



**EMCON**

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

EMCON  
97 JUL -1 PM 4:41

Date June 27, 1997  
Project 20805-130.005

To:

**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>First quarter 1997 groundwater monitoring results</u>
	<u>for ARCO service station 2185, Oakland, California</u>

For your:	<input checked="" type="checkbox"/>	Use	Sent by:	<input checked="" type="checkbox"/>	Regular Mail
	<input type="checkbox"/>	Approval		<input type="checkbox"/>	Standard Air
	<input type="checkbox"/>	Review		<input type="checkbox"/>	Courier
	<input type="checkbox"/>	Information		<input type="checkbox"/>	Other

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.

*Valli Voruganti*  
Valli Voruganti  
Project Manager

cc: Kevin Graves, RWQCB - SFBR  
Paul Supple, ARCO Products Company  
File





Date:

June 25, 1997

Re: ARCO Station #

2185 • 9800 East 14th Street • Oakland, CA  
First Quarter 1997 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 black ink that reads "Paul Supple". The signature is written in a cursive, flowing style.

Paul Supple  
Environmental Engineer



**EMCON**

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

June 27, 1997  
Project 20805-130.005

Mr. Paul Supple  
ARCO Products Company  
P.O. Box 6549  
Moraga, California 94570

Re: First quarter 1997 groundwater monitoring program results, ARCO service station 2185, Oakland, California

Dear Mr. Supple:

This letter presents the results of the first quarter 1997 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.

### LIMITATIONS

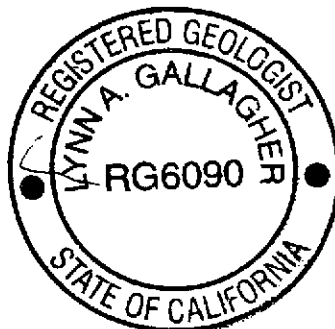
No monitoring event is thorough enough to describe all geologic and hydrogeologic conditions of interest at a given site. If conditions have not been identified during the monitoring event, such a finding should not therefore be construed as a guarantee of the absence of such conditions at the site,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

Please call if you have questions.

Sincerely,

EMCON

Lynn Gallagher, R.G. 6090  
Project Geologist



**ARCO QUARTERLY REPORT**

Station No.: 2185 Address: 9800 East 14th Street, Oakland, California  
 EMCON Project No. 20805-130.005  
 ARCO Environmental Engineer/Phone No.: Paul Supple /(510) 299-8891  
 EMCON Project Manager/Phone No.: Valli Voruganti /(408) 453-7300  
 Primary Agency/Regulatory ID No.: ACHCSA /Barney Chan

**WORK PERFORMED THIS QUARTER (First- 1997):**

1. Performed quarterly groundwater monitoring for first quarter 1997.
2. Prepared and submitted quarterly groundwater monitoring report for fourth quarter 1996.

**WORK PROPOSED FOR NEXT QUARTER (Second- 1997):**

1. Perform quarterly groundwater monitoring and sampling for second quarter 1997.
2. Prepare and submit quarterly groundwater monitoring report for first quarter 1997.

**QUARTERLY MONITORING:**

Current Phase of Project: Quarterly Groundwater Monitoring  
 Frequency of Sampling: Quarterly (groundwater)  
 Frequency of Monitoring: Quarterly (groundwater)  
 Is Floating Product (FP) Present On-site:  Yes  No  
 Bulk Soil Removed to Date : 2,550 cubic yards of TPH impacted soil  
 Bulk Soil Removed This Quarter : None  
 Water Wells or Surface Waters,  
 within 2000 ft., impacted by site: None  
 Current Remediation Techniques: None  
 Average Depth to Groundwater: 9.90 feet  
 Groundwater Gradient (Average): 0.006 ft/ft toward west-northwest (consistent with past events)

**ATTACHED:**

- Table 1 - Groundwater Monitoring Data, First Quarter 1997
- Table 2 - Historical Groundwater Elevation and Analytical Data, Petroleum Hydrocarbons and Their Constituents
- Figure 1 - Site Location
- Figure 2 - Groundwater Data, First Quarter 1997
- Appendix A - Analytical Results and Chain of Custody Documentation, First Quarter 1997 Groundwater Monitoring Event

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

Table 1  
Groundwater Monitoring Data  
First Quarter 1997

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

Date: 06-06-97

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	03-25-97	29.15	10.12	19.03	ND	WNW	0.006	03-25-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-2	03-25-97	28.47	9.84	18.63	ND	WNW	0.006	03-25-97	540	<1 <sup>^</sup>	<1 <sup>^</sup>	<1 <sup>^</sup>	<1 <sup>^</sup>	<6 <sup>^</sup>	--
MW-3	03-25-97	28.57	9.90	18.67	ND	WNW	0.006	03-25-97	<50	<0.5	<0.5	<0.5	<0.5	48	--
MW-4	03-25-97	29.21	10.42	18.79	ND	WNW	0.006	03-25-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-5	03-25-97	28.12	9.58	18.54	ND	WNW	0.006	03-25-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-6	03-25-97	27.79	9.35	18.44	ND	WNW	0.006	03-25-97	1100	<2 <sup>^</sup>	<2 <sup>^</sup>	5	5	<10 <sup>^</sup>	--
MW-7	03-25-97	27.88	9.88	18.00	ND	WNW	0.006	03-25-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-8	03-25-97	28.08	9.73	18.35	ND	WNW	0.006	03-25-97	63	<0.5	<0.5	<0.5	<0.5	38	--
MW-9	03-25-97	27.73	10.41	17.32	ND	WNW	0.006	03-25-97	<50	<0.5	<0.5	<0.5	<0.5	<6 <sup>^</sup>	--
MW-10	03-25-97	27.55	10.02	17.53	ND	WNW	0.006	03-25-97	<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

WNW: west-northwest

--: not analyzed

<sup>^</sup>: method reporting limit was raised due to: (1) high analyte concentration requiring sample dilution, or (2) matrix interference

**Table 2**  
**Historical Groundwater Elevation and Analytical Data**  
**Petroleum Hydrocarbons and Their Constituents**  
**1995 - Present\*\***

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

Date: 06-10-97

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	03-15-95	29.15	8.50	20.65	ND	NW	0.01	03-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-1	05-30-95	29.15	10.28	18.87	ND	SW	0.005	05-30-95	Not sampled: well sampled annually, during the first quarter						
MW-1	09-20-95	29.15	11.70	17.45	ND	WSW	0.005	09-20-95	Not sampled: well sampled annually, during the first quarter						
MW-1	11-07-95	29.15	12.12	17.03	ND	WSW	0.004	11-07-95	Not sampled: well sampled annually, during the first quarter						
MW-1	02-28-96	29.15	8.54	20.61	ND	NW	0.009	02-28-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-1	05-30-96	29.15	10.05	19.10	ND	W	0.007	05-31-96	Not sampled: well sampled annually, during the first quarter						
MW-1	08-20-96	29.15	11.35	17.80	ND	SW	0.005	08-20-96	Not sampled: well sampled annually, during the first quarter						
MW-1	11-19-96	29.15	11.20	17.95	ND	WSW	0.005	11-19-96	Not sampled: well sampled annually, during the first quarter						
MW-1	03-25-97	29.15	10.12	19.03	ND	WNW	0.006	03-25-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-2	03-15-95	28.47	8.37	20.10	ND	NW	0.01	03-15-95	2100	7.4	<2.5	130	39	--	--
MW-2	05-30-95	28.47	9.95	18.52	ND	SW	0.005	05-30-95	1700	3.3	<2.5	120	31	--	--
MW-2	09-20-95	28.47	11.37	17.10	ND	WSW	0.005	09-21-95	1200	1	<1	68	16	<5	--
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-2	02-28-96	28.47	8.12	20.35	ND	NW	0.009	02-29-96	2200	<3	<3	130	27	<20	--
MW-2	05-30-96	28.47	9.89	18.58	ND	W	0.007	05-31-96	970	<9	<1	29	3	<5	--
MW-2	08-20-96	28.47	11.05	17.42	ND	SW	0.005	08-20-96	670	<1	<1	16	1	<5	--
MW-2	11-19-96	28.47	10.96	17.51	ND	WSW	0.005	11-19-96	990	<1^	<1^	46	3	<5^	--
MW-2	03-25-97	28.47	9.84	18.63	ND	WNW	0.006	03-25-97	540	<1^	<1^	<1^	<1^	<6^	--

Table 2  
 Historical Groundwater Elevation and Analytical Data  
 Petroleum Hydrocarbons and Their Constituents  
 1995 - Present\*\*

ARCO Service Station 2185  
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Date: 06-10-97

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-3	03-15-95	28.57	8.47	20.10	ND	NW	0.01	03-15-95	2000	<2.5	<2.5	88	82	--	--
MW-3	05-30-95	28.57	10.03	18.54	ND	SW	0.005	05-30-95	2000	3.2	<2.5	70	46	--	--
MW-3	09-20-95	28.57	11.30	17.27	ND	WSW	0.005	09-21-95	2100	12	3	77	38	280	--
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-3	02-28-96	28.57	8.35	20.22	ND	NW	0.009	02-29-96	5100	83	5	160	57	640	--
MW-3	05-30-96	28.57	9.77	18.80	ND	W	0.007	05-31-96	2100	41	5	57	15	890	--
MW-3	08-20-96	28.57	11.00	17.57	ND	SW	0.005	08-20-96	2500	94	<2.5	62	14	2200	--
MW-3	11-19-96	28.57	10.92	17.65	ND	WSW	0.005	11-19-96	2400	84	<2.5^	73	22	1300	--
MW-3	03-25-97	28.57	9.90	18.67	ND	WNW	0.006	03-25-97	<50	<0.5	<0.5	<0.5	<0.5	48	--
MW-4	03-15-95	29.21	8.69	20.52	ND	NW	0.01	03-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	05-30-95	29.21	10.57	18.64	ND	SW	0.005	05-30-95	Not sampled: well sampled annually, during the first quarter						
MW-4	09-20-95	29.21	12.02	17.19	ND	WSW	0.005	09-20-95	Not sampled: well sampled annually, during the first quarter						
MW-4	11-07-95	29.21	12.42	16.79	ND	WSW	0.004	11-07-95	Not sampled: well sampled annually, during the first quarter						
MW-4	02-28-96	29.21	8.66	20.55	ND	NW	0.009	02-28-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-4	05-30-96	29.21	10.34	18.87	ND	W	0.007	05-31-96	Not sampled: well sampled annually, during the first quarter						
MW-4	08-20-96	29.21	11.67	17.54	ND	SW	0.005	08-20-96	Not sampled: well sampled annually, during the first quarter						
MW-4	11-19-96	29.21	11.50	17.71	ND	WSW	0.005	11-19-96	Not sampled: well sampled annually, during the first quarter						
MW-4	03-25-97	29.21	10.42	18.79	ND	WNW	0.006	03-25-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--

Table 2  
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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-5	03-15-95	28.12	8.47	19.65	ND	NW	0.01	03-15-95	170	5.6	<0.5	17	11	--	--
MW-5	05-30-95	28.12	9.69	18.43	ND	SW	0.005	05-30-95	53	0.6	<0.5	4.8	2.8	--	--
MW-5	09-20-95	28.12	10.90	17.22	ND	WSW	0.005	09-21-95	1500	47	2	120	86	70	--
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-5	02-28-96	28.12	8.15	19.97	ND	NW	0.009	02-29-96	900	11	<1	59	29	99	--
MW-5	05-30-96	28.12	9.48	18.64	ND	W	0.007	05-31-96	Not sampled: well sampled semi-annually, during the first and third quarters						
MW-5	08-20-96	28.12	10.58	17.54	ND	SW	0.005	08-20-96	67	0.7	<0.5	3.6	0.6	27	--
MW-5	11-19-96	28.12	10.50	17.62	ND	WSW	0.005	11-19-96	Not sampled: well sampled semi-annually, during the first and third quarters						
MW-5	03-25-97	28.12	9.58	18.54	ND	WNW	0.006	03-25-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-6	03-15-95	27.79	7.75	20.04	ND	NW	0.01	03-15-95	3600	77	<5	420	180	--	--
MW-6	05-30-95	27.79	9.48	18.31	ND	SW	0.005	05-30-95	5000	68	<5	530	250	--	--
MW-6	09-20-95	27.79	10.75	17.04	ND	WSW	0.005	09-21-95	3300	36	<5	360	120	<30	--
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-6	02-28-96	27.79	7.86	19.93	ND	NW	0.009	02-29-96	520	33	<5	480	160	<30	--
MW-6	05-30-96	27.79	9.35	18.44	ND	W	0.007	05-31-96	Not sampled: well sampled semi-annually, during the first and third quarters						
MW-6	08-20-96	27.79	10.43	17.36	ND	SW	0.005	08-20-96	1900	3.4	<2.5	150	21	<12	--
MW-6	11-19-96	27.79	10.36	17.43	ND	WSW	0.005	11-19-96	Not sampled: well sampled semi-annually, during the first and third quarters						
MW-6	03-25-97	27.79	9.35	18.44	ND	WNW	0.006	03-25-97	1100	<2 <sup>^</sup>	<2 <sup>^</sup>	5	5	<10 <sup>^</sup>	--



**Table 2**  
**Historical Groundwater Elevation and Analytical Data**  
**Petroleum Hydrocarbons and Their Constituents**  
**1995 - Present\*\***

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

Date: 06-10-97

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-7	03-15-95	27.88	8.13	19.75	ND	NW	0.01	03-15-95	150*	<0.5	<0.5	<0.5	<0.5	--	--
MW-7	05-30-95	27.88	10.14	17.74	ND	SW	0.005	05-30-95	110*	<0.5	<0.5	<0.5	<0.5	--	--
MW-7	09-20-95	27.88	11.52	16.36	ND	WSW	0.005	09-20-95	<400*	<0.8	<0.5	<0.5	<0.5	<7	--
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-7	02-28-96	27.88	8.19	19.69	ND	NW	0.009	02-29-96	<300*	<0.5	<0.5	<0.5	<0.5	<6	--
MW-7	05-30-96	27.88	9.98	17.90	ND	W	0.007	05-31-96	<100*	<0.5	<0.5	<0.5	<0.5	<3	--
MW-7	08-20-96	27.88	11.15	16.73	ND	SW	0.005	08-20-96	<200*	<0.5	<0.5	<0.5	<0.5	<5	--
MW-7	11-19-96	27.88	10.92	16.96	ND	WSW	0.005	11-19-96	Not sampled; well sampled annually, during the first quarter						
MW-7	03-25-97	27.88	9.88	18.00	ND	WNW	0.006	03-25-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-8	03-15-95	NR	8.43	NR	ND	NR	NR	03-15-95	280	<0.5	<0.5	0.7	0.7	--	--
MW-8	05-30-95	NR	9.86	NR	ND	NR	NR	05-30-95	390	<0.5	<0.5	<2	1.6	--	--
MW-8	09-20-95	28.08	11.07	17.01	ND	WSW	0.005	09-21-95	470	<0.5	<0.5	3	1.2	52	--
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-8	02-28-96	28.08	8.30	19.78	ND	NW	0.009	02-29-96	160	<0.5	<0.5	<0.9	<0.6	32	--
MW-8	05-30-96	28.08	9.68	18.40	ND	W	0.007	05-31-96	100	<0.5	<0.5	<0.6	<0.5	16	--
MW-8	08-20-96	28.08	10.72	17.36	ND	SW	0.005	08-20-96	140	<0.5	<0.5	<0.5	<0.5	190	--
MW-8	11-19-96	28.08	10.58	17.50	ND	WSW	0.005	11-19-96	Not sampled; well sampled semi-annually, during the first and third quarters						
MW-8	03-25-97	28.08	9.73	18.35	ND	WNW	0.006	03-25-97	63	<0.5	<0.5	<0.5	<0.5	38	--

Table 2  
 Historical Groundwater Elevation and Analytical Data  
 Petroleum Hydrocarbons and Their Constituents  
 1995 - Present\*\*

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

Date: 06-10-97

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	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-9	09-20-95	27.73	11.67	16.06	ND	WSW	0.005	09-20-95	<50	<0.5	<0.5	<0.5	<0.5	<4	--
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-9	02-28-96	27.73	9.23	18.50	ND	NW	0.009	02-29-96	<50	<0.5	<0.5	<0.5	<0.5	<5	--
MW-9	05-30-96	27.73	10.50	17.23	ND	W	0.007	05-31-96	<50	0.6	<0.5	<0.5	<0.5	<8	--
MW-9	08-20-96	27.73	11.33	16.40	ND	SW	0.005	08-20-96	<50	<0.5	<0.5	<0.5	<0.5	<7	--
MW-9	11-19-96	27.73	11.20	16.53	ND	WSW	0.005	11-19-96	Not sampled: well sampled annually, during the first quarter						
MW-9	03-25-97	27.73	10.41	17.32	ND	WNW	0.006	03-25-97	<50	<0.5	<0.5	<0.5	<0.5	<6 <sup>a</sup>	--
MW-10	09-20-95	27.55	10.65	16.90	ND	WSW	0.005	09-21-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--
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	--
MW-10	02-28-96	27.55	9.38	18.17	ND	NW	0.009	02-29-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-10	05-30-96	27.55	9.99	17.56	ND	W	0.007	05-31-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-10	08-20-96	27.55	10.47	17.08	ND	SW	0.005	08-20-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-10	11-19-96	27.55	10.44	17.11	ND	WSW	0.005	11-19-96	Not sampled: well sampled annually, during the first quarter						
MW-10	03-25-97	27.55	10.02	17.53	ND	WNW	0.006	03-25-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--

Table 2  
 Historical Groundwater Elevation and Analytical Data  
 Petroleum Hydrocarbons and Their Constituents  
 1995 - Present\*\*

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

Date: 06-10-97

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L

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

NR: not reported; data not available or not measurable

SW: southwest

NW: northwest

WSW: west-southwest

WNW: west-northwest

W: west

\*: chromatogram does not match the typical gasoline fingerprint

^: method reporting limit was raised due to: (1) high analyte concentration requiring sample dilution, or (2) matrix interference

--: not analyzed or not applicable

\*\* : For previous historical groundwater elevation and analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results, ARCO Service Station 2185, Oakland, California*, (EMCON, February 27, 1996).



EA-SANJOSE-CAD/DRAWINGS: I:\DZ002\SITELOC.dwg Xrefs: <NONE>  
 Scale: 1" = 1.00' DimScale: 1" = 1.00' Date: 3/12/97 Time: 5:19 PM Operator: KAJ



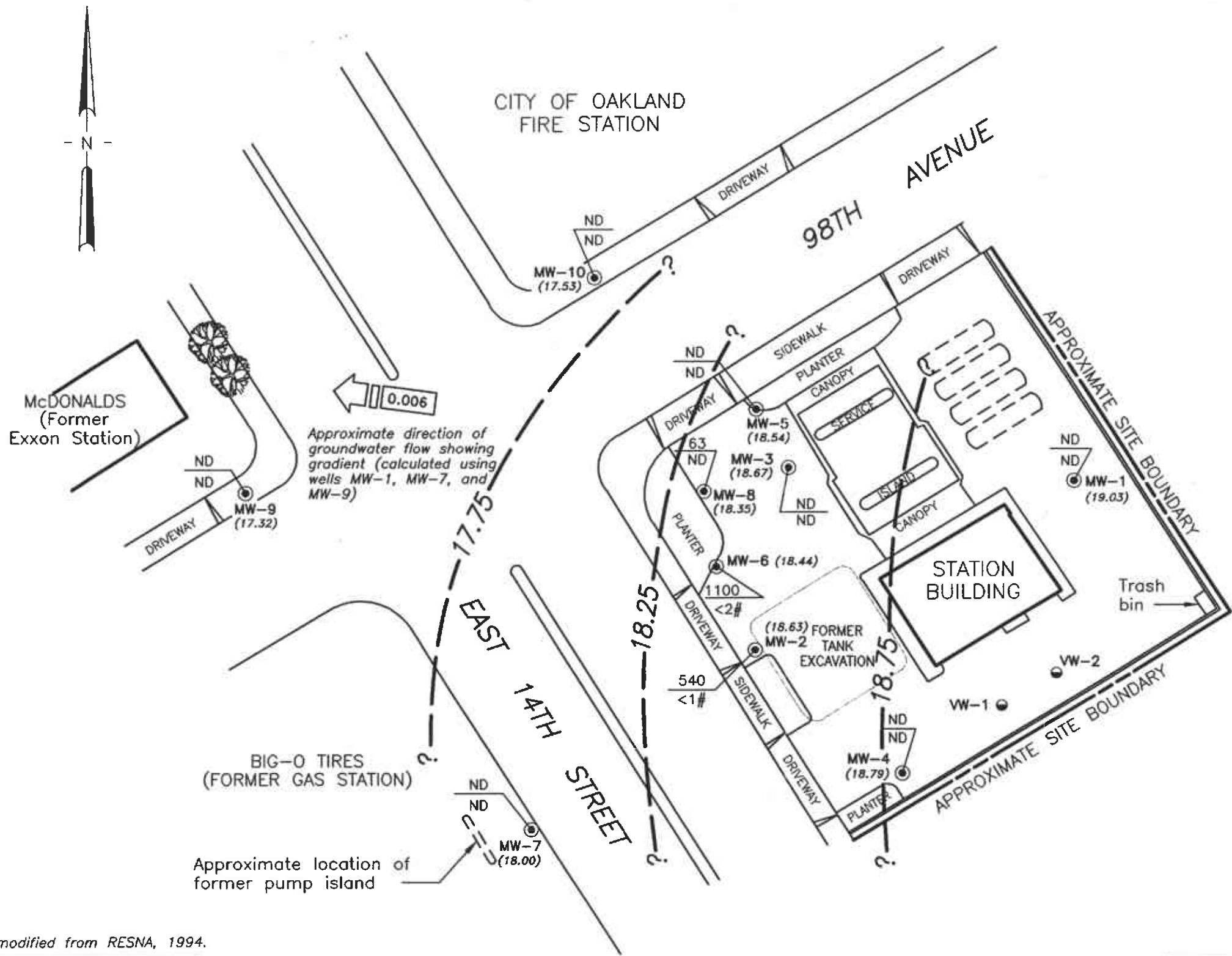
Base map from USGS 7.5' Quad. Maps:  
 Oakland East and San Leandro, California.  
 Photorevised 1980.



DATE APR. 1997  
 DWN KAJ  
 APP \_\_\_\_\_  
 REV \_\_\_\_\_  
 PROJECT NO.  
 805-130.005

**FIGURE 1**  
**ARCO PRODUCTS COMPANY**  
**SERVICE STATION 2185, 9800 E. 14TH STREET**  
**OAKLAND, CALIFORNIA**  
**QUARTERLY GROUNDWATER MONITORING**  
**SITE LOCATION**

EA-SANJOSE-CAD/DRAWINGS: G:\805-130\SIGWELEV.dwg Xrefs: <NONE>  
 Scale: 1" = 40.00' DimScale: 1" = 40.00' Date: 6/5/97 Time: 12:32 PM Operator: KMM

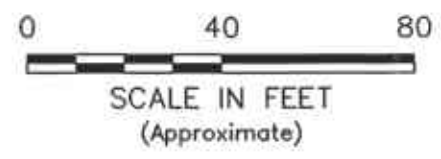


- EXPLANATION**
- Groundwater monitoring well
  - Vapor extraction well
  - Existing underground gasoline storage tank
  - (18.35) Groundwater elevation (Ft.-MSL) measured 3/25/97
  - - - Groundwater elevation contour (Ft.-MSL)
  - 63 / ND TPH, as gasoline concentration (ug/L); sampled 3/25/97
  - ND / ND Benzene concentration (ug/L); sampled 3/25/97
  - ND Not detected at or above the method reporting limit for TPHG (50 ug/L) or benzene (0.5 ug/L)
  - # Raised method reporting limit

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

Approximate location of former pump island

Base map modified from RESNA, 1994.

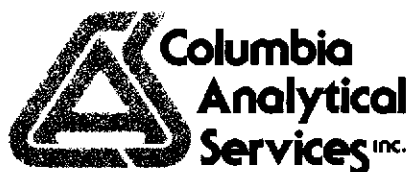


DATE	AMY 1997
DWN	KMM
APP	
REV	0
PROJECT NO.	20805-130.005

**FIGURE 2**  
 ARCO PRODUCTS COMPANY  
 SERVICE STATION 2185, 9800 E. 14TH ST.  
 OAKLAND, CALIFORNIA  
**QUARTERLY GROUNDWATER MONITORING  
 GROUNDWATER DATA - 1ST QUARTER 1997**

**APPENDIX A**

**ANALYTICAL RESULTS AND CHAIN OF CUSTODY  
DOCUMENTATION, FIRST QUARTER 1997  
GROUNDWATER MONITORING EVENT**



April 8, 1997

Service Request No.: S9700541

Mr. John Young  
EMCON  
1921 Ringwood Avenue  
San Jose, CA 95131

**RE: 2185 OAKLAND/20805-130.003/TO#19350.00**

Dear Mr. Young:

The following pages contain analytical results for sample(s) received by the laboratory on March 25, 1997. 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 10, 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,

A handwritten signature in black ink, appearing to read "S. L. Green", written over a large, light-colored scribble or mark.

Steven L. Green  
Project Chemist

A handwritten signature in black ink, appearing to read "Bernadette T. Cox for", written in a cursive style.

Greg Anderson  
Regional QA Coordinator

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

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



**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Report

**Client:** ARCO Products Company  
**Project:** 2185 OAKLAND/20805-130.003/TO#19350.00  
**Sample Matrix:** Water

**Service Request:** S9700541  
**Date Collected:** 3/25/97  
**Date Received:** 3/25/97  
**Date Extracted:** NA

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

<b>Sample Name:</b>	<b>MW-9 (11)</b>	<b>MW-10 (11)</b>	<b>MW-1 (11)</b>
<b>Lab Code:</b>	S9700541-001	S9700541-002	S9700541-003
<b>Date Analyzed:</b>	4/3/97	4/3/97	4/3/97

<b>Analyte</b>	<b>MRL</b>			
TPH as Gasoline	50	ND	ND	ND
Benzene	0.5	ND	ND	ND
Toluene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Total Xylenes	0.5	ND	ND	ND
Methyl-tert Butyl Ether	3	<6 M1	ND	ND

M1            The MRL was elevated because of matrix interferences.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company  
Project: 2185 OAKLAND/20805-130.003/TO#19350.00  
Sample Matrix: Water

Service Request: S9700541  
Date Collected: 3/25/97  
Date Received: 3/25/97  
Date Extracted: NA

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

Sample Name:	MW-4 (11)	MW-7 (10)	MW-5 (11)
Lab Code:	S9700541-004	S9700541-005	S9700541-006
Date Analyzed:	4/3/97	4/3/97	4/3/97

Analyte	MRL			
TPH as Gasoline	50	ND	ND	ND
Benzene	0.5	ND	ND	ND
Toluene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Total Xylenes	0.5	ND	ND	ND
Methyl tert-Butyl Ether	3	ND	ND	ND

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Report

**Client:** ARCO Products Company  
**Project:** 2185 OAKLAND/20805-130.003/TO#19350.00  
**Sample Matrix:** Water

**Service Request:** S9700541  
**Date Collected:** 3/25/97  
**Date Received:** 3/25/97  
**Date Extracted:** NA

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

<b>Sample Name:</b>	<b>MW-8 (22)</b>	<b>MW-2 (11)</b>	<b>MW-6 (11)</b>
<b>Lab Code:</b>	S9700541-007	S9700541-008	S9700541-009
<b>Date Analyzed:</b>	4/3/97	4/3/97	4/4/97

<b>Analyte</b>	<b>MRL</b>			
TPH as Gasoline	50	63	540	1100
Benzene	0.5	ND	<1C1	<2 C1
Toluene	0.5	ND	<1C1	<2 C1
Ethylbenzene	0.5	ND	<1C1	5
Total Xylenes	0.5	ND	<1C1	5
Methyl tert-Butyl Ether	3	38	<6 C1	<10 C1

C1            The MRL was elevated due to high analyte concentration requiring sample dilution.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

**Client:** ARCO Products Company  
**Project:** 2185 OAKLAND/20805-130.003/TO#19350.00  
**Sample Matrix:** Water

**Service Request:** S9700541  
**Date Collected:** 3/25/97  
**Date Received:** 3/25/97  
**Date Extracted:** NA

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

<b>Sample Name:</b>	<b>MW-3 (11)</b>	<b>Method Blank</b>	<b>Method Blank</b>
<b>Lab Code:</b>	<b>S9700541-010</b>	<b>S970403-WB1</b>	<b>S970405-WB1</b>
<b>Date Analyzed:</b>	<b>4/5/97</b>	<b>4/3/97</b>	<b>4/5/97</b>

Analyte	MRL			
TPH as Gasoline	50	ND	ND	ND
Benzene	0.5	ND	ND	ND
Toluene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Total Xylenes	0.5	ND	ND	ND
Methyl tert-Butyl Ether	3	48	ND	ND

**COLUMBIA ANALYTICAL SERVICES, INC.**

QA/QC Report

**Client:** ARCO Products Company  
**Project:** 2185 OAKLAND/20805-130.003/TO#19350.00  
**Sample Matrix:** Water

**Service Request:** S9700541  
**Date Collected:** 3/25/97  
**Date Received:** 3/25/97  
**Date Extracted:** NA  
**Date Analyzed:** NA

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 $\alpha,\alpha,\alpha$ -Trifluorotoluene
MW-9 (11)	S9700541-001	99	99
MW-10 (11)	S9700541-002	97	94
MW-1 (11)	S9700541-003	99	95
MW-4 (11)	S9700541-004	99	87
MW-7 (10)	S9700541-005	94	91
MW-5 (11)	S9700541-006	100	91
MW-8 (22)	S9700541-007	100	95
MW-2 (11)	S9700541-008	90	111
MW-6 (11)	S9700541-009	96	104
MW-3 (11)	S9700541-010	88	91
MW-9 (17) MS	S9700541-001 MS	94	107
MW-9 (17) DMS	S9700541-001 DMS	95	106
Method Blank	S970403-WB1	97	94
Method Blank	S970405-WB1	95	85

CAS Acceptance Limits:                      69-116                      69-116

**COLUMBIA ANALYTICAL SERVICES, INC.**

QA/QC Report

**Client:** ARCO Products Company  
**Project:** 2185 OAKLAND/20805-130.003/TO#19350.00  
**Sample Matrix:** Water

**Service Request:** S9700541  
**Date Collected:** 3/25/97  
**Date Received:** 3/25/97  
**Date Extracted:** NA  
**Date Analyzed:** 4/3/97

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

**Sample Name:** MW-9 (11)  
**Lab Code:** S9700541-001 MS, DMS

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

**COLUMBIA ANALYTICAL SERVICES, INC.**

**QA/QC Report**

**Client:** ARCO Products Company  
**Project:** 2185 OAKLAND/20805-130.003/TO#19350.00

**Service Request:** S9700541  
**Date Analyzed:** 4/3/97

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

<b>Analyte</b>	<b>True Value</b>	<b>Result</b>	<b>Percent Recovery</b>	<b>CAS Percent Recovery Acceptance Limits</b>
Benzene	25	25	100	85-115
Toluene	25	26	104	85-115
Ethylbenzene	25	26	104	85-115
Xylenes, Total	75	78	104	85-115
Gasoline	250	240	96	90-110
Methyl tert-Butyl Ether	25	24	96	85-115

01100241

Task Order No. **19350-00**

Chain of Custody

ARCO Facility no. <b>2185</b>	City (Facility) <b>OAKLAND</b>	Project manager (Consultant) <b>John Young</b>	Laboratory name <b>CAS</b>
ARCO engineer <b>PAUL Supple</b>	Telephone no. (ARCO)	Telephone no. (Consultant) <b>453-7300</b>	Fax no. (Consultant)
Consultant name <b>EMCON</b>	Address (Consultant)		Contract number <b>20805-1301003</b>

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA 1602/8020/8015	TPH Modified 8015 Gas <input type="checkbox"/> Diesel <input type="checkbox"/>	Oil and Grease 413.1 <input type="checkbox"/> 413.2 <input type="checkbox"/>	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals <input type="checkbox"/> VOA <input type="checkbox"/> VOA <input type="checkbox"/> Semi <input type="checkbox"/>	CAM Metals EPA 6010/7000 TLC <input type="checkbox"/> STLC <input type="checkbox"/>	Lead Org./DHS <input type="checkbox"/> Lead EPA 7420/7421 <input type="checkbox"/>	
			Soil	Water	Other	Ice	Acid														
MW-9(11)	1	2		X				3/25/97	0925		✓										
MW-10(11)	2								0905		✓										
MW-1(11)	3								0815		✓										
MW-4(11)	4								0910		✓										
MW-7(10)	5								0945		✓										
MW-5(11)	6								0920		✓										
MW-8(22)	7								0933		✓										
MW-2(11)	8								0940		✓										
MW-6(11)	9								0950		✓										
MW-3(11)	10	✓		✓				✓	1000		✓										

Method of shipment  
**samples will deliver**

Special detection Limit/reporting  
**Lowest Possible**

Special QA/QC

Remarks  
**2 40 ml HCL VOA'S**

20805-1301003

Lab number  
**59700541**

Turnaround time

Priority Rush 1 Business Day

Rush 2 Business Days

Expedited 5 Business Days

Standard 10 Business Days

Condition of sample:		Temperature received:	
Relinquished by sampler <i>[Signature]</i>	Date <b>3/25/97</b> Time <b>13:30</b>	Received by <b>Russell Platt</b>	
Relinquished by	Date	Received by	
Relinquished by	Date	Received by laboratory <b>CAS</b>	Date <b>3/25/97</b> Time <b>1:30 PM</b>

*RS*