



EMCON

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

97 SEP 30 AM 9:13

Date September 30, 1997
Project 20805-130.005

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

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

Gary P. Messerotes
Project Manager

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





Date: September 30, 1997

Re: ARCO Station #

2185 • 9800 East 14th Street • Oakland, CA
Second 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 style with a large initial "P" and a long, sweeping underline.

Paul Supple
Environmental Engineer



EMCON

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

August 29, 1997
Project 20805-130.005

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

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

Dear Mr. Supple:

This letter presents the results of the second 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

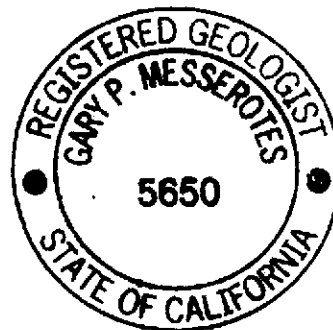
No monitoring event is thorough enough to describe all geologic and hydrogeologic conditions of interest at a given site. If conditions have not been identified during the monitoring event, results should not be construed as a guarantee of the absence of such conditions at the site, but rather as the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

Please call if you have questions.

Sincerely,

EMCON


Gary P. Messerotes, R.G. 5650
Project Manager



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.: Gary P. Messerotes /(408) 453-7300
 Primary Agency/Regulatory ID No.: ACHCSA /Barney Chan

WORK PERFORMED THIS QUARTER (Second- 1997):

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

WORK PROPOSED FOR NEXT QUARTER (Third- 1997):

1. Prepare and submit quarterly groundwater monitoring report for second quarter 1997.
2. Perform quarterly groundwater monitoring and sampling for third 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: 28.12 feet
 Groundwater Gradient (Average): 0.001 ft/ft toward west (consistent with past events)

ATTACHED:

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

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

Table 1
Groundwater Monitoring Data
Second Quarter 1997

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

Date: 08-27-97

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	06-17-97	29.15	11.27	17.88	ND	W	0.001	06-17-97	Not sampled: well sampled annually, during the first quarter						
MW-2	06-17-97	28.47	10.99	17.48	ND	W	0.001	06-17-97	510	<7 [^]	0.9	1.1	<2 [^]	<3	--
MW-3	06-17-97	28.57	10.95	17.62	ND	W	0.001	06-17-97	<200 [^]	<2 [^]	<2 [^]	<2 [^]	<2 [^]	200	--
MW-4	06-17-97	29.21	11.60	17.61	ND	W	0.001	06-17-97	Not sampled: well sampled annually, during the first quarter						
MW-5	06-17-97	28.12	10.52	17.60	ND	W	0.001	06-17-97	Not sampled: well sampled semi-annually, during the first and third quarters						
MW-6	06-17-97	27.79	10.37	17.42	ND	W	0.001	06-17-97	Not sampled: well sampled semi-annually, during the first and third quarters						
MW-7	06-17-97	27.88	11.13	16.75	ND	W	0.001	06-17-97	Not sampled: well sampled annually, during the first quarter						
MW-8	06-17-97	28.08	10.67	17.41	ND	W	0.001	06-17-97	Not sampled: well sampled semi-annually, during the first and third quarters						
MW-9	06-17-97	27.73	11.30	16.43	ND	W	0.001	06-17-97	Not sampled: well sampled annually, during the first quarter						
MW-10	06-17-97	27.55	10.40	17.15	ND	W	0.001	06-17-97	Not sampled: well sampled annually, during the first quarter						

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

W: west

--: not analyzed

[^]: 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: 08-27-97

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-1	06-17-97	29.15	11.27	17.88	ND	W	0.001	06-17-97	Not sampled: well sampled annually, during the first quarter						
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^	--
MW-2	06-17-97	28.47	10.99	17.48	ND	W	0.001	06-17-97	510	<7^	0.9	1.1	<2^	<3	--

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Date: 08-27-97

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
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-3	06-17-97	28.57	10.95	17.62	ND	W	0.001	06-17-97	<200^	<2^	<2^	<2^	<2^	200	--
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	--
MW-4	06-17-97	29.21	11.60	17.61	ND	W	0.001	06-17-97	Not sampled: well sampled annually, during the first quarter						

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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-5	06-17-97	28.12	10.52	17.60	ND	W	0.001	06-17-97	Not sampled: well sampled semi-annually, during the first and third quarters						
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^	<2^	5	5	<10^	--
MW-6	06-17-97	27.79	10.37	17.42	ND	W	0.001	06-17-97	Not sampled: well sampled semi-annually, during the first and third quarters						

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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-7	06-17-97	27.88	11.13	16.75	ND	W	0.001	06-17-97	Not sampled: well sampled annually, during the first quarter						
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	--
MW-8	06-17-97	28.08	10.67	17.41	ND	W	0.001	06-17-97	Not sampled: well sampled semi-annually, during the first and third quarters						

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: 08-27-97

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-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	--	
MW-9	06-17-97	27.73	11.30	16.43	ND	W	0.001	06-17-97	Not sampled: well sampled annually, during the first quarter							
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	--	
MW-10	06-17-97	27.55	10.40	17.15	ND	W	0.001	06-17-97	Not sampled: well sampled annually, during the first quarter							

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: 08-27-97

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).

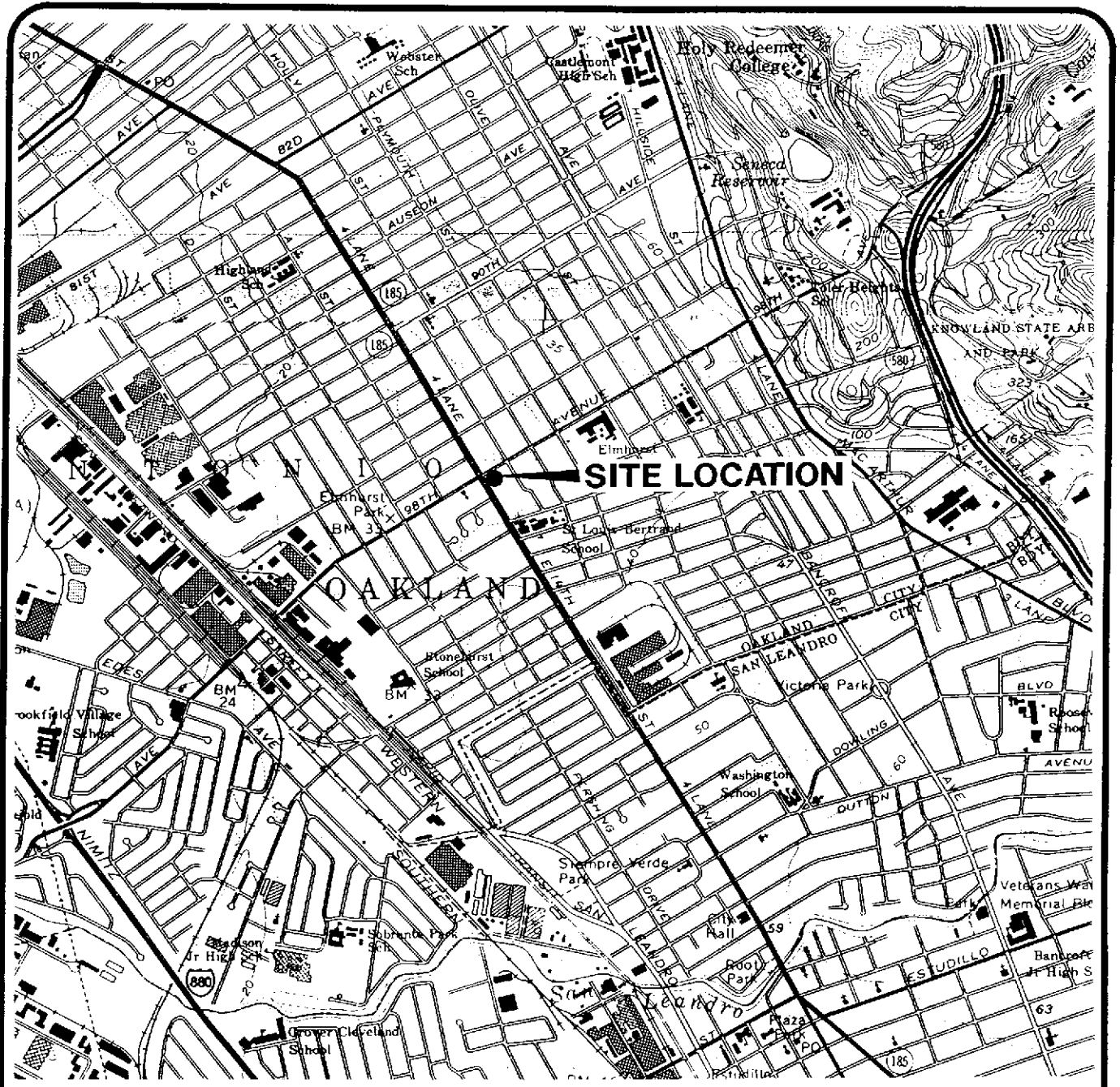
Table 3
Bioremediation Indicator Parameters
Third Quarter 1995

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

Date: 08-22-97

Well Designation	Water Sample Field Date	Relative Distance from Well MW-3 feet	TPHC Concentration µg/L	Gasoline-Utilizing Bacteria CFUs/ml	Heterotrophic Organisms CFUs/ml	Dissolved Oxygen mg/L	Laboratory Redox Potential millivolts	Field Redox Potential millivolts	Ammonia as Nitrogen mg/L	Total Kjeldahl Nitrogen mg/L	pH std. units	Ortho-phosphate mg/L	Dissolved Potassium µg/L
MW-3	09-21-95	0	2,100	420	5,500	2.5	118	25	<0.1	<1	6.76	0.17	<2,000
MW-5	09-21-95	23	1,500	100	8,500	3.5	328	280	<0.1	<1	6.82	0.22	<2,000
MW-8	09-21-95	30	470	110	89,000	3.5	327	25	<0.1	<1	6.84	0.21	<2,000
MW-6	09-21-95	42	3,300	330	13,400	3.5	150	-35	<0.1	<1	6.72	0.34	<2,000
MW-2	09-21-95	62	1,200	200	9,400	1.5	138	-60	<0.1	<1	6.78	0.36	<2,000

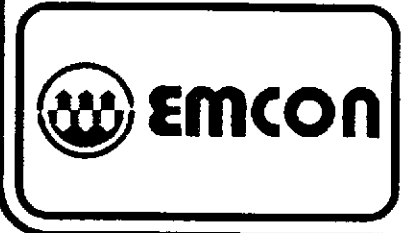
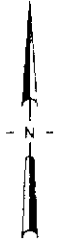
µg/L: micrograms per liter
CFUs/ml: colony forming units per milliliter
mg/L: milligrams per liter
std. units: standard pH units



EA-SANJOSE-CAD/DRAWINGS: I:\020002\SITELOC.dwg Xrefs: <NONE>
 Scale: 1 = 1.00 DimScale: 1 = 1.00 Date: 3/12/97 Time: 5:19 PM Operator: KAJ



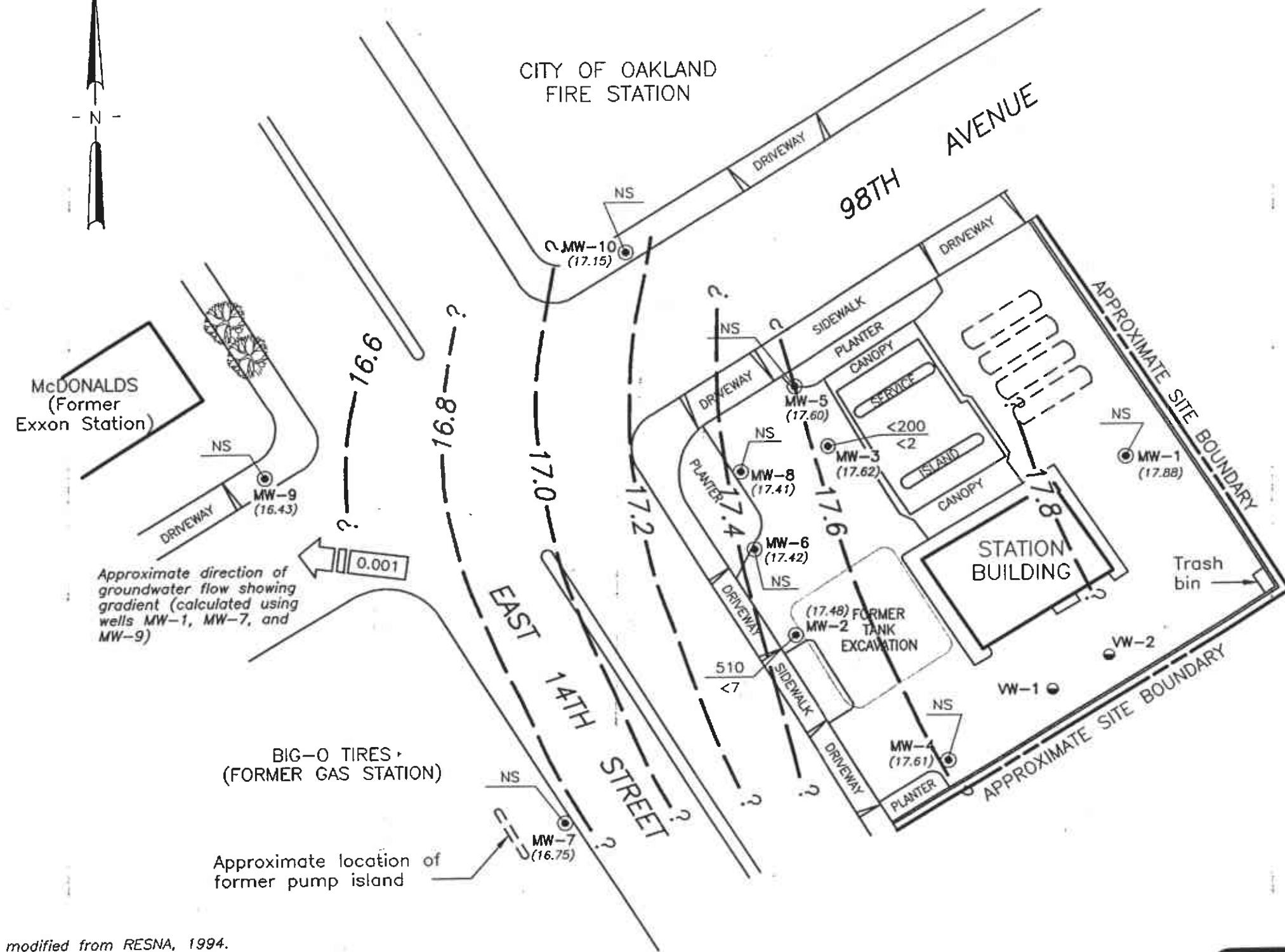
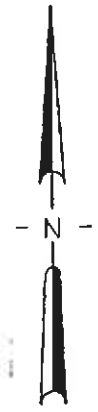
Base map from USGS 7.5' Quad. Maps:
 Oakland East and San Leandro, California.
 Photorevised 1980.



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\SJGWLELEY.dwg Xrefs: <NONE>
 Scale: 1" = 40.00' DimsScale: 1" = 40.00' Date: 8/26/97 Time: 3:30 PM Operator: KAJ



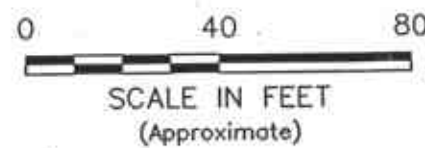
- EXPLANATION**
- Groundwater monitoring well
 - Vapor extraction well
 - ⊞ Existing underground gasoline storage tank
 - (17.48) Groundwater elevation (Ft.-MSL) measured 6/17/97
 - Groundwater elevation contour (Ft.-MSL)
 - 63 / ND TPH, as gasoline concentration (ug/L); sampled 6/17/97
 - ND Benzene concentration (ug/L); sampled 6/17/97
 - ND Not detected at or above the method reporting limit for TPHG (50 ug/L) or benzene (0.5 ug/L)
 - NS Not sampled; not scheduled for chemical analysis
 - < Method reporting limit raised due to high analyte concentration or matrix interference requiring sample dilution

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

Base map modified from RESNA, 1994.



DATE AUG. 1997
 DWN KAJ
 APP _____
 REV _____
 PROJECT NO. 805-130.005

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

APPENDIX A

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

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

June 30, 1997

Service Request No.: S9701137

Ivy Inouye
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

RE: 20805-130.005/TO#19350.00/2185 OAKLAND

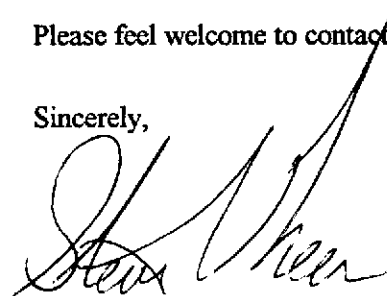
Dear Ms. Inouye:

The following pages contain analytical results for sample(s) received by the laboratory on June 17, 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,



Steven L. Green
Project Chemist

COLUMBIA ANALYTICAL SERVICES, Inc.

Acronyms

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-130.005/TO#19350.00/2185 OAKLAND
Sample Matrix: Water

Service Request: S9701137
Date Collected: 6/17/97
Date Received: 6/17/97

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-2(12)
Lab Code: S9701137-001
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/24/97	510	
Benzene	EPA 5030	8020	0.5	1	NA	6/24/97	<7	M1
Toluene	EPA 5030	8020	0.5	1	NA	6/24/97	0.9	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	6/24/97	1.1	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	6/24/97	<2	M1
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	6/24/97	ND	

M1 The MRL was elevated because of matrix interferences.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-130.005/TO#19350.00/2185 OAKLAND
Sample Matrix: Water

Service Request: S9701137
Date Collected: 6/17/97
Date Received: 6/17/97

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-3(12)
Lab Code: S9701137-002
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	4	NA	6/23/97	<200	C1
Benzene	EPA 5030	8020	0.5	4	NA	6/23/97	<2	C1
Toluene	EPA 5030	8020	0.5	4	NA	6/23/97	<2	C1
Ethylbenzene	EPA 5030	8020	0.5	4	NA	6/23/97	<2	C1
Xylenes, Total	EPA 5030	8020	0.5	4	NA	6/23/97	<2	C1
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	4	NA	6/23/97	200	

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-130.005/TO#19350.00/2185 OAKLAND
Sample Matrix: Water

Service Request: S9701137
Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
Lab Code: S970623-WB1
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/23/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	6/23/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	6/23/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	6/23/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	6/23/97	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	6/23/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-130.005/TO#19350.00/2185 OAKLAND
Sample Matrix: Water

Service Request: S9701137
Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
Lab Code: S970624-WB1
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/23/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	6/23/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	6/23/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	6/23/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	6/23/97	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	6/23/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 2080 130.005/TO#19350.00/2185 OAKLAND
Sample Matrix: Water

Service Request: S9701137
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: NA

**Surrogate Recovery Summary
 BTEX, MTBE and TPH as Gasoline**

Prep Method: EPA 5030
Analysis Method: 8020 CA/LUFT

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery	
			4-Bromofluorobenzene	a,a,a-Trifluorotoluene
MW-2(12)	S9701137-001		80	96 B2
MW-3(12)	S9701137-002		98	97
MW-3(12)	S9701137-002MS		107	101
MW-3(12)	S9701137-002DMS		101	100
Method Blank	S970623-WB1		97	108
Method Blank	S970624-WB1		95	89

CAS Acceptance Limits: 69-116 69-116

B2 The surrogate used for this sample was 1,4-Difluorobenzene.

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-130.005/TO#19350.00/2185 OAKLAND
Sample Matrix: Water

Service Request: S9701137
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 6/23/97

Matrix Spike/Duplicate Matrix Spike Summary
 TPH as Gasoline

Sample Name: MW-3(12)
Lab Code: S9701137-002MS, S9701137-002DMS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	Percent Recovery										Result Notes
			Spike Level		Sample Result	CAS				Relative Percent Difference			
			MRL	MS		DMS	MS	DMS	MS		DMS	Acceptance Limits	
Gasoline	EPA 5030	CA/LUFT	50	1000	1000	<200	850	850	85	85	75-135	<1	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-130.005/TO#19350.00/2185 OAKLAND

Service Request: S9701137
Date Analyzed: 6/23/97

Initial Calibration Verification (ICV) Summary
 BTEX, MTBE and TPH as Gasoline

Sample Name: ICV Units: ug/L (ppb)
Lab Code: ICV1 Basis: NA
Test Notes:

ICV Source:

Analyte	Prep Method	Analysis Method	True Value	Result	CAS		Result Notes
					Percent Recovery Acceptance Limits	Percent Recovery	
TPH as Gasoline	EPA 5030	CA/LUFT	250	250	90-110	100	
Benzene	EPA 5030	8020	25	24	85-115	96	
Toluene	EPA 5030	8020	25	25	85-115	100	
Ethylbenzene	EPA 5030	8020	25	25	85-115	100	
Xylenes, Total	EPA 5030	8020	75	74	85-115	99	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	25	24	85-115	96	

ICV032196

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-130.005/TO#19350.00/2185 OAKLAND
Sample Matrix: Water

Service Request: S9701137
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 6/23/97

Matrix Spike Summary
 TPH as Gasoline

Sample Name: MW-3(12)
Lab Code: S9701137-002MS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS	Result Notes
								Percent Recovery Acceptance Limits	
Gasoline	EPA 5030	CA/LUFT	50	1000	<200	850	85	75-135	

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 19350.00

Chain of Custody

ARCO Facility no. 2185 City (Facility) Oakland Project manager (Consultant) IVY INOYE Laboratory name CAS

ARCO engineer Paul Supple Telephone no. (ARCO) — Telephone no. (Consultant) (408) 453-7300 Fax no. (Consultant) (408) 453-0452 Contract number —

Consultant name EMCOR LOWT Address (Consultant) 1921 RINGWOOD AVE.

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX 602/EPA 9020	INCL. MTEX BTEX/TPH EPA M602/8020/8015	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 601/9010	EPA 624/8240	EPA 625/8270	TCLP Metals <input type="checkbox"/> VOA <input type="checkbox"/> VOA <input type="checkbox"/>	Semi Metals EPA 601/7000 TTL <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-2(A)	1	2		X		X	X	6/17/97	1130		X											
MW-3(A)	2	2		X		X	X	6/17/97	1145		X											

Method of shipment
Sampler will deliver

Special detection Limit/reporting
LOWEST POSSIBLE

Special QA/QC
AS NORMAL

Remarks
2- 40 ML VOA'S (HLD)

20805-130 005

Lab number
59701137

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 [Signature] Date 6/17/97 Time 1300 Received by Russell Platt

Relinquished by _____ Date _____ Time _____ Received by _____

Relinquished by _____ Date _____ Time _____ Received by laboratory CAS Date 6/17/97 Time 1300