designation	Water Sample Field Date	TPHC LUFT Method µg/L	Benzene EPA 8020 µg/L	Toluene EPA 8020 µg/L	Ethylbenzene EPA 8020 µg/L	Total Xylenes EPA 8020 µg/L	MTBE EPA 8020 µg/L	MTBE EPA 8240 µg/L
MW-4	07-24-92	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	10-19-92	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	01-14-93	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	04-09-93	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	08-23-93	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	10-11-93	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	03-04-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	05-10-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	08-12-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	11-22-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	03-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	05-30-95	Not sampled: not scheduled for chemical analysis						
MW-4	09-20-95	Not sampled: not scheduled for chemical analysis						
MW-4	11-07-95	Not sampled: not scheduled for chemical analysis						
MW-5	02-11-93	9300	620	<50	890	2200	--	--
MW-5	04-09-93	960	29	<1	100	96	--	--
MW-5	08-23-93	2700	50	<2.5	260	250	--	--
MW-5	10-11-93	840	9	<1	87	41	--	--
MW-5	03-04-94	540	0.9	0.6	16	6.3	--	--
MW-5	05-10-94	1300	11	<2.5	110	68	--	--
MW-5	08-12-94	1500	10	<2.5	110	30	--	--
MW-5	11-22-94	84	1	<0.5	5	2	--	--
MW-5	03-15-95	170	5.6	<0.5	17	11	--	--
MW-5	05-30-95	53	0.6	<0.5	4.8	2.8	--	--
MW-5	09-21-95	1500	47	2	120	86	70	--
MW-5	11-07-95	140	4.5	<0.5	8.3	16	10	--
MW-6	02-11-93	4800	630	<10	490	460	--	--
MW-6	04-09-93	13000	880	<10	1000	1000	--	--
MW-6	08-23-93	6300	390	<20	450	390	--	--
MW-6	10-11-93	2900	150	3.4	190	140	--	--
MW-6	03-04-94	5800	320	<5	510	360	--	--
MW-6	05-10-94	11000	470	<10	880	650	--	--
MW-6	08-12-94	4400	170	<10	390	210	--	--
MW-6	11-22-94	7300	390	<5	940	640	--	--
MW-6	03-15-95	3600	77	<5	420	180	--	--
MW-6	05-30-95	5000	68	<5	530	250	--	--
MW-6	09-21-95	3300	36	<5	360	120	<30	--
MW-6	11-07-95	3500	33	<5	410	110	<30	--

Table 3
 Historical Groundwater Analytical Data
 Petroleum Hydrocarbons and Their Constituents

ARCO Service Station 2185
 9800 East 14th Street, Oakland, California

Date: 12-13-95

Well Designation	Water Sample Field Date	TPHC LUFT Method µg/L	Benzene EPA 8020 µg/L	Toluene EPA 8020 µg/L	Ethylbenzene EPA 8020 µg/L	Total Xylenes EPA 8020 µg/L	MTBE EPA 8020 µg/L	MTBE EPA 8240 µg/L
MW-7	05-14-93	350	0.83	<0.5	<0.5	<0.5	--	--
MW-7	08-23-93	630*	7.3	<1	<1	<1	--	--
MW-7	10-11-93	620*	3.5	<0.5	<0.5	<0.5	--	--
MW-7	03-04-94	320*	<0.5	<0.5	<0.5	<0.5	--	--
MW-7	05-10-94	330*	0.6	<0.5	<0.5	<0.5	--	--
MW-7	08-12-94	360*	<0.5	<0.5	<0.5	<0.5	--	--
MW-7	11-22-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-7	03-15-95	150*	<0.5	<0.5	<0.5	<0.5	--	--
MW-7	05-30-95	110*	<0.5	<0.5	<0.5	<0.5	--	--
MW-7	09-20-95	<400*	<0.8	<0.5	<0.5	<0.5	<7	--
MW-7	11-07-95	<500	2	<1	<1	<1	<20	--
MW-8	08-12-94	5100	12	<5	470	53	--	--
MW-8	11-22-94	2300	16	<0.5	140	4	--	--
MW-8	03-15-95	280	<0.5	<0.5	0.7	0.7	--	--
MW-8	05-30-95	390	<0.5	<0.5	<2	1.6	--	--
MW-8	09-21-95	470	<0.5	<0.5	3	1.2	52	--
MW-8	11-07-95	280	<0.5	<0.5	0.6	<0.5	94	--
MW-9	09-20-95	<50	<0.5	<0.5	<0.5	<0.5	<4	--
MW-9	11-07-95	<50	<0.5	<0.5	<0.5	<0.5	<4	--
MW-10	09-21-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-10	11-07-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--

TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method
 µg/L: micrograms per liter
 EPA: United States Environmental Protection Agency
 MTBE: Methyl-tert-butyl ether
 -- : not analyzed
 *: chromatogram does not match the typical gasoline fingerprint



Base map from USGS 7.5' Quad. Maps:
Oakland East and San Leandro, California.
Photorevised 1980.

Scale : 0 2000 4000 Feet



EMCON

ARCO PRODUCTS COMPANY
SERVICE STATION 2185, 9800 E. 14TH STREET
QUARTERLY GROUNDWATER MONITORING
OAKLAND, CALIFORNIA

SITE LOCATION

FIGURE

1

PROJECT NO.
805-130.03



McDONALDS
(Former
Exxon Station)

Approximate direction of
groundwater flow showing
gradient (calculated using
wells MW-1, MW-7, and
MW-9)



BIG-O TIRES
(FORMER GAS STATION)

Approximate location of
former pump island

CITY OF OAKLAND
FIRE STATION

98TH AVENUE

EAST 14TH STREET

STATION BUILDING

APPROXIMATE SITE BOUNDARY

EXPLANATION

- ⊙ Groundwater monitoring well
- Vapor extraction well
- ⎓ Existing underground gasoline storage tank
- (16.92) Groundwater elevation (Ft.-MSL) measured 11/7/95
- Groundwater elevation contour (Ft.-MSL)
- 280 / ND TPH, as gasoline concentration (ug/L); sampled 11/7/95
- 280 / ND Benzene concentration (ug/L); sampled 11/7/95
- Raised MRL due to high analyte concentration requiring sample dilution
- ** Raised MRL due to matrix interference
- NS Not sampled; not scheduled for chemical analysis
- ND Not detected at or above the method reporting limit for TPHG (50 ug/L) or benzene (0.5 ug/L)

Base map modified from RESNA, 1994.



SCALE: 0 40 80 FEET
(APPROXIMATE)

ARCO PRODUCTS COMPANY
SERVICE STATION 2185, 9800 E. 14TH STREET
QUARTERLY GROUNDWATER MONITORING
OAKLAND, CALIFORNIA
GROUNDWATER DATA
FOURTH QUARTER 1995

FIGURE NO.
2
PROJECT NO.
805-130.03

C:\805-130\G00-A REV 0 02/14/96 14:41:01 KAU DJ

APPENDIX A

**FIELD DATA SHEETS, FOURTH QUARTER 1995
GROUNDWATER MONITORING EVENT**

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 1775-236.01

STATION ADDRESS : 9800 East 14th Street

DATE : 11-07-95

ARCO STATION # : 2185

FIELD TECHNICIAN : J. Wilkin

DAY : THURSDAY

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-9	OK	YES	OK		OK	11.70	11.70	ND	ND	22.5	LOCKING WELL CAP
2	MW-10	OK	YES	OK		OK	10.85	10.85	ND	ND	23.0	WAS OFF
3	MW-1	OK	YES	OK	ARCO	BAD	12.12	12.12	ND	ND	23.6	
4	MW-4	OK	YES	OK	ARCO	OK	12.42	12.42	ND	ND	23.8	
5	MW-7	OK	YES	OK	ARCO	OK	11.70	11.70	ND	ND	25.2	
6	MW-5	OK	YES	OK	ARCO	OK	11.20	11.20	ND	ND	26.8	
7	MW-8	OK	YES	OK	ARCO	OK	11.40	11.40	ND	ND	22.6	
8	MW-2	OK	YES	OK	ARCO	OK	11.73	11.73	ND	ND	23.6	
9	MW-6	OK	YES	OK	ARCO	OK	11.06	11.06	ND	ND	27.8	
10	MW-3	OK	YES	OK	ARCO	OK	11.65	11.65	ND	ND	23.2	
SURVEY POINTS ARE TOP OF WELL CASINGS												



WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 1775-236-01

SAMPLE ID: MW-2 (23)

PURGED BY: J WILLIAMS

CLIENT NAME: ARCO 2185

SAMPLED BY: J

LOCATION: OAKLAND CA

TYPE: Ground Water Surface Water Treatment Effluent Other

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 7.75
 DEPTH TO WATER (feet): 1173 CALCULATED PURGE (gal.): 2326
 DEPTH OF WELL (feet): 23.6 ACTUAL PURGE VOL. (gal.): 24

DATE PURGED: 11-07-95 Start (2400 Hr) 1621 End (2400 Hr) 1629
 DATE SAMPLED: 11-07-95 Start (2400 Hr) End (2400 Hr) 1634

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1624</u>	<u>8</u>	<u>6.56</u>	<u>680</u>	<u>69.5</u>	<u>CLEAR</u>	<u>TRACE</u>
<u>1626</u>	<u>16</u>	<u>6.59</u>	<u>694</u>	<u>69.7</u>	<u>L</u>	<u>L</u>
<u>1629</u>	<u>24</u>	<u>6.59</u>	<u>691</u>	<u>69.6</u>	<u>L</u>	<u>L</u>

D. O. (ppm): NR ODOR: STRONG COLOR: NR TURBIDITY: NR
(COBALT 0 - 500) (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NR Parameters field filtered at this well: NR

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- | | | | |
|--|---|--|--|
| <input type="checkbox"/> 2' Bladder Pump | <input type="checkbox"/> Bailer (Teflon®) | <input type="checkbox"/> 2' Bladder Pump | <input checked="" type="checkbox"/> Bailer (Teflon®) |
| <input checked="" type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> DDL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailer (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated |

Other: _____

WELL INTEGRITY: OK LOCK #: ARCO

REMARKS: _____

Meter Calibration: Date: 11-7-95 Time: _____ Meter Serial #: _____ Temperature °F: _____
 (EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)
 Location of previous calibration: _____

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



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev. 3, 2/94

PROJECT NO: 1775-236-01

SAMPLE ID: MW-3 (23)

PURGED BY: J WILLIAMS

CLIENT NAME: ARCO 2185-

SAMPLED BY: J

LOCATION: OAKLAND CA

TYPE: Ground Water Surface Water Treatment Effluent Other

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

CASING ELEVATION (feet/MSL): <u>NK</u>	VOLUME IN CASING (gal.): <u>7.54</u>
DEPTH TO WATER (feet): <u>11.65</u>	CALCULATED PURGE (gal.): <u>22.63</u>
DEPTH OF WELL (feet): <u>23.2</u>	ACTUAL PURGE VOL. (gal.): <u>23</u>

DATE PURGED: <u>11-07-95</u>	Start (2400 Hr) <u>1716</u>	End (2400 Hr) <u>1724</u>
DATE SAMPLED: <u>11-07-95</u>	Start (2400 Hr) <input checked="" type="checkbox"/>	End (2400 Hr) <u>1730</u>

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1719</u>	<u>8</u>	<u>6.67</u>	<u>563</u>	<u>66.1</u>	<u>CLEAR</u>	<u>TRACE</u>
<u>1721</u>	<u>16</u>	<u>6.65</u>	<u>609</u>	<u>67.1</u>	<u>CLEAR</u>	<u>TRACE</u>
<u>1724</u>	<u>23</u>	<u>6.66</u>	<u>611</u>	<u>67.2</u>	<u>CLEAR</u>	<u>TRACE</u>

D. O. (ppm): NK ODOR: STRONG NK NK
 (COBALT 0 - 500) (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NK Parameters field filtered at this well: NK

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- | | | | |
|--|---|--|--|
| <input type="checkbox"/> 2" Bladder Pump | <input type="checkbox"/> Bailer (Teflon®) | <input type="checkbox"/> 2" Bladder Pump | <input checked="" type="checkbox"/> Bailer (Teflon®) |
| <input checked="" type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> DDL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailer (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated |
| Other: _____ | | Other: _____ | |

WELL INTEGRITY: OK LOCK #: ARCO

REMARKS: _____

Meter Calibration: Date: 11-7-95 Time: _____ Meter Serial #: _____ Temperature °F: _____
 (EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)
 Location of previous calibration: _____

Signature: [Signature] Reviewed By: [Signature] Page 2 of 8



WATER SAMPLE FIELD DATA SHEET

Rev. 3, 2/94

PROJECT NO: 1775-236-01
PURGED BY: J WILLIAMS
SAMPLED BY: J WILLIAMS

SAMPLE ID: MW-5 (26)
CLIENT NAME: ARCO 2185
LOCATION: OAKLAND CA

TYPE: Ground Water Surface Water Treatment Effluent Other

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 10.19
DEPTH TO WATER (feet): 11.20 CALCULATED PURGE (gal.): 30.57
DEPTH OF WELL (feet): 26.8 ACTUAL PURGE VOL. (gal.): 31

DATE PURGED: 11-07-95 Start (2400 Hr) 1523 End (2400 Hr) 1533
DATE SAMPLED: 11-07-95 Start (2400 Hr) --- End (2400 Hr) 1537

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1527</u>	<u>10.5</u>	<u>6.66</u>	<u>505</u>	<u>71.9</u>	<u>GRAY</u>	<u>MOD</u>
<u>1529</u>	<u>21</u>	<u>6.69</u>	<u>531</u>	<u>68.5</u>	<u>CLEAR</u>	<u>TRACE</u>
<u>1533</u>	<u>31</u>	<u>6.68</u>	<u>531</u>	<u>67.8</u>	<u>CLEAR</u>	<u>TRACE</u>
---	---	---	---	---	---	---
---	---	---	---	---	---	---

D. O. (ppm): NR ODOR: STRONG NR NR
(COBALT 0 - 500) (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NR Parameters field filtered at this well: NR

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- | | | | |
|--|---|--|--|
| <input type="checkbox"/> 2" Bladder Pump | <input type="checkbox"/> Bailer (Teflon®) | <input type="checkbox"/> 2" Bladder Pump | <input checked="" type="checkbox"/> Bailer (Teflon®) |
| <input checked="" type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> ODL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailer (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated |
- Other: _____ Other: _____

WELL INTEGRITY: OK LOCK #: ARLO

REMARKS: _____

Meter Calibration: Date: _____ Time: _____ Meter Serial #: _____ Temperature °F: _____
(EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)

Location of previous calibration: _____

Signature: [Signature] Reviewed By: [Signature] Page: 3 of 8



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev. 3, 2/94

PROJECT NO: 1775-236-01

SAMPLE ID: MW-6 (27)

PURGED BY: J WILLIAMS

CLIENT NAME: ARCO 2185

SAMPLED BY: J

LOCATION: OAKLAND CA

TYPE: Ground Water Surface Water Treatment Effluent Other

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 1093

DEPTH TO WATER (feet): 1106 CALCULATED PURGE (gal.): 32.81

DEPTH OF WELL (feet): 27.8 ACTUAL PURGE VOL. (gal.): 33

DATE PURGED: 11-07-95

Start (2400 Hr) 1645

End (2400 Hr) 1654

DATE SAMPLED: 11-07-95

Start (2400 Hr) 1645

End (2400 Hr) 1659

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1648</u>	<u>11</u>	<u>6.60</u>	<u>706</u>	<u>68.0</u>	<u>CLEAR</u>	<u>TRACE</u>
<u>1651</u>	<u>27</u>	<u>6.69</u>	<u>677</u>	<u>67.9</u>	<u>GRAY</u>	<u>MOD</u>
<u>1654</u>	<u>33</u>	<u>6.64</u>	<u>679</u>	<u>68.2</u>	<u>GRAY</u>	<u>MOD</u>

D. O. (ppm): NR

ODOR: STRONG

NR NR

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

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

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- 2" Bladder Pump
- Centrifugal Pump
- Submersible Pump
- Well Wizard™
- Bailer (Teflon®)
- Bailer (PVC)
- Bailer (Stainless Steel)
- Dedicated

- 2" Bladder Pump
- DDL Sampler
- Dipper
- Well Wizard™
- Bailer (Teflon®)
- Bailer (Stainless Steel)
- Submersible Pump
- Dedicated

Other: _____

Other: _____

WELL INTEGRITY: OK

LOCK #: ARCO

REMARKS: _____

Meter Calibration: Date: _____ Time: _____ Meter Serial #: _____ Temperature °F: _____
(EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)

Location of previous calibration: _____

Signature: Joe Williams

Reviewed By: JW

Page 4 of 8



WATER SAMPLE FIELD DATA SHEET

Rev. 3, 2/94

PROJECT NO: 1775-236-00
PURGED BY: ES WILLIAMS
SAMPLED BY: [Signature]

SAMPLE ID: MW-7 25
CLIENT NAME: ARCO 2185
LOCATION: OAKLAND

TYPE: Ground Water Surface Water Treatment Effluent Other
CASING DIAMETER (inches): 2 3 4 4.5 6 Other

CASING ELEVATION (feet/VMSL): NR VOLUME IN CASING (gal.): 2.20
DEPTH TO WATER (feet): 11.70 CALCULATED PURGE (gal.): 6.61
DEPTH OF WELL (feet): 25.2 ACTUAL PURGE VOL. (gal.): 7

DATE PURGED: 11-07-95 Start (2400 Hr) 1435 End (2400 Hr) 1446
DATE SAMPLED: 11-07-95 Start (2400 Hr) End (2400 Hr) 1450

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1440</u>	<u>3</u>	<u>6.58</u>	<u>586</u>	<u>70.3</u>	<u>BROWN</u>	<u>HEAVY</u>
<u>1443</u>	<u>5</u>	<u>6.57</u>	<u>583</u>	<u>69.1</u>	<u>↓</u>	<u>↓</u>
<u>1446</u>	<u>7</u>	<u>6.59</u>	<u>588</u>	<u>68.9</u>	<u>↓</u>	<u>↓</u>

D. O. (ppm): NR ODOR: None (COBALT 0 - 500) NR (NTU 0 - 200 or 0 - 1000) NR
Field QC samples collected at this well: NR Parameters field filtered at this well: NR

- | PURGING EQUIPMENT | | SAMPLING EQUIPMENT | |
|---|---|--|--|
| <input type="checkbox"/> 2' Bladder Pump | <input type="checkbox"/> Bailer (Teflon®) | <input type="checkbox"/> 2' Bladder Pump | <input checked="" type="checkbox"/> Bailer (Teflon®) |
| <input type="checkbox"/> Centrifugal Pump | <input checked="" type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> ODL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailer (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated |
| Other: <u> </u> | | Other: <u> </u> | |

WELL INTEGRITY: Good LOCK #: 3490

REMARKS:

Meter Calibration: Date: Time: Meter Serial #: Temperature °F:
(EC 1000 /) (DI) (pH 7 /) (pH 10 /) (pH 4 /)
Location of previous calibration:

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



WATER SAMPLE FIELD DATA SHEET

Rev. 3, 2/94

PROJECT NO: 1775-236-01

SAMPLE ID: MW-8 (22)

PURGED BY: J WILLIAMS

CLIENT NAME: ARCO 2185

SAMPLED BY: [Signature]

LOCATION: OAKLAND, CA

TYPE: Ground Water Surface Water Treatment Effluent Other

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 7.31
 DEPTH TO WATER (feet): 1140 CALCULATED PURGE (gal.): ~~21.95~~
 DEPTH OF WELL (feet): 22.6 ACTUAL PURGE VOL. (gal.): 23

DATE PURGED: 11-07-95 Start (2400 Hr) 1553 End (2400 Hr) 1600

DATE SAMPLED: 11-07-95 Start (2400 Hr) [Signature] End (2400 Hr) 1605

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1556</u>	<u>8</u>	<u>6.61</u>	<u>561</u>	<u>70.0</u>	<u>CLEAR</u>	<u>TRACE</u>
<u>1558</u>	<u>16</u>	<u>6.61</u>	<u>562</u>	<u>69.6</u>	<u>GRAY</u>	<u>MOD</u>
<u>1600</u>	<u>23</u>	<u>6.65</u>	<u>560</u>	<u>69.0</u>	<u>GRAY</u>	<u>HEAVY</u>

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

Field QC samples collected at this well: NR Parameters field filtered at this well: NR

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- 2" Bladder Pump
- Centrifugal Pump
- Submersible Pump
- Well Wizard™
- Bailer (Teflon®)
- Bailer (PVC)
- Bailer (Stainless Steel)
- Dedicated
- 2" Bladder Pump
- Bailer (Teflon®)
- DDL Sampler
- Dipper
- Well Wizard™
- Bailer (Stainless Steel)
- Submersible Pump
- Dedicated

Other: _____ Other: _____

WELL INTEGRITY: OK LOCK #: ARCO

REMARKS: _____

Meter Calibration: Date: _____ Time: _____ Meter Serial #: _____ Temperature °F: _____
(EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)

Location of previous calibration: _____

Signature: [Signature] Reviewed By: [Signature] Page 6 of 8



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev. 3, 2/94

PROJECT NO: 1775-236-01
PURGED BY: J. Williams
SAMPLED BY: J

SAMPLE ID: MW-9 (22)
CLIENT NAME: ARCO 2185
LOCATION: OAKLAND CA

TYPE: Ground Water Surface Water Treatment Effluent Other
CASING DIAMETER (inches): 2 3 4 4.5 6 Other

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 1.76
DEPTH TO WATER (feet): 11.70 CALCULATED PURGE (gal.): 5.29
DEPTH OF WELL (feet): 22.5 ACTUAL PURGE VOL. (gal.): 6

DATE PURGED: 11-07-95 Start (2400 Hr) 1406 End (2400 Hr) 1415
DATE SAMPLED: 11-07-95 Start (2400 Hr) End (2400 Hr) 1420

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1410</u>	<u>2</u>	<u>6.56</u>	<u>7.28</u>	<u>73.7</u>	<u>BROWN</u>	<u>HEAVY</u>
<u>1413</u>	<u>4</u>	<u>6.54</u>	<u>7.09</u>	<u>73.2</u>	<u>L</u>	<u>L</u>
<u>1415</u>	<u>6</u>	<u>6.52</u>	<u>7.14</u>	<u>72.8</u>	<u>L</u>	<u>L</u>

D. O. (ppm): NR ODOR: NR (COBALT 0 - 500) NR (NTU 0 - 200 or 0 - 1000) NR
Field QC samples collected at this well: NR Parameters field filtered at this well: WB

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- | | | | |
|---|---|--|--|
| <input type="checkbox"/> 2" Bladder Pump | <input type="checkbox"/> Bailer (Teflon®) | <input type="checkbox"/> 2" Bladder Pump | <input checked="" type="checkbox"/> Bailer (Teflon®) |
| <input type="checkbox"/> Centrifugal Pump | <input checked="" type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> DDL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailer (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated |
| Other: _____ | | Other: _____ | |

WELL INTEGRITY: GOOD LOCK #: 3900

REMARKS: _____

Meter Calibration: Date: _____ Time: _____ Meter Serial #: _____ Temperature °F: _____
(EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)
Location of previous calibration: _____

Signature: [Signature] Reviewed By: [Signature] Page 7 of 8



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev. 3, 2/94

PROJECT NO: 1775-236-01

SAMPLE ID: MW-10 (23)

PURGED BY: J WILLIAMS

CLIENT NAME: ARCO 2185

SAMPLED BY: J WILLIAMS

LOCATION: OAKLAND, CA.

TYPE: Ground Water Surface Water Treatment Effluent Other

CASING DIAMETER (inches): 2 _{.45} 3 4 4.5 6 Other

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 1.98
 DEPTH TO WATER (feet): ~~1085~~ 1085 CALCULATED PURGE (gal.): ~~5078~~ 5.95
 DEPTH OF WELL (feet): ~~2225~~ 230 ACTUAL PURGE VOL. (gal.): 6

DATE PURGED: 11-07-95 Start (2400 Hr) 1326 End (2400 Hr) 1336
 DATE SAMPLED: 11-07-95 Start (2400 Hr) ✓ End (2400 Hr) 1338

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1330</u>	<u>2</u>	<u>6.78</u>	<u>539</u>	<u>70.2</u>	<u>BROWN</u>	<u>HEAVY</u>
<u>1333</u>	<u>4</u>	<u>6.73</u>	<u>536</u>	<u>70.5</u>	<u>↓</u>	<u>↓</u>
<u>1336</u>	<u>6</u>	<u>6.71</u>	<u>540</u>	<u>70.5</u>	<u>↓</u>	<u>↓</u>

D. O. (ppm): NR ODOR: None NR NR
 (COBALT 0 - 500) (NTU 0 - 200 or 0 - 1000)
 Field QC samples collected at this well: NR Parameters field filtered at this well: NR

PURGING EQUIPMENT **SAMPLING EQUIPMENT**

2" Bladder Pump Bladder Pump Bladder Pump Bailer (Teflon®)

Centrifugal Pump Bailer (PVC) DDL Sampler Bailer (Stainless Steel)

Submersible Pump Bailer (Stainless Steel) Dipper Submersible Pump

Well Wizard™ Dedicated Well Wizard™ Dedicated

Other: _____ Other: _____

WELL INTEGRITY: Good LOCK #: 3490 3490

REMARKS: SEE N

Meter Calibration: Date: 11-07-95 Time: 1256 Meter Serial #: _____ Temperature °F: 62.7
 (EC 1000 1022 / 1000) (DI _____) (pH 7 7.08 / 7.00) (pH 10 9.98 / 10.00) (pH 4 3.96 / _____)
 Location of previous calibration: _____

Signature: Joe Williams Reviewed By: GA Page 8 of 8

APPENDIX B

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

**Columbia
Analytical
Services^{inc.}**

December 1, 1995

Service Request No: S951401

John Young
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

Re: 0805-130.03 / TO# 17075.00 / 2185 Oakland

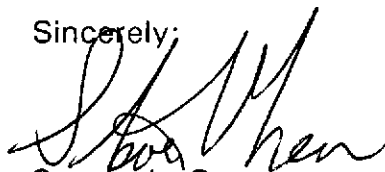
Dear Mr. Young:

The following pages contain analytical results for sample(s) received by the laboratory on November 08, 1995. Results of sample analyses are followed by Appendix A which contains sample custody documentation and quality assurance deliverables requested for this project. The work requested has been assigned the Service Request No. listed above -to help expedite our service please refer to this number when contacting the laboratory.

Analytical results were produced by procedures consistent with Columbia Analytical Services' (CAS) Quality Assurance Manual (with any deviations noted). Signature of this CAS Analytical Report below confirms that pages 2 through 14, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

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

Sincerely:



Steven L. Green
Project Chemist

3x J. Bazar For
Annelise J. Bazar
Regional QA Coordinator

SLG/ajb

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-130.03/TO#17075.00/2185 Oakland
Sample Matrix: Water

Service Request: S951401
Date Collected: 11/7/95
Date Received: 11/8/95
Date Extracted: N/A

BTEX, MTBE and TPH as Gasoline
 EPA Methods 5030/8020/California DHS LUFT Method
 Units: ug/L (ppb)

Sample Name:	MW-9 (22)	MW-10 (23)	MW-7 (25)
Lab Code:	S951401-001	S951401-002	S951401-003
Date Analyzed:	11/16/95	11/17/95	11/18/95

Analyte	MRL			
TPH as Gasoline	50	ND	ND	<500*
Benzene	0.5	ND	ND	2
Toluene	0.5	ND	ND	<1*
Ethylbenzene	0.5	ND	ND	<1*
Total Xylenes	0.5	ND	ND	<1*
Methyl-tert-butyl ether	3	<4**	ND	<20*

* Raised MRL due to matrix interference. This sample contains non-fuel components eluting in the gasoline range, quantified as gasoline. The chromatogram does not match the typical gasoline fingerprint.

** Raised MRL due to matrix interference.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-130.03/TO#17075.00/2185 Oakland
Sample Matrix: Water

Service Request: S951401
Date Collected: 11/7/95
Date Received: 11/8/95
Date Extracted: N/A

BTEX, MTBE and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ug/L (ppb)

Sample Name:	MW-5 (26)	MW-8 (22)	MW-2 (23)
Lab Code:	S951401-004	S951401-005	S951401-006
Date Analyzed:	11/17/95	11/17/95	11/17/95

Analyte	MRL			
TPH as Gasoline	50	140	280	1100
Benzene	0.5	4.5	ND	<3*
Toluene	0.5	ND	ND	<3*
Ethylbenzene	0.5	8.3	0.6	74
Total Xylenes	0.5	16	ND	14
Methyl-tert-butyl ether	3	10	94	<20*

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-130.03/TO#17075.00/2185 Oakland
Sample Matrix: Water

Service Request: S951401
Date Collected: 11/7/95
Date Received: 11/8/95
Date Extracted: N/A

BTEX, MTBE and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
Units: ug/L (ppb)

Sample Name:	MW-6 (27)	Method Blank	Method Blank
Lab Code:	S951401-007	S951116-WB	S951117-WB
Date Analyzed:	11/17/95	11/16/95	11/17/95

Analyte	MRL			
TPH as Gasoline	50	3500	ND	ND
Benzene	0.5	33	ND	ND
Toluene	0.5	<5*	ND	ND
Ethylbenzene	0.5	410	ND	ND
Total Xylenes	0.5	110	ND	ND
Methyl-tert-butyl ether	3	<30*	ND	ND

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-130.03/TO#17075.00/2185 Oakland
Sample Matrix: Water

Service Request: S951401
Date Collected: 11/7/95
Date Received: 11/8/95
Date Extracted: N/A
Date Analyzed: 11/16/95

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

Analyte:	TPH as Gasoline	Benzene	Toluene	Ethylbenzene	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	TPH as Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes, Total
MW-3 (23)	S951401-008	3000	18	<3**	120	62
Method Blank	S951116-WMB	ND	ND	ND	ND	ND

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 0805-130.03/TO#17075.00/2185 Oakland
Sample Matrix: Water

Service Request: S951401
Date Collected: 11/7/95
Date Received: 11/8/95
Date Extracted: NA

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

Sample Name:	MW-3 (23)	Method Blank
Lab Code:	S951401-008	S951113-WMB
Date Analyzed:	11/13/95	11/13/95

Analyte	MRL		
MTBE	1	430	ND

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-130.03/TO#17075.00/2185 Oakland
Sample Matrix: Water

Service Request: S951401
Date Collected: 11/7/95
Date Received: 11/8/95
Date Extracted: N/A
Date Analyzed: 11/16 - 17/95

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

Sample Name	Lab Code	PID Detector	FID Detector
		Percent Recovery 4-Bromofluorobenzene	Percent Recovery α,α,α -Trifluorotoluene
MW-9 (22)	S951401-001	92	102
MW-10 (23)	S951401-002	94	100
MW-7 (25)	S951401-003	81	101
MW-5 (26)	S951401-004	90	94
MW-8 (22)	S951401-005	83	106
MW-2 (23)	S951401-006	92	101
MW-6 (27)	S951401-007	91	101
MW-3 (23)	S951401-008	93	104
MW-10 (23) (MS)	S951401-002MS	87	108
MW-10 (23) (DMS)	S951401-002DMS	89	108
Method Blank	S951116-WB1	93	102
Method Blank	S951117-WB1	91	97

CAS Acceptance Limits: 69-116 69-116

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-130.03/TO#17075.00/2185 Oakland

Service Request: S951401
Date Analyzed: 11/16/95

Initial Calibration Verification (ICV) Summary
BTEX, MTBE 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	24.6	98	85-115
Toluene	25	24.8	99	85-115
Ethylbenzene	25	24.9	100	85-115
Xylenes, Total	75	75.3	100	85-115
Gasoline	250	270	108	90-110
Methyl-tert-butyl Ether	50	48	96	85-115

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-130.03/TO#17075.00/2185 Oakland
Sample Matrix: Water

Service Request: S951401
Date Collected: 11/7/95
Date Received: 11/8/95
Date Extracted: NA
Date Analyzed: 11/18/95

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

Sample Name: MW-10 (23)
Lab Code: S951401-002

Analyte	Spike Level		Sample Result	Spike Result		Percent Recovery				Relative Percent Difference
	MS	DMS		MS	DMS	MS	DMS	CAS Acceptance Limits		
	Gasoline	250		250	ND	240	240	96	96	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-130.03/TO#17075.00/2185 Oakland
Sample Matrix: Water

Service Request: S951401
Date Collected: 11/7/95
Date Received: 11/8/95
Date Extracted: NA
Date Analyzed: 11/13/95

Surrogate Recovery Summary
Volatile Organic Compounds
EPA Method 8240

Sample Name	Lab Code	P e r c e n t R e c o v e r y		
		1,2-Dichloroethane-D ₄	Toluene-D ₈	4-Bromofluorobenzene
MW-3 (23)	S951401-008	96	100	97
Batch QC(MS)	S951406-003MS	106	97	92
Batch QC(DMS)	S951406-003DMS	98	99	93
Method Blank	S951113-WMB	90	96	94

CAS Acceptance Limits: 76-114 88-110 86-115

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 0805-130.03/TO#17075.00/2185 Oakland

Service Request: S951401
Date Analyzed: 8/24/95

Initial Calibration Verification (ICV) Summary
 Volatile Organic Compounds
 EPA Method 624
 Units: ppb

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Chloromethane	50	50.1	100	70-130
Vinyl Chloride	50	53.0	106	70-130
Bromomethane	50	53.2	106	70-130
Chloroethane	50	53.4	107	70-130
Acetone	50	59.7	119	70-130
1,1-Dichloroethene	50	56.5	113	70-130
Carbon Disulfide	50	52.8	106	70-130
Methylene Chloride	50	54.6	109	70-130
trans-1,2-Dichloroethene	50	56.0	112	70-130
cis-1,2-Dichloroethene	50	55.6	111	70-130
1,1-Dichloroethane	50	56.2	112	70-130
Vinyl Acetate	50	45.8	92	70-130
2-Butanone (MEK)	50	53.8	108	70-130
Chloroform	50	56.6	113	70-130
1,1,1-Trichloroethane (TCA)	50	56.8	114	70-130
Carbon Tetrachloride	50	54.3	109	70-130
Benzene	50	48.0	96	70-130
1,2-Dichloroethane	50	56.7	113	70-130
Trichloroethene (TCE)	50	47.6	95	70-130
1,2-Dichloropropane	50	47.3	95	70-130
Bromodichloromethane	50	46.8	94	70-130
2-Chloroethyl Vinyl Ether	50	62.6	125	70-130
2-Hexanone	50	60.8	122	70-130
trans-1,3-Dichloropropene	50	48.6	97	70-130
Toluene	50	47.9	96	70-130
cis-1,3-Dichloropropene	50	46.6	93	70-130
1,1,2-Trichloroethane	50	57.6	115	70-130
Tetrachloroethene (PCE)	50	53.6	107	70-130
Dibromochloromethane	50	51.5	103	70-130
Chlorobenzene	50	51.0	102	70-130
Ethylbenzene	50	48.4	97	70-130
o- Xylene	50	50.1	100	70-130
Styrene	50	48.3	97	70-130
Bromoform	50	49.1	98	70-130
1,1,2,2-Tetrachloroethane	50	49.6	99	70-130

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Date Extracted: NA
Date Analyzed: 11/13/95

Matrix Spike/Duplicate Matrix Spike Summary
 Volatile Organic Compounds
 EPA Method 8240
 Units: ug/L (ppb)

Sample Name: Batch QC
Lab Code: S951406-003

Analyte	Spike Level		Sample Result	Spike Result		Percent Recovery				Relative Percent Difference
	MS	DMS		MS	DMS	CAS		Acceptance Limits		
						MS	DMS			
1,1-Dichloroethene	500	500	ND	458	445	92	89	61-145	3	
Trichloroethene	500	500	ND	492	491	98	98	71-120	<1	
Chlorobenzene	500	500	ND	534	535	107	107	75-130	<1	
Toluene	500	500	ND	521	465	104	93	76-125	11	
Benzene	500	500	ND	481	483	96	97	76-127	<1	

ARCO Facility no. 2185	City (Facility) Oakland	Project manager (Consultant) John Young	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) (408) 453-7300	Contract number
Consultant name EMCON		Fax no. (Consultant) (408) 453-0457	
Address (Consultant) 1921 Ringwood Ave. San Jose, CA 95131			

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA 1631/8015	TPH Modified 8015 Gas Diesel	Oil and Grease 413.1 413.2	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 8240/8240 MTBE ONLY	EPA 825/8270	TCLP Metals VOA VOA	Semi Metals VOA	CAN Metals EPA 6010/7000 TTLC STLC	Lead Org./DHS Lead EPA 7420/7421	
			Soil	Water	Other	Ice	Acid															
MW-9(22)	1	2		X		X	HCL	11-7	14:20	X												
MW-10(23)	2	2		X		X	HCL	11-7	13:38	X												
MW-7(25)	3	2		X		X	HCL	11-7	14:50	X												
MW-5(26)	4	2		X		X	HCL	11-7	15:39	X												
MW-8(22)	5	2		X		X	HCL	11-7	16:05	X												
MW-2(23)	6	2		X		X	HCL	11-7	16:34	X												
MW-6(27)	7	2		X		X	HCL	11-7	16:59	X												
MW-3(23)	8	4		X		X	HCL	11-7	17:36	X					X							

Method of shipment
Sampler will deliver

Special detection Limit/reporting
Lowest Possible

Special QA/QC
As Normal

All wells but MW-3 MTBE L&S
Analyze samples from MW-3 for MTBE only by EPA 8240. DO NOT REPORT ANY OTHER COMPOUNDS FOR EPA 8240.

Lab number
595-01401

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

Condition of sample: ok	Temperature received:
Relinquished by sampler [Signature]	Date 11-9-95 Time 09:14
Relinquished by	Date Time Received by [Signature]
Relinquished by	Date Time Received by laboratory