

**EMCON**

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

Date December 31, 1997
Project 20805-121.005

To:

Mr. Scott Seery
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harborbay Parkway, Suite 250
Alameda, California 94502

We are enclosing:

Copies	Description
<u>1</u>	<u>Third quarter 1997 groundwater monitoring results report,</u>
	<u>ARCO service station 601, San Leandro, California</u>
<u>1</u>	<u>John Sullivan letter</u>

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



Gary P. Messerotes
Project Manager

cc: Mike Bakaldin, SLFD
Paul Supple, ARCO Products Company
File

98 JAN -2 PM 4:02
RECEIVED
PROJECTION





Date: December 31, 1997

Re: ARCO Station #

601 • 712 Lewelling Boulevard • San Leandro, CA
Third 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, appearing to read "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

December 29, 1997
Project 20805-121.005

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

Re: Third quarter 1997 groundwater monitoring results, ARCO service station 601, San Leandro, California

Dear Mr. Supple:

This letter presents the results of the third quarter 1997 groundwater monitoring program at ARCO Products Company (ARCO) service station 601, 712 Lewelling Boulevard, San Leandro, California (Figure 1). The quarterly monitoring program complies with Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

LIMITATIONS

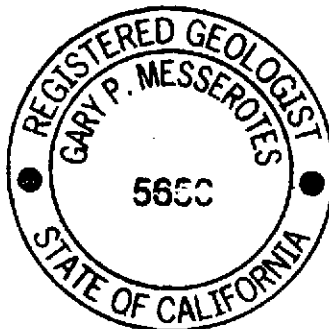
No monitoring event is thorough enough to describe all geologic and hydrogeologic conditions of interest at a given site. If conditions have not been identified during the monitoring event, results should not be construed as a guarantee of the absence of such conditions at the site, but rather as the 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.: 601 Address: 712 Lewelling Boulevard, San Leandro, California
 EMCON Project No. 20805-121.005
 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 /Scott Seery

WORK PERFORMED THIS QUARTER (Third- 1997):

1. Prepared and submitted quarterly groundwater monitoring report for second quarter 1997.
2. Performed quarterly groundwater monitoring and sampling for third quarter 1997.
3. Stimulated natural biodegradation with oxygen releasing compounds (ORCs) in groundwater monitoring well MW-8.

WORK PROPOSED FOR NEXT QUARTER (Fourth- 1997):

1. Prepare and submit quarterly groundwater monitoring report for third quarter 1997.
2. Perform quarterly groundwater monitoring and sampling for fourth quarter 1997.
3. Continue to monitor dissolved oxygen in groundwater monitoring wells MW-2, MW-3, MW-5, and MW-8.
4. Evaluate potential off-site plume migration.

QUARTERLY MONITORING:

Current Phase of Project:	<u>Quarterly Groundwater Monitoring</u>
Frequency of Sampling:	<u>Quarterly (groundwater)</u>
Frequency of Monitoring:	<u>Quarterly (groundwater)</u>
Is Floating Product (FP) Present On-site:	☐ Yes ☒ No
Cumulative FP Recovered to Date :	<u>3.45 gallons, Well MW-1</u>
FP Recovered This Quarter :	<u>None</u>
Bulk Soil Removed to Date :	<u>1,565 cubic yards of TPH impacted soil</u>
Bulk Soil Removed This Quarter :	<u>None</u>
Water Wells or Surface Waters within 2000 ft., impacted by site:	<u>None</u>
Current Remediation Techniques:	<u>Enhanced bioremediation</u>
Average Depth to Groundwater:	<u>8.32 feet</u>
Groundwater Gradient (Average):	<u>0.04 ft/ft toward southeast</u>

ATTACHED:

- Table 1 - Groundwater Monitoring Data, Third Quarter 1997
- Table 2 - Historical Groundwater Elevation and Analytical Data, Petroleum Hydrocarbons and Their Constituents
- Table 3 - Historical Groundwater Analytical Data, Metals
- Table 4 - Historical Groundwater Analytical Data, Volatile and Semivolatile Organic Compounds
- Table 5 - Approximate Cumulative Floating Product Recovered, Monitoring Well MW-1
- Figure 1 - Site Location
- Figure 2 - Site Plan
- Figure 3 - Groundwater Data, Third Quarter 1997
- Appendix A - Analytical Results and Chain of Custody Documentation, Third Quarter 1997 Groundwater Monitoring Event

cc: Scott Seery, ACHCSA
 Mike Bakaldin, SLFD

Table 1
Groundwater Monitoring Data
Third Quarter 1997

ARCO Service Station 601
712 Lewelling Boulevard, San Leandro, California

Date: 11-25-97

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	TRPH EPA 418.1 µg/L	TPHD LUFT Method µg/L
MW-1	08-19-97	19.19	8.65	10.54	ND	SE	0.04	08-19-97	83000	4500	<100 [^]	2200	8100	<600 [^]	--	--	--
MW-2	08-19-97	21.12	7.64	13.48	ND	SE	0.04	08-19-97	Not sampled: well sampled annually, during the first quarter								
MW-3	08-19-97	22.99	7.25	15.74	ND	SE	0.04	08-19-97	100000	2000	3200	<100 [^]	19000	<600 [^]	--	--	--
MW-4	08-19-97	22.38	-	NA	ND	SE	0.04	08-19-97	Not sampled: well is dry								
MW-5	08-19-97	22.45	7.58	14.87	ND	SE	0.04	08-19-97	16000	4600	790	<50 [^]	1300	<300 [^]	--	--	--
MW-6	08-19-97	22.77	-	NA	ND	SE	0.04	08-19-97	Not sampled: well is dry								
MW-7	08-19-97	22.89	-	NA	ND	SE	0.04	08-19-97	Not sampled: well is dry								
MW-8	08-19-97	20.89	7.87	13.02	ND	SE	0.04	08-19-97	<500 [^]	<5 [^]	<5 [^]	<5 [^]	290	--	--	--	--
MW-9	08-19-97	22.26	8.32	13.94	ND	SE	0.04	08-19-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-10	08-19-97	21.33	8.39	12.94	ND	SE	0.04	08-19-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-11	08-19-97	20.97	8.67	12.30	ND	SE	0.04	08-19-97	Not sampled: well sampled annually, during the first quarter								
MW-12	08-19-97	20.11	9.20	10.91	ND	SE	0.04	08-19-97	Not sampled: well sampled annually, during the first quarter								
MW-13	08-19-97	20.75	8.40	12.35	ND	SE	0.04	08-19-97	Not sampled: well sampled annually, during the first quarter								
MW-14	08-19-97	20.90	9.80	11.10	ND	SE	0.04	08-19-97	Not sampled: well sampled annually, during the first quarter								
MW-15	08-19-97	22.08	6.34	15.74	ND	SE	0.04	08-19-97	99*	<0.5	<0.5	<0.5	0.7	6	--	--	--

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

TRPH: total recoverable petroleum hydrocarbons

TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method

ESE: east-southeast

--: not analyzed

ND: none detected

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

*: Sample contains a higher boiling point hydrocarbon mixture quantitated as gasoline. The chromatogram did not match the typical gasoline fingerprint.

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

ARCO Service Station 601
712 Lewelling Boulevard, San Leandro, California

Date: 11-25-97

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	TRPH EPA 418.1 µg/L	TPHD LUFT Method µg/L
MW-1	03-17-95	22.26	6.57	15.69	ND	WSW	0.006	03-17-95	120000	5300	370	1500	13000	--	--	48000	6200*
MW-1	06-01-95	22.26	7.87	14.39	ND	SW	0.003	06-01-95	250000	7100	950	3500	21000	--	--	38000	190000*
MW-1	08-31-95	22.26	8.12	** 14.15	0.01	SSW	0.005	08-31-95	Not sampled: well contained floating product								
MW-1	11-27-95	22.26	8.42	13.84	Sheen	SSW	0.004	11-27-95	310000	4600	770	5700	21000	--	--	--	--
MW-1	02-22-96	22.26	6.01	** 16.26	0.01	NW	0.007	03-14-96	100000	6200	320	2500	12000	<1000*	--	--	--
MW-1	05-20-96	22.26	7.03	15.23	ND	SW	0.007	05-21-96	340000	6600	240	4500	22000	<1000^	--	150	<2500*
MW-1	08-26-96	22.26	8.16	14.10	ND	SSW	0.004	08-26-96	210000	7900	320	3400	15000	<1000^	--	--	--
MW-1	11-20-96	22.26	7.84	14.42	ND	SSE	0.004	11-20-96	62000	5900	77	2000	7700	<300^	--	--	--
MW-1	03-24-97	19.19	8.05	11.14	ND	SE	0.013	03-24-97	170000	6500	<200^	2400	9900	<1000^	--	--	--
MW-1	05-23-97	19.19	8.42	10.77	ND	SE	0.014	05-23-97	83000	6200	84	2500	9000	<300^	--	--	--
MW-1	08-19-97	19.19	8.65	10.54	ND	SE	0.04	08-19-97	83000	4500	<100^	2200	8100	<600^	--	--	--
MW-2	03-17-95	21.33	6.12	15.21	ND	WSW	0.006	03-17-95	10000	460	77	260	550	--	--	--	--
MW-2	06-01-95	21.33	6.56	14.77	ND	SW	0.003	06-01-95	13000	400	78	210	410	--	--	--	--
MW-2	08-31-95	21.33	7.18	14.15	ND	SSW	0.005	08-31-95	5000	280	18	120	140	<50^	--	--	--
MW-2	11-27-95	21.33	7.39	13.94	ND	SSW	0.004	11-27-95	3200	230	12	77	90	--	--	--	--
MW-2	02-22-96	21.33	5.78	15.55	ND	NW	0.007	03-14-96	11000	290	67	190	330	<50^	--	--	--
MW-2	05-20-96	21.33	6.27	15.06	ND	SW	0.007	05-21-96	Not sampled: well sampled annually, during the first quarter								
MW-2	08-26-96	21.33	7.30	14.03	ND	SSW	0.004	08-26-96	Not sampled: well sampled annually, during the first quarter								
MW-2	11-20-96	21.33	7.28	14.05	ND	SSE	0.004	11-20-96	Not sampled: well sampled annually, during the first quarter								
MW-2	03-24-97	21.12	7.11	14.01	ND	SE	0.013	03-24-97	4800	570	6	71	32	67	--	--	--
MW-2	05-23-97	21.12	7.44	13.68	ND	SE	0.014	05-23-97	Not sampled: well sampled annually, during the first quarter								
MW-2	08-19-97	21.12	7.64	13.48	ND	SE	0.04	08-19-97	Not sampled: well sampled annually, during the first quarter								

Table 2
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Petroleum Hydrocarbons and Their Constituents
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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	TRPH EPA 418.1 µg/L	TPHD LUFT Method µg/L
MW-3	03-17-95	20.11	5.46	14.65	ND	WSW	0.006	03-17-95	370000	4800	12000	5800	34000	--	--	--	--
MW-3	06-01-95	20.11	6.34	13.77	ND	SW	0.003	06-01-95	270000	6000	11000	5200	28000	--	--	--	--
MW-3	08-31-95	20.11	6.60	** 13.52	0.02	SSW	0.005	08-31-95	Not sampled; well contained floating product								
MW-3	11-27-95	20.11	6.76	** 13.36	0.01	SSW	0.004	11-27-95	150000	5100	8800	3900	21000	--	--	--	--
MW-3	02-22-96	20.11	5.14	** 14.98	0.01	NW	0.007	03-14-96	150000	4400	7600	4100	22000	<3000^	--	--	--
MW-3	05-20-96	20.11	5.17	14.94	ND	SW	0.007	05-21-96	410000	4700	8000	6300	36000	<3000^	--	--	--
MW-3	08-26-96	20.11	7.04	13.07	ND	SSW	0.004	08-26-96	260000	4000	6100	4200	24000	<2000^	--	--	--
MW-3	11-20-96	20.11	6.26	13.85	ND	SSE	0.004	11-20-96	190000	3200	5800	3300	20000	<1000^	--	--	--
MW-3	03-24-97	22.99	6.94	16.05	ND	SE	0.013	03-24-97	430000	2700	7600	7000	39000	<5000^	--	--	--
MW-3	05-23-97	22.99	6.98	16.01	ND	SE	0.014	05-23-97	130000	2100	4300	3500	19000	<700^	--	--	--
MW-3	08-19-97	22.99	7.25	15.74	ND	SE	0.04	08-19-97	100000	2000	3200	<100^	19000	<600^	--	--	--
MW-4	03-17-95	20.75	6.65	14.10	ND	WSW	0.006	03-17-95	16000	1800	970	310	2500	--	--	--	--
MW-4	06-01-95	20.75	7.25	13.50	ND	SW	0.003	06-01-95	16000	2800	870	380	2700	--	--	--	--
MW-4	08-31-95	20.75	7.75	13.00	ND	SSW	0.005	08-31-95	9000	2000	270	270	1400	<100^	--	--	--
MW-4	11-27-95	20.75	7.87	12.88	ND	SSW	0.004	11-27-95	3800	890	130	130	550	--	--	--	--
MW-4	02-22-96	20.75	7.29	13.46	ND	NW	0.007	03-14-96	940	150	82	19	130	<20^	--	--	--
MW-4	05-20-96	20.75	7.30	13.45	ND	SW	0.007	05-21-96	6700	1100	330	120	1100	<100^	--	--	--
MW-4	08-26-96	20.75	7.57	13.18	ND	SSW	0.004	08-26-96	14000	2400	510	350	2100	<100^	--	--	--
MW-4	11-20-96	20.75	7.89	12.86	ND	SSE	0.004	11-20-96	420	55	17	11	62	<3	--	--	--
MW-4	03-24-97	22.38	6.90	15.48	ND	SE	0.013	03-24-97	6800	620	150	81	1300	<50^	--	--	--
MW-4	05-23-97	22.38	7.80	14.58	ND	SE	0.014	05-23-97	9000	1300	240	200	1600	<60^	--	--	--
MW-4	08-19-97	22.38	-	NA	ND	SE	0.04	08-19-97	Not sampled; well is dry								

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1995 - Present***

ARCO Service Station 601
712 Lewelling Boulevard, San Leandro, California

Date: 11-25-97

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	TRPH EPA 418.1 µg/L	TPHD LUFT Method µg/L
MW-5	03-17-95	20.90	5.51	15.39	ND	WSW	0.006	03-17-95	48000	6400	2000	740	5100	--	--	--	--
MW-5	06-01-95	20.90	6.55	14.35	ND	SW	0.003	06-01-95	76000	11000	5400	1400	7700	--	--	--	--
MW-5	08-31-95	20.90	6.80	14.10	ND	SSW	0.005	08-31-95	53000	12000	1600	1000	6000	<500^	--	--	--
MW-5	11-27-95	20.90	7.13	13.77	ND	SSW	0.004	11-27-95	43000	7900	3300	950	4900	--	--	--	--
MW-5	02-22-96	20.90	5.12	15.78	ND	NW	0.007	03-14-96	52000	9100	3300	940	5000	<500^	--	--	--
MW-5	05-20-96	20.90	5.87	15.03	ND	SW	0.007	05-21-96	55000	9300	3800	1100	5400	<500^	--	--	--
MW-5	08-26-96	20.90	7.15	13.75	ND	SSW	0.004	08-26-96	47000	5300	2100	780	3200	<300^	--	--	--
MW-5	11-20-96	20.90	6.88	14.02	ND	SSE	0.004	11-20-96	53000	8700	5700	920	4400	<500^	--	--	--
MW-5	03-24-97	22.45	7.13	15.32	ND	SE	0.013	03-24-97	39000	8200	3200	720	3100	<500^	--	--	--
MW-5	05-23-97	22.45	7.42	15.03	ND	SE	0.014	05-23-97	29000	6600	1700	400	1500	<600^	--	--	--
MW-5	08-19-97	22.45	7.58	14.87	ND	SE	0.04	08-19-97	16000	4600	790	<50^	1300	<300^	--	--	--
MW-6	03-17-95	22.08	6.66	15.42	ND	WSW	0.006	03-17-95	45000	9300	<100^	1900	3600	--	--	--	--
MW-6	06-01-95	22.08	7.60	14.48	ND	SW	0.003	06-01-95	23000	5600	<50^	1300	1900	--	--	--	--
MW-6	08-31-95	22.08	7.92	14.16	ND	SSW	0.005	08-31-95	26000	8000	<100^	1900	900	<500^	--	--	--
MW-6	11-27-95	22.08	8.21	13.87	ND	SSW	0.004	11-27-95	6700	1800	<20^	480	230	--	--	--	--
MW-6	02-22-96	22.08	6.21	15.87	ND	NW	0.007	03-14-96	17000	3100	69	810	1500	<300^	--	--	--
MW-6	05-20-96	22.08	7.07	15.01	ND	SW	0.007	05-21-96	16000	3700	<50^	1100	1100	<300^	--	--	--
MW-6	08-26-96	22.08	7.93	14.15	ND	SSW	0.004	08-26-96	23000	5800	<50^	2000	560	<300^	--	--	--
MW-6	11-20-96	22.08	8.02	14.06	ND	SSE	0.004	11-20-96	11000	3300	<50*	480	370	<300^	--	--	--
MW-6	03-24-97	22.77	7.95	14.82	ND	SE	0.013	03-24-97	9700	1900	<20^	800	270	<100^	--	--	--
MW-6	05-23-97	22.77	8.17	14.60	ND	SE	0.014	05-23-97	16000	4300	<50^	1400	180	<300^	--	--	--
MW-6	08-19-97	22.77	-	NA	ND	SE	0.04	08-19-97	Not sampled: well is dry								

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

ARCO Service Station 601
712 Lewelling Boulevard, San Leandro, California

Date: 11-25-97

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	TRPH EPA 418.1	TPHD LUFT Method		
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
MW-7	03-17-95	22.89	7.68	15.21	ND	WSW	0.006	03-17-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--		
MW-7	06-01-95	22.89	8.40	14.49	ND	SW	0.003	06-01-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--		
MW-7	08-31-95	22.89	9.09	13.80	ND	SSW	0.005	08-31-95	<50	<0.5	<0.5	0.6	<0.5	<3	--	--	--		
MW-7	11-27-95	22.89	9.15	13.74	ND	SSW	0.004	11-27-95	<50	<0.5	<0.5	0.9	<0.5	--	--	--	--		
MW-7	02-22-96	22.89	7.44	15.45	ND	NW	0.007	03-14-96	110	1.4	<0.5	3.8	3	<3	--	--	--		
MW-7	05-20-96	22.89	8.47	14.42	ND	SW	0.007	05-21-96	Not sampled: well sampled annually, during the first quarter										
MW-7	08-26-96	22.89	8.81	14.08	ND	SSW	0.004	08-26-96	Not sampled: well sampled annually, during the first quarter										
MW-7	11-20-96	22.89	9.17	13.72	ND	SSE	0.004	11-20-96	Not sampled: well sampled annually, during the first quarter										
MW-7	03-24-97	22.89	8.31	14.58	ND	SE	0.013	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-7	05-23-97	22.89	9.26	13.63	ND	SE	0.014	05-23-97	Not sampled: well sampled annually, during the first quarter										
MW-7	08-19-97	22.89	-	NA	ND	SE	0.04	08-19-97	Not sampled: well is dry										
MW-8	03-17-95	20.97	6.14	14.83	ND	WSW	0.006	03-17-95	5400	<5^	<5^	35	<5^	--	--	--	--		
MW-8	06-01-95	20.97	6.50	14.47	ND	SW	0.003	06-01-95	2600	<2.5^	<2.5^	15	<2.5^	--	--	--	--		
MW-8	08-31-95	20.97	7.35	13.62	ND	SSW	0.005	08-31-95	1400	<3^	<3^	5	<3^	520	--	900	--		
MW-8	11-27-95	20.97	7.60	13.37	ND	SSW	0.004	11-27-95	620	<0.5	<0.5	<0.5	0.5	--	560	900	510*		
MW-8	02-22-96	20.97	5.35	15.62	ND	NW	0.007	03-14-96	5800	<5^	<5^	28	<5^	110	--	1900	6800*		
MW-8	05-20-96	20.97	5.92	15.05	ND	SW	0.007	05-21-96	6100	<5^	<5^	26	<5^	240	--	--	--		
MW-8	08-26-96	20.97	7.08	13.89	ND	SSW	0.004	08-26-96	970	<1^	<1^	3	<1^	710	--	--	--		
MW-8	11-20-96	20.97	7.01	13.96	ND	SSE	0.004	11-20-96	3900	<2.5^	<2.5^	12	<2.5^	930	--	--	--		
MW-8	03-24-97	20.89	7.33	13.56	ND	SE	0.013	03-24-97	1400	<10^	<10^	<10^	12	1300	--	--	--		
MW-8	05-23-97	20.89	7.55	13.34	ND	SE	0.014	05-23-97	730	<5^	<5^	<5^	<5^	630	--	--	--		
MW-8	08-19-97	20.89	7.87	13.02	ND	SE	0.04	08-19-97	<500^	<5^	<5^	<5^	<5^	290	--	--	--		

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

ARCO Service Station 601
712 Lewelling Boulevard, San Leandro, California

Date: 11-25-97

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	TRPH EPA 418.1 µg/L	TPHD LUFT Method µg/L
MW-9	03-17-95	20.89	6.94	13.95	ND	WSW	0.006	03-17-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-9	06-01-95	20.89	8.15	12.74	ND	SW	0.003	06-01-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-9	08-31-95	20.89	8.10	12.79	ND	SSW	0.005	08-31-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-9	11-27-95	20.89	8.38	12.51	ND	SSW	0.004	11-27-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-9	02-22-96	20.89	7.36	13.53	ND	NW	0.007	03-14-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-9	05-20-96	20.89	7.81	13.08	ND	SW	0.007	05-21-96	Not sampled: well sampled semi-annually, during the first and third quarters								
MW-9	08-26-96	20.89	8.00	12.89	ND	SSW	0.004	08-26-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-9	11-20-96	20.89	7.06	13.83	ND	SSE	0.004	11-20-96	Not sampled: well sampled semi-annually, during the first and third quarters								
MW-9	03-24-97	22.26	7.74	14.52	ND	SE	0.013	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-9	05-23-97	22.26	8.28	13.98	ND	SE	0.014	05-23-97	Not sampled: well sampled semi-annually, during the first and third quarters								
MW-9	08-19-97	22.26	8.32	13.94	ND	SE	0.04	08-19-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-10	03-17-95	21.12	6.26	14.86	ND	WSW	0.006	03-17-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-10	06-01-95	21.12	7.63	13.49	ND	SW	0.003	06-01-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-10	08-31-95	21.12	8.17	12.95	ND	SSW	0.005	08-31-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-10	11-27-95	21.12	8.38	12.74	ND	SSW	0.004	11-27-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-10	02-22-96	21.12	5.41	15.71	ND	NW	0.007	03-14-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-10	05-20-96	21.12	6.78	14.34	ND	SW	0.007	05-21-96	Not sampled: well sampled semi-annually, during the first and third quarters								
MW-10	08-26-96	21.12	8.00	13.12	ND	SSW	0.004	08-26-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-10	11-20-96	21.12	7.81	13.31	ND	SSE	0.004	11-20-96	Not sampled: well sampled semi-annually, during the first and third quarters								
MW-10	03-24-97	21.33	7.87	13.46	ND	SE	0.013	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-10	05-23-97	21.33	8.33	13.00	ND	SE	0.014	05-23-97	Not sampled: well sampled semi-annually, during the first and third quarters								
MW-10	08-19-97	21.33	8.39	12.94	ND	SE	0.04	08-19-97	<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 601
712 Lewelling Boulevard, San Leandro, California

Date: 11-25-97

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	TRPH EPA 418.1 µg/L	TPHD LUFT Method µg/L		
MW-11	03-17-95	22.38	6.94	15.44	ND	WSW	0.006	03-17-95	100	<0.5	<0.5	<0.5	<0.5	--	--	--	--		
MW-11	06-01-95	22.38	7.90	14.48	ND	SW	0.003	06-01-95	210	<0.5	<0.5	0.9	0.7	--	--	--	--		
MW-11	08-31-95	22.38	8.18	14.20	ND	SSW	0.005	08-31-95	680	<0.5	<0.5	4	1.8	<3	--	--	--		
MW-11	11-27-95	22.38	8.48	13.90	ND	SSW	0.004	11-27-95	340	<0.5	<0.5	2.2	1.6	--	--	--	--		
MW-11	02-22-96	22.38	6.63	15.75	ND	NW	0.007	03-14-96	150	<0.5	<0.5	<0.8^	0.8	<3	--	--	--		
MW-11	05-20-96	22.38	7.25	15.13	ND	SW	0.007	05-21-96	Not sampled: well sampled annually, during the first quarter										
MW-11	08-26-96	22.38	8.22	14.16	ND	SSW	0.004	08-26-96	Not sampled: well sampled annually, during the first quarter										
MW-11	11-20-96	22.38	8.37	14.01	ND	SSE	0.004	11-20-96	Not sampled: well sampled annually, during the first quarter										
MW-11	03-24-97	20.97	8.15	12.82	ND	SE	0.013	03-24-97	63	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-11	05-23-97	20.97	8.48	12.49	ND	SE	0.014	05-23-97	Not sampled: well sampled annually, during the first quarter										
MW-11	08-19-97	20.97	8.67	12.30	ND	SE	0.04	08-19-97	Not sampled: well sampled annually, during the first quarter										
MW-12	03-17-95	22.77	7.09	15.68	ND	WSW	0.006	03-17-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--		
MW-12	06-01-95	22.77	8.40	14.37	ND	SW	0.003	06-01-95	Not sampled: well sampled semi-annually, during the first and third quarters										
MW-12	08-31-95	22.77	8.55	14.22	ND	SSW	0.005	08-31-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-12	11-27-95	22.77	8.95	13.82	ND	SSW	0.004	11-27-95	Not sampled: well sampled semi-annually, during the first and third quarters										
MW-12	02-22-96	22.77	6.81	15.96	ND	NW	0.007	03-14-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-12	05-20-96	22.77	7.56	15.21	ND	SW	0.007	05-21-96	Not sampled: well sampled annually, during the first quarter										
MW-12	08-26-96	22.77	8.63	14.14	ND	SSW	0.004	08-26-96	Not sampled: well sampled annually, during the first quarter										
MW-12	11-20-96	22.77	8.38	14.39	ND	SSE	0.004	11-20-96	Not sampled: well sampled annually, during the first quarter										
MW-12	03-24-97	20.11	8.75	11.36	ND	SE	0.013	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--		
MW-12	05-23-97	20.11	8.92	11.19	ND	SE	0.014	05-23-97	Not sampled: well sampled annually, during the first quarter										
MW-12	08-19-97	20.11	9.20	10.91	ND	SE	0.04	08-19-97	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 601
712 Lewelling Boulevard, San Leandro, California

Date: 11-25-97

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	TRPH EPA 418.1	TPHD LUFT Method			
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
MW-13	03-17-95	22.45	6.91	15.54	ND	WSW	0.006	03-17-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--			
MW-13	06-01-95	22.45	7.72	14.73	ND	SW	0.003	06-01-95	Not sampled: well sampled annually, during the first quarter											
MW-13	08-31-95	22.45	7.58	14.87	ND	SSW	0.005	08-31-95	Not sampled: well sampled annually, during the first quarter											
MW-13	11-27-95	22.45	7.98	14.47	ND	SSW	0.004	11-27-95	Not sampled: well sampled annually, during the first quarter											
MW-13	02-22-96	22.45	6.71	15.74	ND	NW	0.007	03-14-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--			
MW-13	05-20-96	22.45	6.98	15.47	ND	SW	0.007	05-21-96	Not sampled: well sampled annually, during the first quarter											
MW-13	08-26-96	22.45	7.85	14.60	ND	SSW	0.004	08-26-96	Not sampled: well sampled annually, during the first quarter											
MW-13	11-20-96	22.45	7.76	14.69	ND	SSE	0.004	11-20-96	Not sampled: well sampled annually, during the first quarter											
MW-13	03-24-97	20.75	7.85	12.90	ND	SE	0.013	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--			
MW-13	05-23-97	20.75	8.16	12.59	ND	SE	0.014	05-23-97	Not sampled: well sampled annually, during the first quarter											
MW-13	08-19-97	20.75	8.40	12.35	ND	SE	0.04	08-19-97	Not sampled: well sampled annually, during the first quarter											
MW-14	03-17-95	22.99	8.17	14.82	ND	WSW	0.006	03-17-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--			
MW-14	06-01-95	22.99	8.57	14.42	ND	SW	0.003	06-01-95	Not sampled: well sampled annually, during the first quarter											
MW-14	08-31-95	22.99	9.05	13.94	ND	SSW	0.005	08-31-95	Not sampled: well sampled annually, during the first quarter											
MW-14	11-27-95	22.99	9.19	13.80	ND	SSW	0.004	11-27-95	Not sampled: well sampled annually, during the first quarter											
MW-14	02-22-96	22.99	6.52	16.47	ND	NW	0.007	03-14-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--			
MW-14	05-20-96	22.99	7.88	15.11	ND	SW	0.007	05-21-96	Not sampled: well sampled annually, during the first quarter											
MW-14	08-26-96	22.99	8.83	14.16	ND	SSW	0.004	08-26-96	Not sampled: well sampled annually, during the first quarter											
MW-14	11-20-96	22.99	8.95	14.04	ND	SSE	0.004	11-20-96	Not sampled: well sampled annually, during the first quarter											
MW-14	03-24-97	20.90	8.98	11.92	ND	SE	0.013	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--			
MW-14	05-23-97	20.90	9.61	11.29	ND	SE	0.014	05-23-97	Not sampled: well sampled annually, during the first quarter											
MW-14	08-19-97	20.90	9.80	11.10	ND	SE	0.04	08-19-97	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 601
712 Lewelling Boulevard, San Leandro, California

Date: 11-25-97

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	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-15	03-17-95	19.19	5.21	13.98	ND	WSW	0.006	03-17-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-15	06-01-95	19.19	5.84	13.35	ND	SW	0.003	06-01-95	Not sampled: well sampled semi-annually, during the first and third quarters								
MW-15	08-31-95	19.19	6.18	13.01	ND	SSW	0.005	08-31-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-15	11-27-95	19.19	6.42	12.77	ND	SSW	0.004	11-27-95	Not sampled: well sampled semi-annually, during the first and third quarters								
MW-15	02-22-96	19.19	4.84	14.35	ND	NW	0.007	03-14-96	<50	<0.5	<0.5	<0.5	<0.5	12	--	--	--
MW-15	05-20-96	19.19	5.31	13.88	ND	SW	0.007	05-21-96	Not sampled: well sampled semi-annually, during the first and third quarters								
MW-15	08-26-96	19.19	6.05	13.14	ND	SSW	0.004	08-26-96	<50	<0.5	<0.5	<0.5	<0.5	8	--	--	--
MW-15	11-20-96	19.19	5.46	13.73	ND	SSE	0.004	11-20-96	Not sampled: well sampled semi-annually, during the first and third quarters								
MW-15	03-24-97	22.08	6.00	16.08	ND	SE	0.013	03-24-97	<50	<0.5	<0.5	<0.5	<0.5	15	--	--	--
MW-15	05-23-97	22.08	6.25	15.83	ND	SE	0.014	05-23-97	Not sampled: well sampled semi-annually, during the first and third quarters								
MW-15	08-19-97	22.08	6.34	15.74	ND	SE	0.04	08-19-97	99*	<0.5	<0.5	<0.5	0.7	6	--	--	--

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

ARCO Service Station 601
712 Lewelling Boulevard, San Leandro, California

Date: 11-25-97

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	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	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

TRPH: total recoverable petroleum hydrocarbons

TPHD: total petroleum hydrocarbons as diesel, California DHS LUFT Method

ND: none detected

ESE: east-southeast

SW: southwest

WSW: west-southwest

SSW: south-southwest

SSE: south-southeast

NW: northwest

- : not analyzed

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

*: Sample contains a higher boiling point hydrocarbon mixture quantitated as gasoline. The chromatogram did not match the typical gasoline fingerprint.

**: [corrected elevation (Z')] = Z + (h * 0.73) where: Z = measured elevation, h = floating product thickness, 0.73 = density ratio of oil to water

***: For previous historical groundwater elevation and analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results, ARCO Service Station 601, San Leandro, California*, (EMCON, March 14, 1996).

Table 3
Historical Groundwater Analytical Data
Metals*
1994 - Present**

ARCO Service Station 601

712 Lewelling Boulevard, San Leandro, California

Date: 11-25-97

Well Designation	Water Sample Field Date	Cadmium EPA 6010 µg/L	Chromium EPA 6010 µg/L	Lead EPA 7421 µg/L	Nickel EPA 6010 µg/L	Zinc EPA 6010 µg/L
MW-1	03-17-95	<5	20	20	<40	60
MW-1	06-01-95	<5	20	22	70	100
MW-1	08-31-95	Not sampled: well contained floating product				
MW-1	11-27-95	Not sampled: well contained floating product				
MW-1	03-14-96	Not sampled: well contained floating product				
MW-1	05-21-96	0.006	<0.01	<0.005	<0.02	<0.02
MW-1	08-26-96	--	--	--	--	--
MW-1	11-20-96	--	--	--	--	--
MW-1	03-24-97	--	--	--	--	--
MW-1	05-23-97	Not analyzed: well MW-8 was sampled for additional parameters in lieu of well MW-1				
MW-1	08-19-97	--	--	--	--	--
MW-2	03-23-92	Not analyzed: sampling for additional parameters was discontinued				
MW-3	03-23-92	Not analyzed: sampling for additional parameters was discontinued				
MW-5	06-08-92	Not analyzed: sampling for additional parameters was discontinued				
MW-4	06-10-91	Not analyzed: sampling for additional parameters was discontinued				
MW-6	06-10-91	Not analyzed: sampling for additional parameters was discontinued				
MW-7	06-10-91	Not analyzed: sampling for additional parameters was discontinued				
MW-8	03-17-95	Not analyzed: well MW-1 was sampled for additional parameters in lieu of well MW-8				
MW-8	06-01-95	Not analyzed: well MW-1 was sampled for additional parameters in lieu of well MW-8				
MW-8	08-31-95	<5	40	16	50	90
MW-8	11-27-95	<5	130	77	170	280
MW-8	03-14-96	<5	30	7	40	60
MW-8	05-21-96	Not analyzed: well MW-1 was sampled for additional parameters in lieu of well MW-8				
MW-8	08-26-96	--	--	--	--	--
MW-8	11-20-96	--	--	--	--	--
MW-8	03-24-97	--	--	--	--	--
MW-8	05-23-97	<0.005	<0.01	<0.005	<0.02	<0.02
MW-8	08-19-97	--	--	--	--	--
MW-9	06-11-93	Not analyzed: sampling for additional parameters was discontinued				
MW-10	06-11-93	Not analyzed: sampling for additional parameters was discontinued				
MW-11	11-16-92	Not analyzed: sampling for additional parameters was discontinued				
MW-12	11-16-92	Not analyzed: sampling for additional parameters was discontinued				
MW-13	11-16-92	Not analyzed: sampling for additional parameters was discontinued				
MW-14	09-15-92	Not analyzed: sampling for additional parameters was discontinued				
MW-15	05-13-93	Not analyzed: sampling for additional parameters was discontinued				

EPA: United States Environmental Protection Agency

µg/L: micrograms per liter

-- : not analyzed

*: Historically samples were analyzed for total metals. Since March 14, 1996, the samples were filtered and analyzed for dissolved metals.

** : For previous historical analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results, ARCO Service Station 601, San Leandro, California*, (EMCON, March 14, 1996).

Table 4
Historical Groundwater Analytical Data
Volatile and Semivolatile Organic Compounds
1995 - Present*

ARCO Service Station 601
712 Lewelling Boulevard, San Leandro, California

Date: 11-21-97

Well Designation	Water Sample Field Date	Volatile Organic Compounds by EPA Method 601/8010 or 624/8240							Semivolatile Organic Compounds by EPA Method 3520/8270				
		Methylene Chloride µg/L	1,2-Dichloro-ethane µg/L	1,1-Dichloro-ethane µg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Total Xylenes µg/L	Naphthalene µg/L	2-Methyl-naphthalene µg/L	Bis (2-ethylhexyl) Phthalate µg/L	Phenol µg/L	2,4-Di-methyl-phenol µg/L
MW-1	03-17-95	--	--	--	--	--	--	--	1300	730	<50	ND	150
MW-1	06-01-95	--	--	--	--	--	--	--	2200	1700	<100	240	<100
MW-1	08-31-95	Not sampled: well contained floating product											
MW-1	11-27-95	Not sampled: well contained floating product											
MW-1	03-14-96	Not sampled: well contained floating product											
MW-1	05-21-96	--	--	--	--	--	--	--	1200	860	<50	<50	<50
MW-1	08-26-96	--	--	--	--	--	--	--	2300	1800	<500	<500	<1000
MW-1	11-20-96	--	--	--	--	--	--	--	590	250	91	<50^	<100^
MW-1	03-24-97	--	--	--	--	--	--	--	730	610	<50^	<50^	<100^
MW-1	05-23-97	Not analyzed: well MW-8 was sampled for additional parameters in lieu of well MW-1											
MW-1	08-19-97	--	--	--	--	--	--	--	1300**	790**	<50^**	<50^**	<100^**
MW-8	03-17-95	Not analyzed: well MW-1 was sampled for additional parameters in lieu of well MW-8											
MW-8	06-01-95	Not analyzed: well MW-1 was sampled for additional parameters in lieu of well MW-8											
MW-8	08-31-95	--	--	--	--	--	--	--	62	8	<5	<5	<5
MW-8	11-27-95	--	--	--	--	--	--	--	15	<5	<5	<5	<5
MW-8	03-14-96	--	--	--	--	--	--	--	400	55	<50	<50	<50
MW-8	05-21-96	Not analyzed: well MW-1 was sampled for additional parameters in lieu of well MW-8											
MW-8	08-26-96	Not analyzed: well MW-1 was sampled for additional parameters in lieu of well MW-8											
MW-8	11-20-96	Not analyzed: well MW-1 was sampled for additional parameters in lieu of well MW-8											
MW-8	03-24-97	Not analyzed: well MW-1 was sampled for additional parameters in lieu of well MW-8											
MW-8	05-23-97	--	--	--	--	--	--	--	26	<5	<5	<5	<10
MW-8	08-19-97	--	--	--	--	--	--	--	--	--	--	--	--

Table 4
Historical Groundwater Analytical Data
Volatile and Semivolatile Organic Compounds
1995 - Present*

ARCO Service Station 601
712 Lewelling Boulevard, San Leandro, California

Date: 11-21-97

Well Designation	Water Sample Field Date	Volatile Organic Compounds by EPA Method 601/8010 or 624/8240							Semivolatile Organic Compounds by EPA Method 3520/8270				
		Methylene Chloride µg/L	1,2-Dichloro- ethane µg/L	1,1-Dichloro- ethane µg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Total Xylenes µg/L	Naphthalene µg/L	2-Methyl- naphthalene µg/L	Bis (2-ethylhexyl) Phthalate µg/L	Phenol µg/L	2,4-Di-methyl- phenol µg/L

EPA: United States Environmental Protection Agency

µg/L: micrograms per liter

--: not analyzed

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

*: For previous historical analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results, ARCO Service Station 601, San Leandro, California*, (EMCON, March 14, 1996).

** : The sample was analyzed initially on 8/22/97, within the recommended holding time, and the surrogates were below normal CAS control limits.

The sample was reextracted on 9/2/97, 7 days past the recommended holding time, and the QA/QC results for reanalysis are within CAS acceptance criteria.

Table 5
Approximate Cumulative Floating Product Recovered

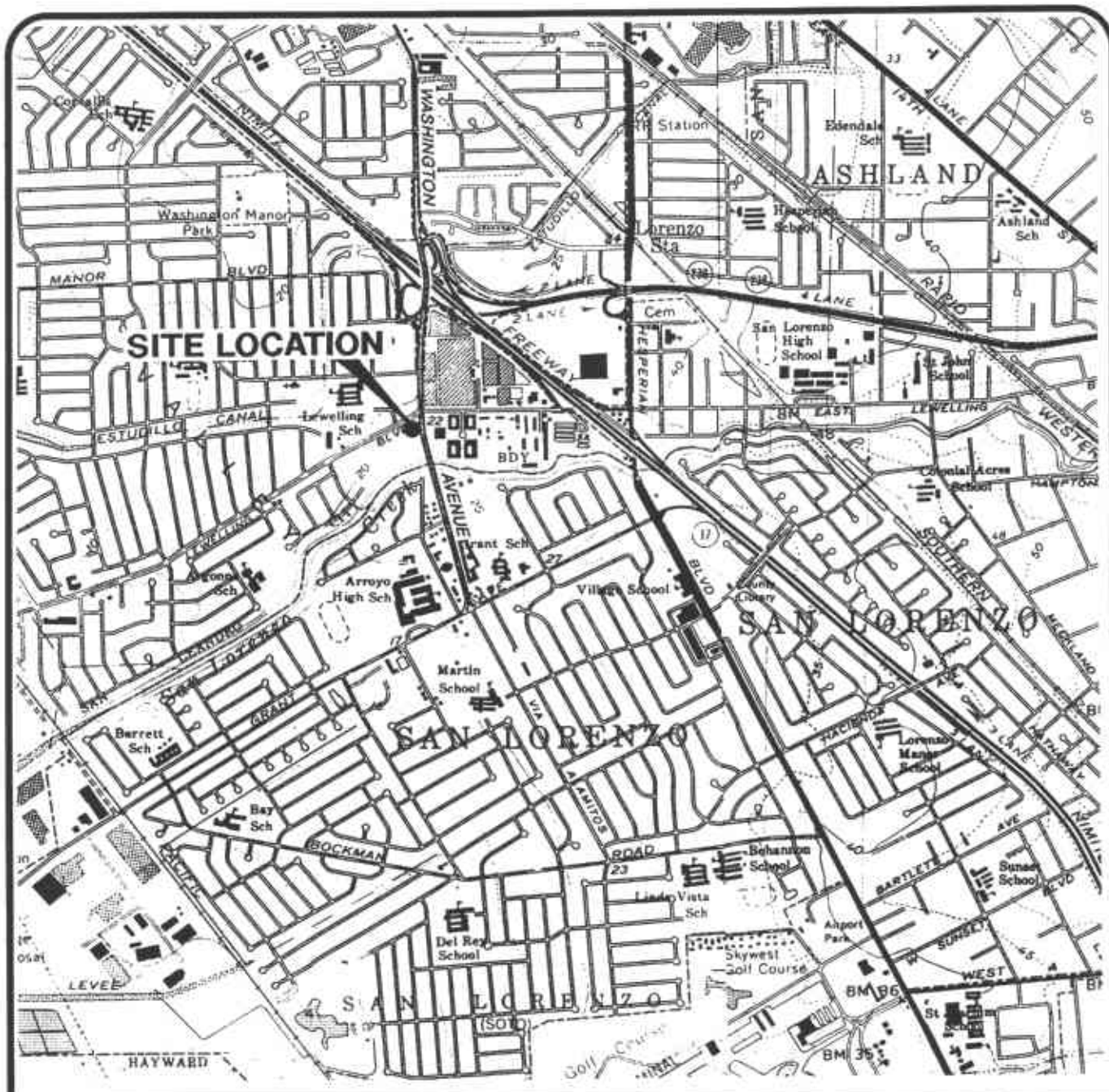
ARCO Service Station 601

712 Lewelling Boulevard, San Leandro, California

Date: 11-21-97

Well Desig- nation	Date	Floating Product Recovered gallons
MW-1	1991	3.43
MW-1	1992	0.02
MW-1	1993	0.00
MW-1	1994	0.00
MW-1	1995	0.00
MW-1	1996	0.00
MW-1	1997	0.00
1991 to 1997 Total:		3.45

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:
 Hayward and San Leandro, California.
 Photorevised 1980.

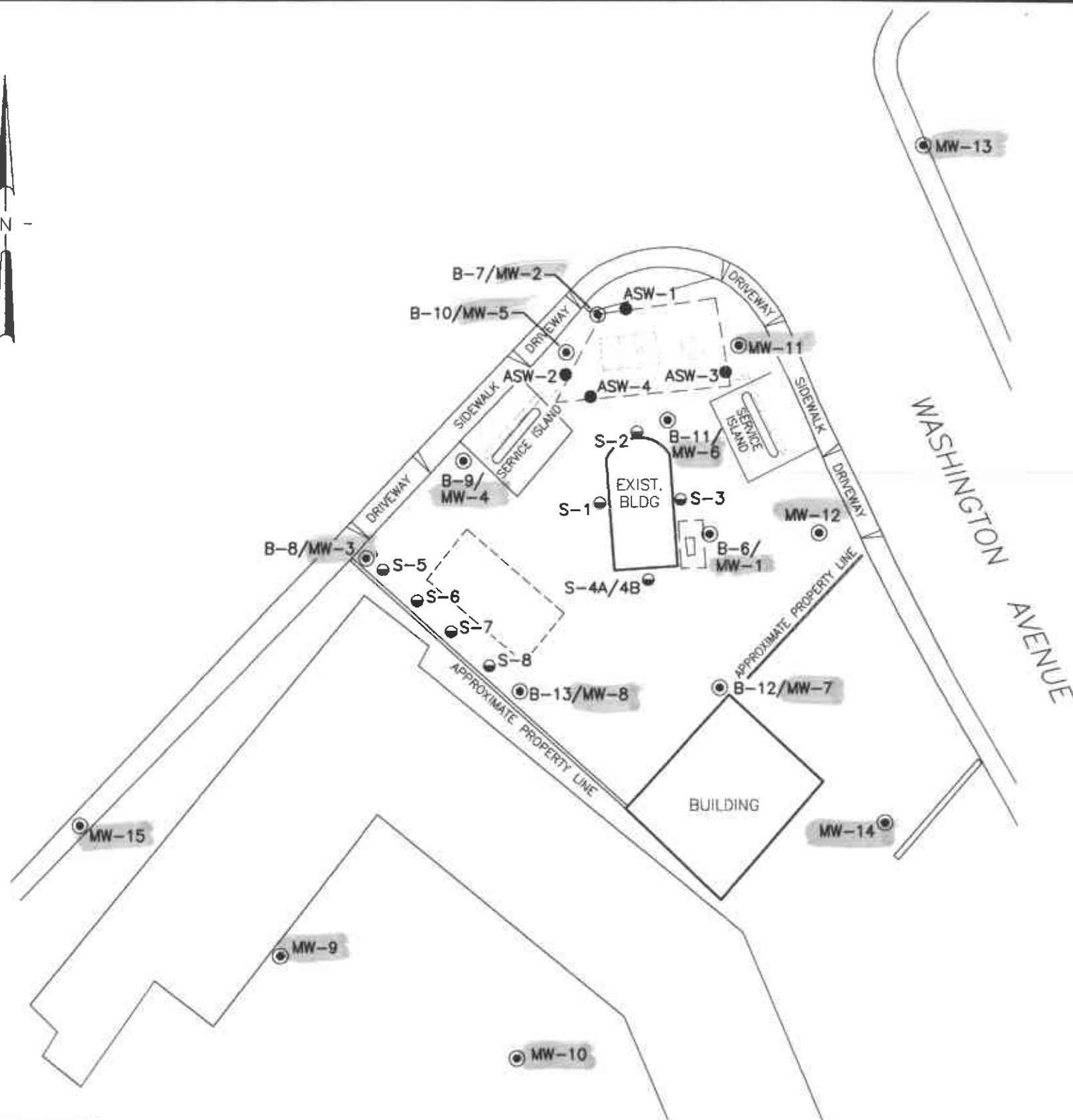
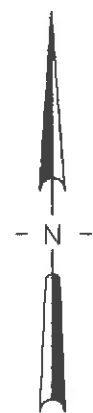
0 2000 4000
 SCALE IN FEET



Emcon

DATE NOV. 1997
 DWN KAJ
 APP
 REV
 PROJECT NO.
 805-121.005

FIGURE 1
 ARCO PRODUCTS COMPANY
 SERVICE STATION 601, 712 LEWELLING BLVD.
 SAN LEANDRO, CALIFORNIA
**QUARTERLY GROUNDWATER MONITORING
 SITE LOCATION**



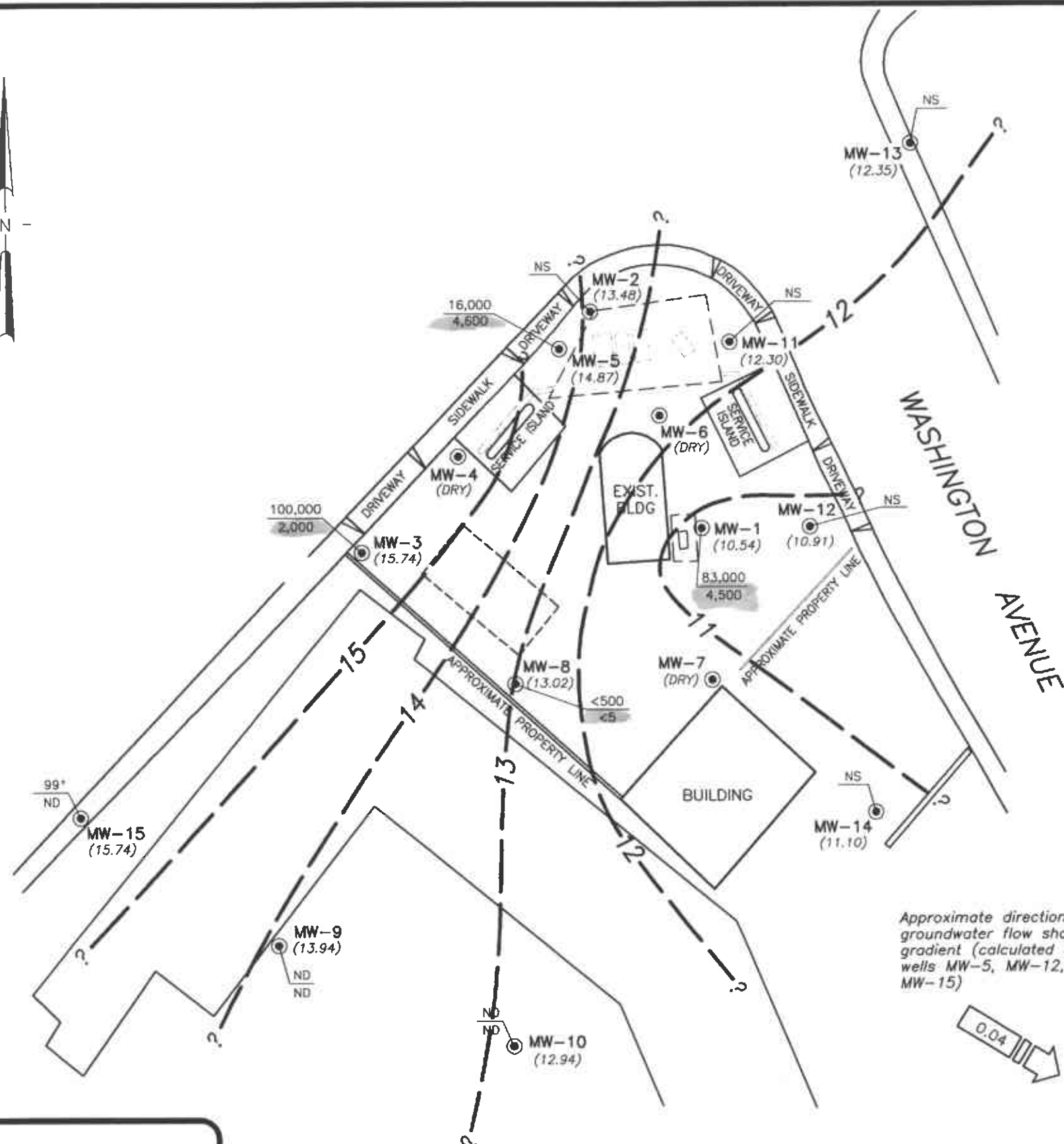
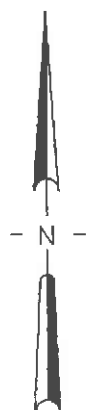
EXPLANATION

- Groundwater monitoring well
- Excavation sidewall soil sample
- Soil vapor sample
- Former underground gasoline storage tank
- Existing underground gasoline storage tank
- Approximate limit of gasoline tank excavation
- Former product line

0 50 100
 SCALE IN FEET
 (Approximate)

DATE NOV. 1997
 DWN KAJ
 APP
 REV
 PROJECT NO.
 805-121.005

FIGURE 2
 ARCO PRODUCTS COMPANY
 SERVICE STATION 601, 712 LEWELLING BLVD.
 SAN LEANDRO, CALIFORNIA
SITE PLAN



EXPLANATION	
	Groundwater monitoring well
	Vapor extraction well
	Former underground gasoline storage tank
	Existing underground gasoline storage tank
	Approximate limit of gasoline tank excavation
	Former product line
(10.54)	Groundwater elevation (Ft.-MSL) measured 8/19/97
?	Groundwater elevation contour (Ft.-MSL)
83,000 4,500	TPHG, concentration in groundwater (ug/L); sampled 8/19/97
83,000 4,500	Benzene concentration in groundwater (ug/L); sampled 8/19/97
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
<	Raised method reporting limit due to high analyte concentration requiring sample dilution or matrix interference
.	Sample contains a high-boiling-point hydrocarbon mixture quantitated as gasoline. The chromatogram does not match the typical gasoline footprint.

Approximate direction of groundwater flow showing gradient (calculated using wells MW-5, MW-12, and MW-15)



0 50 100
SCALE IN FEET
(Approximate)



DATE NOV. 1997
DWN KAJ
APP
REV
PROJECT NO.
805-121.005

FIGURE 3
ARCO PRODUCTS COMPANY
SERVICE STATION 601, 712 LEWELLING BLVD.
SAN LEANDRO, CALIFORNIA
**QUARTERLY GROUNDWATER MONITORING
GROUNDWATER DATA - 3RD QUARTER 1997**

APPENDIX A

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



September 3, 1997

Service Request No.: S9701586

Gary Messerotes
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

RE: 20805-121.005/TO#21133.00/601 SAN LEANDRO

Dear Mr. Messerotes:

The following pages contain analytical results for sample(s) received by the laboratory on August 19, 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 20, 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 'Steven L. Green', written over a large, stylized 'S' that loops around the beginning of the signature.

Steven L. Green
Project Chemist

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

Greg Anderson
Regional QA Coordinator

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701586
Date Collected: 8/19/97
Date Received: 8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-8(10)
Lab Code: S9701586-001
Test Notes: C1

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	10	NA	8/22/97	<500	
Benzene	EPA 5030	8020	0.5	10	NA	8/22/97	<5	
Toluene	EPA 5030	8020	0.5	10	NA	8/22/97	<5	
Ethylbenzene	EPA 5030	8020	0.5	10	NA	8/22/97	<5	
Xylenes, Total	EPA 5030	8020	0.5	10	NA	8/22/97	<5	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	10	NA	8/22/97	290	

C1

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701586
Date Collected: 8/19/97
Date Received: 8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-5(10)
Lab Code: S9701586-002
Test Notes: C1

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	100	NA	8/22/97	16000	
Benzene	EPA 5030	8020	0.5	100	NA	8/22/97	4600	
Toluene	EPA 5030	8020	0.5	100	NA	8/22/97	790	
Ethylbenzene	EPA 5030	8020	0.5	100	NA	8/22/97	<50	
Xylenes, Total	EPA 5030	8020	0.5	100	NA	8/22/97	1300	
Methyl tert-Butyl Ether	EPA 5030	8020	3	100	NA	8/22/97	<300	

C1

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701586
Date Collected: 8/19/97
Date Received: 8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-1(11)
Lab Code: S9701586-003
Test Notes: C1

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	200	NA	8/25/97	83000	
Benzene	EPA 5030	8020	0.5	200	NA	8/25/97	4500	
Toluene	EPA 5030	8020	0.5	200	NA	8/25/97	<100	
Ethylbenzene	EPA 5030	8020	0.5	200	NA	8/25/97	2200	
Xylenes, Total	EPA 5030	8020	0.5	200	NA	8/25/97	8100	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	200	NA	8/25/97	<600	

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701586
Date Collected: 8/19/97
Date Received: 8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-3(11)
Lab Code: S9701586-004
Test Notes: C1

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	200	NA	8/22/97	100000	
Benzene	EPA 5030	8020	0.5	200	NA	8/22/97	2000	
Toluene	EPA 5030	8020	0.5	200	NA	8/22/97	3200	
Ethylbenzene	EPA 5030	8020	0.5	200	NA	8/22/97	<100	
Xylenes, Total	EPA 5030	8020	0.5	200	NA	8/22/97	19000	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	200	NA	8/22/97	<600	

C1

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701586
Date Collected: 8/19/97
Date Received: 8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-15(10)
Lab Code: S9701586-005
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	8/20/97	99	G3
Benzene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/20/97	0.7	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	8/20/97	6	

G3

Sample contains a higher boiling point hydrocarbon mixture quantitated as gasoline. The chromatogram did not match the typical gasoline fingerprint.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701586
Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
Lab Code: S970820-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	8/20/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	8/20/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701586
Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
Lab Code: S970821-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	8/21/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	8/21/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/21/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/21/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/21/97	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	8/21/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701586
Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
Lab Code: S970825-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	8/25/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	8/25/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/25/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/25/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/25/97	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	8/25/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
 Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
 Sample Matrix: Water

Service Request: S9701586
 Date Collected: 8/19/97
 Date Received: 8/19/97

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: MW-1(11)
 Lab Code: S9701586-003
 Test Notes: C1,X

Units: ug/L (ppb)
 Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
N-Nitrosodimethylamine	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Aniline	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Bis(2-chloroethyl) Ether	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Phenol	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
2-Chlorophenol	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
1,3-Dichlorobenzene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
1,4-Dichlorobenzene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
1,2-Dichlorobenzene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Benzyl Alcohol	EPA 3510	8270B	10	10	9/2/97	9/3/97	<100	
Bis(2-chloroisopropyl) Ether	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
2-Methylphenol	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Hexachloroethane	EPA 3510	8270B	10	10	9/2/97	9/3/97	<100	
N-Nitrosodi-n-propylamine	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
3- and 4-Methylphenol*	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Nitrobenzene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Isophorone	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
2-Nitrophenol	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
2,4-Dimethylphenol	EPA 3510	8270B	10	10	9/2/97	9/3/97	<100	
Bis(2-chloroethoxy)methane	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
2,4-Dichlorophenol	EPA 3510	8270B	50	10	9/2/97	9/3/97	<500	
Benzoic Acid	EPA 3510	8270B	50	10	9/2/97	9/3/97	<500	
1,2,4-Trichlorobenzene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Naphthalene	EPA 3510	8270B	5	10	9/2/97	9/3/97	1300	
4-Chloroaniline	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Hexachlorobutadiene	EPA 3510	8270B	10	10	9/2/97	9/3/97	<100	
4-Chloro-3-methylphenol	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
2-Methylnaphthalene	EPA 3510	8270B	5	10	9/2/97	9/3/97	790	
Hexachlorocyclopentadiene	EPA 3510	8270B	10	10	9/2/97	9/3/97	<100	
2,4,6-Trichlorophenol	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
2,4,5-Trichlorophenol	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
2-Chloronaphthalene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
2-Nitroaniline	EPA 3510	8270B	20	10	9/2/97	9/3/97	<200	
Acenaphthylene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Dimethyl Phthalate	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
2,6-Dinitrotoluene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Acenaphthene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
3-Nitroaniline	EPA 3510	8270B	20	10	9/2/97	9/3/97	<200	
2,4-Dinitrophenol	EPA 3510	8270B	50	10	9/2/97	9/3/97	<500	
Dibenzofuran	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
4-Nitrophenol	EPA 3510	8270B	50	10	9/2/97	9/3/97	<500	
2,4-Dinitrotoluene	EPA 3510	8270B	50	10	9/2/97	9/3/97	<500	
Fluorene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
4-Chlorophenyl Phenyl Ether	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	

*
 C1
 X

Quantified as 4-methylphenol.

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

The analysis of this sample was initially performed on 8/22/97, within the recommended holding time. The surrogate recoveries were below normal CAS control limits. The sample was reextracted on 9/2/97, 7 days past the recommended holding time. The QA/QC results for reanalysis are within CAS acceptance criteria.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
 Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
 Sample Matrix: Water

Service Request: S9701586
 Date Collected: 8/19/97
 Date Received: 8/19/97

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: MW-1(11)
 Lab Code: S9701586-003
 Test Notes: C1,X

Units: ug/L (ppb)
 Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Diethyl Phthalate	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
4-Nitroaniline	EPA 3510	8270B	20	10	9/2/97	9/3/97	<200	
2-Methyl-4,6-dinitrophenol	EPA 3510	8270B	20	10	9/2/97	9/3/97	<200	
N-Nitrosodiphenylamine	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
4-Bromophenyl Phenyl Ether	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Hexachlorobenzene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Pentachlorophenol	EPA 3510	8270B	30	10	9/2/97	9/3/97	<300	
Phenanthrene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Anthracene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Di-n-butyl Phthalate	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Fluoranthene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Pyrene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Butylbenzyl Phthalate	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
3,3'-Dichlorobenzidine	EPA 3510	8270B	20	10	9/2/97	9/3/97	<200	
Benz(a)anthracene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Chrysene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Bis(2-ethylhexyl) Phthalate	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Di-n-octyl Phthalate	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Benzo(b)fluoranthene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Benzo(k)fluoranthene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Benzo(a)pyrene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Indeno(1,2,3-cd)pyrene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Dibenz(a,h)anthracene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	
Benzo(g,h,i)perylene	EPA 3510	8270B	5	10	9/2/97	9/3/97	<50	

*

C1

X

Quantified as 4-methylphenol.

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

The analysis of this sample was initially performed on 8/22/97, within the recommended holding time. The surrogate recoveries were below normal CAS control limits. The sample was reextracted on 9/2/97, 7 days past the recommended holding time. The QA/QC results for reanalysis are within CAS acceptance criteria.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
 Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
 Sample Matrix: Water

Service Request: S9701586
 Date Collected: NA
 Date Received: NA

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: Method Blank
 Lab Code: S970902-WB1
 Test Notes:

Units: ug/L (ppb)
 Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
N-Nitrosodimethylamine	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Aniline	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Bis(2-chloroethyl) Ether	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Phenol	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
2-Chlorophenol	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
1,3-Dichlorobenzene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
1,4-Dichlorobenzene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
1,2-Dichlorobenzene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Benzyl Alcohol	EPA 3510	8270B	10	1	9/2/97	9/3/97	ND	
Bis(2-chloroisopropyl) Ether	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
2-Methylphenol	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Hexachloroethane	EPA 3510	8270B	10	1	9/2/97	9/3/97	ND	
N-Nitrosodi-n-propylamine	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
3- and 4-Methylphenol*	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Nitrobenzene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Isophorone	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
2-Nitrophenol	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
2,4-Dimethylphenol	EPA 3510	8270B	10	1	9/2/97	9/3/97	ND	
Bis(2-chloroethoxy)methane	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
2,4-Dichlorophenol	EPA 3510	8270B	50	1	9/2/97	9/3/97	ND	
Benzoic Acid	EPA 3510	8270B	50	1	9/2/97	9/3/97	ND	
1,2,4-Trichlorobenzene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Naphthalene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
4-Chloroaniline	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Hexachlorobutadiene	EPA 3510	8270B	10	1	9/2/97	9/3/97	ND	
4-Chloro-3-methylphenol	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
2-Methylnaphthalene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Hexachlorocyclopentadiene	EPA 3510	8270B	10	1	9/2/97	9/3/97	ND	
2,4,6-Trichlorophenol	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
2,4,5-Trichlorophenol	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
2-Chloronaphthalene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
2-Nitroaniline	EPA 3510	8270B	20	1	9/2/97	9/3/97	ND	
Acenaphthylene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Dimethyl Phthalate	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
2,6-Dinitrotoluene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Acenaphthene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
3-Nitroaniline	EPA 3510	8270B	20	1	9/2/97	9/3/97	ND	
2,4-Dinitrophenol	EPA 3510	8270B	50	1	9/2/97	9/3/97	ND	
Dibenzofuran	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
4-Nitrophenol	EPA 3510	8270B	50	1	9/2/97	9/3/97	ND	
2,4-Dinitrotoluene	EPA 3510	8270B	50	1	9/2/97	9/3/97	ND	
Fluorene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
4-Chlorophenyl Phenyl Ether	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	

* Quantified as 4-methylphenol.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
 Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
 Sample Matrix: Water

Service Request: S9701586
 Date Collected: NA
 Date Received: NA

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: Method Blank
 Lab Code: S970902-WB1
 Test Notes:

Units: ug/L (ppb)
 Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Diethyl Phthalate	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
4-Nitroaniline	EPA 3510	8270B	20	1	9/2/97	9/3/97	ND	
2-Methyl-4,6-dinitrophenol	EPA 3510	8270B	20	1	9/2/97	9/3/97	ND	
N-Nitrosodiphenylamine	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
4-Bromophenyl Phenyl Ether	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Hexachlorobenzene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Pentachlorophenol	EPA 3510	8270B	30	1	9/2/97	9/3/97	ND	
Phenanthrene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Anthracene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Di-n-butyl Phthalate	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Fluoranthene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Pyrene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Butylbenzyl Phthalate	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
3,3'-Dichlorobenzidine	EPA 3510	8270B	20	1	9/2/97	9/3/97	ND	
Benz(a)anthracene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Chrysene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Bis(2-ethylhexyl) Phthalate	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Di-n-octyl Phthalate	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Benzo(b)fluoranthene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Benzo(k)fluoranthene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Benzo(a)pyrene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Indeno(1,2,3-cd)pyrene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Dibenz(a,h)anthracene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	
Benzo(g,h,i)perylene	EPA 3510	8270B	5	1	9/2/97	9/3/97	ND	

*

Quantified as 4-methylphenol.

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701586
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-8(10)	S9701586-001		92	93
MW-5(10)	S9701586-002		94	88
MW-1(11)	S9701586-003		107	98
MW-3(11)	S9701586-004		92	90
MW-15(10)	S9701586-005		99	87
MW-15(10)	S9701586-005MS		93	87
MW-15(10)	S9701586-005DMS		98	83
Method Blank	S970820-WB1		100	82
Method Blank	S970821-WB1		96	89
Method Blank	S970825-WB1		102	94

CAS Acceptance Limits: 69-116 69-116

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701586
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 8/20/97

Matrix Spike/Duplicate Matrix Spike Summary
BTE

Sample Name: MW-15(10)
Lab Code: S9701586-005MS, S9701586-005DMS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Percent Recovery

Analyte	Prep Method	Analysis Method	Spike Level			Sample Result	Spike Result		Percent Recovery		CAS Acceptance Limits	Relative Percent Difference
			MRL	MS	DMS		MS	DMS	MS	DMS		
Benzene	EPA 5030	8020	0.5	25	25	ND	22	26	88	104	75-135	17
Toluene	EPA 5030	8020	0.5	25	25	ND	23	27	92	108	73-136	16
Ethylbenzene	EPA 5030	8020	0.5	25	25	ND	23	27	92	108	69-142	16

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO

Service Request: S9701586
Date Analyzed: 8/20/97

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

Sample Name: ICV
Lab Code: ICV1
Test Notes:

Units: ug/L (ppb)
Basis: NA

ICV Source:

CAS
Percent Recovery

Analyte	Prep Method	Analysis Method	True Value	Result	Acceptance Limits	Percent Recovery	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	250	240	90-110	96	
Benzene	EPA 5030	8020	25	26	85-115	104	
Toluene	EPA 5030	8020	25	28	85-115	112	
Ethylbenzene	EPA 5030	8020	25	28	85-115	112	
Xylenes, Total	EPA 5030	8020	75	84	85-115	112	
Methyl tert -Butyl Ether	EPA 5030	8020	25	28	85-115	112	

ICV/032196

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
 Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
 Sample Matrix: Water

Service Request: S9701586
 Date Collected: NA
 Date Received: NA
 Date Extracted: NA
 Date Analyzed: NA

Surrogate Recovery Summary
 Base Neutral/Acid Semivolatile Organic Compounds

Prep Method: EPA 3510
 Analysis Method: 8270B

Units: PERCENT
 Basis: NA

Sample Name	Lab Code	Test Notes	P e r c e n t					R e c o v e r y	
			2FP	PHL	NBZ	FBP	TBP	TPH	
MW-1(11)	S9701586-003		2	2	53	98 S1	12	102	
LCS	S970902-LCS		48	24	65	70	67	78	
LCSD	S970902-LCSD		43	20	55	65	64	81	
Method Blank	S970902-WB1		46	28	54	64	69	87	

CAS Acceptance Limits: D-50 D-58 47-100 53-85 D-119 50-107

2FP 2-Fluorophenol
 PHL Phenol-D6
 NBZ Nitrobenzene-D5
 FBP 2-Fluorobiphenyl
 TBP 2,4,6-Tribromophenol
 TPH Terphenyl-D14

S1 Surrogate recovery out of control limits due to matrix interference.

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
LCS Matrix: Water

Service Request: S9701586
Date Collected: NA
Date Received: NA
Date Extracted: 9/2/97
Date Analyzed: 9/3/97

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary
 Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: Lab Control Sample
Lab Code: S970902-DLCS, S970902-LCS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	Percent Recovery								Relative Percent Difference	Result Notes
			True Value		Result		CAS Acceptance		Limits			
			LCS	DLCS	LCS	DLCS	LCS	DLCS				
Phenol	EPA 3510	8270B	100	100	30	28	30	28	26-90	7		
2-Chlorophenol	EPA 3510	8270B	100	100	76	68	76	68	25-102	11		
1,4-Dichlorobenzene	EPA 3510	8270B	50	50	32	27	64	54	28-104	17		
N-Nitrosodi-n-propylamine	EPA 3510	8270B	50	50	38	32	76	64	41-126	17		
1,2,4-Trichlorobenzene	EPA 3510	8270B	50	50	33	28	66	56	38-107	16		
4-Chloro-3-methylphenol	EPA 3510	8270B	100	100	63	53	63	53	26-103	17		
Acenaphthene	EPA 3510	8270B	50	50	40	36	80	72	31-137	11		
4-Nitrophenol	EPA 3510	8270B	100	100	24	28	24	28	11-114	15		
2,4-Dinitrotoluene	EPA 3510	8270B	50	50	32	29	64	58	28-89	10		
Pentachlorophenol	EPA 3510	8270B	100	100	57	62	57	62	17-109	8		
Pyrene	EPA 3510	8270B	50	50	53	55	106	110	35-142	4		

ARCO Products Company

Division of AtlanticRichfield Company

Task Order No. 21133.00

Chain of Custody

ARCO Facility no. 0601		City (Facility) San Leandro		Project manager (Consultant) Gary Messerides		Laboratory name CAS																	
ARCO engineer Paul Supple		Telephone no. (ARCO)		Telephone no. (Consultant) (408) 453-7300		Fax no. (Consultant) (408) 453-0457																	
Consultant name EMCON		Address (Consultant) 1921 Ringwood Ave. San Jose, CA 95131																					
Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX EPA 8015	BTEX/TPH EPA 8015/8016	TPH Modified 8015 Gas Diesel	Oil and Grease 413.1 413.2	TPH EPA 418.1/SM603E	EPA 801/8010	EPA 824/8240	EPA 825/8270	TCLP Metals VOC VOA	CAMP Metals EPA 8010/7000 TTLC STLC	Lead Org./DHS Lead EPA 7420/7421	Method of shipment Sampler will deliver		
			Soil	Water	Other	Ice	Acid																
MW-8(10)①	2		X			X	HCL	8/19/97	1200		X											Special detection Limit/reporting Lowest Possible	
MW-5(10)②	2		X			X	HCL	8/19/97	1220		X												
MW-1(11)③	4		X			X	HCL	8/19/97	1235		X						X						
MW-3(11)④	2		X			X	HCL	8/19/97	1305		X												
Special QA/QC As Normal																							
Remarks																							
#20805-121.00																							
Lab number 89701586																							
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 Mike P...										Date 8/19/97		Time 1400		Received by Kristina Spaulen CAS 8/19/97 1400									
Relinquished by										Date		Time		Received by									
Relinquished by										Date		Time		Received by laboratory									
										Date		Time		Date									
														Time									



September 3, 1997

Service Request No.: S9701585

Mr. Gary Messerotes
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

RE: 20805-121.005/TO#21133.00/601 SAN LEANDRO

Dear Mr. Messerotes:

The following pages contain analytical results for sample(s) received by the laboratory on August 19, 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 9, 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 'Steven L. Green', written over a large, stylized 'S'.

Steven L. Green
Project Chemist

A handwritten signature in black ink, appearing to read 'Greg Anderson', 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
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)

ACRONLST.DOC 7/14/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701585
Date Collected: 8/19/97
Date Received: 8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-9(16)
Lab Code: S9701585-001
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	8/20/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	8/20/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701585
Date Collected: 8/19/97
Date Received: 8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-10(18)
Lab Code: S9701585-002
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	1	NA	8/20/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	8/20/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-121.005/IO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701585
Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
Lab Code: S970820-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	8/20/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	8/20/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701585
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-9(16)	S9701585-001		96	86
MW-10(18)	S9701585-002		95	86
Method Blank	S970820-WB1		100	82
BATCH QC	S9701586-005MS		93	87
BATCH QC	S9701586-005DMS		98	83

CAS Acceptance Limits: 69-116 69-116

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701585
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 8/20/97

Matrix Spike/Duplicate Matrix Spike Summary
BTE

Sample Name: BATCH QC Units: ug/L (ppb)
Lab Code: S9701586-005MS, S9701586-005DMS Basis: NA
Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Percent Recovery									
				Spike Level			Sample Result	Spike Result				CAS	Relative
												Acceptance	Percent
				MS	DMS	Result	MS	DMS	MS	DMS	Limits	Difference	
Benzene	EPA 5030	8020	0.5	25	25	ND	22	26	88	104	75-135	17	
Toluene	EPA 5030	8020	0.5	25	25	ND	23	27	92	108	73-136	16	
Ethylbenzene	EPA 5030	8020	0.5	25	25	ND	23	27	92	108	69-142	16	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO

Service Request: S9701585
Date Analyzed: 8/20/97

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	Percent Recovery	Result Notes
					Percent Recovery Acceptance Limits		
TPH as Gasoline	EPA 5030	CA/LUFT	250	240	90-110	96	
Benzene	EPA 5030	8020	25	26	85-115	104	
Toluene	EPA 5030	8020	25	28	85-115	112	
Ethylbenzene	EPA 5030	8020	25	28	85-115	112	
Xylenes, Total	EPA 5030	8020	75	84	85-115	112	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	25	28	85-115	112	

ICV/032196

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December 5, 1997
Project 20805-121.005

Mr. John Sullivan
17760 Sweetbriar Place
Castro Valley, California 94546

Re: Third quarter 1997 laboratory analytical results, groundwater samples, Chateau Manor Apartments, 724 Lewelling Boulevard, San Leandro, California

Dear Mr. Sullivan:

Enclosed please find copies of the laboratory analytical results for groundwater samples collected from wells MW-9 and MW-10 during the third quarter of 1997. These wells are located at Chateau Manor Apartments, 724 Lewelling Boulevard, San Leandro, California. The groundwater samples were collected on August 19, 1997, during quarterly sampling of the ARCO Products Company service station 601, 712 Lewelling Boulevard, San Leandro. The laboratory analytical results indicate that the groundwater sample concentrations were not detectable for total petroleum hydrocarbons as gasoline, and the gasoline constituents benzene, toluene, ethylbenzene, and total xylenes.

Please call if you have questions.

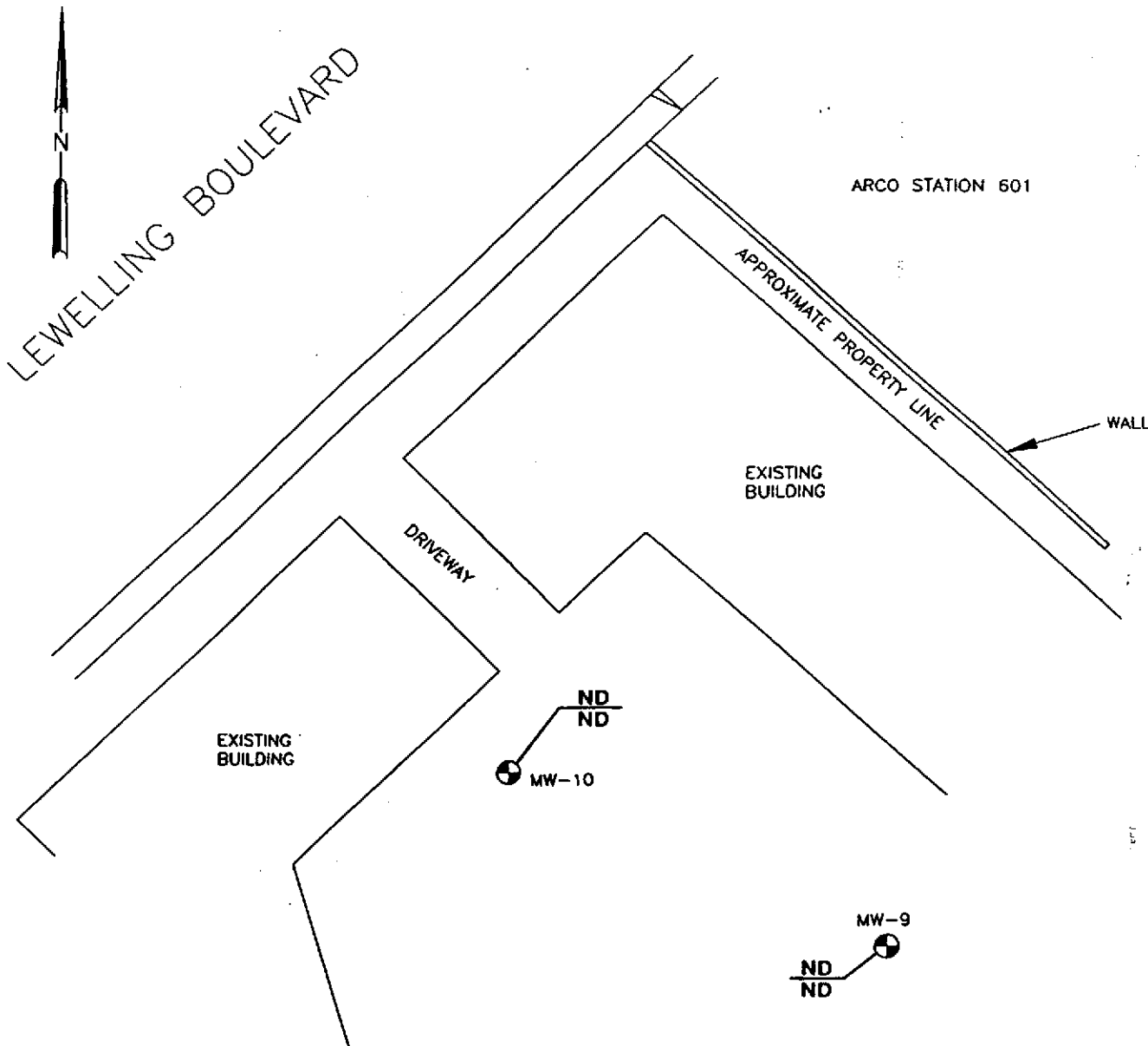
Sincerely,

EMCON

Gary P. Messerotes
Project Manager

Attachments: Figure 1 - Generalized Site Plan
Attachment A - Copy of Analytical Results and Chain-of-Custody
Documentation, Wells MW-9 and MW-10,
Third Quarter 1997

cc: Scott Seery, ACHCSA
Paul Supple, ARCO Products Company
File



EXPLANATION

- ⊕ Groundwater monitoring well
- ND — TPHG concentration in groundwater (ppb)
- ND — Benzene concentration in groundwater (ppb)
- ND Not detected

0 40 80
SCALE IN FEET (APPROX.)

Base map modified from RESNA, 1994.



DATE NOV. 1997
DWN KAJ
APP
REV
PROJECT NO.
805-121.005

FIGURE 1
CHATEAU MANOR APARTMENTS
724 LEWELLING BLVD.
SAN LEANDRO, CALIFORNIA
QUARTERLY GROUNDWATER MONITORING
GENERALIZED SITE PLAN

ATTACHMENT A

**COPY OF ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY
DOCUMENTATION, WELLS MW-9 AND MW-10,
THIRD QUARTER 1997**



September 3, 1997

Service Request No.: S9701585

Mr. Gary Messerotes
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

RE: 20805-121.005/TO#21133.00/601 SAN LEANDRO

Dear Mr. Messerotes:

The following pages contain analytical results for sample(s) received by the laboratory on August 19, 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 9, 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

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
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)

ACRONLST.DOC 7/14/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701585
Date Collected: 8/19/97
Date Received: 8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-9(16)
Lab Code: S9701585-001
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	8/20/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	8/20/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701585
Date Collected: 8/19/97
Date Received: 8/19/97

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-10(18)
Lab Code: S9701585-002
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	1	NA	8/20/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	8/20/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701585
Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
Lab Code: S970820-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	8/20/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	8/20/97	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	8/20/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701585
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-9(16)	S9701585-001		96	86
MW-10(18)	S9701585-002		95	86
Method Blank	S970820-WB1		100	82
BATCH QC	S9701586-005MS		93	87
BATCH QC	S9701586-005DMS		98	83

CAS Acceptance Limits: 69-116 69-116

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO
Sample Matrix: Water

Service Request: S9701585
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 8/20/97

Matrix Spike/Duplicate Matrix Spike Summary
BTE

Sample Name: BATCH QC **Units:** ug/L (ppb)
Lab Code: S9701586-005MS, S9701586-005DMS **Basis:** NA
Test Notes:

Percent Recovery

Analyte	Prep Method	Analysis Method	MRL	Spike Level			Sample Result	Spike Result		Percent Recovery		Relative Percent Difference
				MS	DMS			MS	DMS	MS	DMS	
Benzene	EPA 5030	8020	0.5	25	25	ND	22	26	88	104	75-135	17
Toluene	EPA 5030	8020	0.5	25	25	ND	23	27	92	108	73-136	16
Ethylbenzene	EPA 5030	8020	0.5	25	25	ND	23	27	92	108	69-142	16

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-121.005/TO#21133.00/601 SAN LEANDRO

Service Request: S9701585
Date Analyzed: 8/20/97

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

Sample Name: ICV
Lab Code: ICV1
Test Notes:

Units: ug/L (ppb)
Basis: NA

ICV Source:

Analyte	Prep Method	Analysis Method	True Value	Result	CAS Percent Recovery	Percent Recovery	Result Notes
					Acceptance Limits		
TPH as Gasoline	EPA 5030	CA/LUFT	250	240	90-110	96	
Benzene	EPA 5030	8020	25	26	85-115	104	
Toluene	EPA 5030	8020	25	28	85-115	112	
Ethylbenzene	EPA 5030	8020	25	28	85-115	112	
Xylenes, Total	EPA 5030	8020	75	84	85-115	112	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	25	28	85-115	112	

Division of AtlanticRichfieldCompany

Task Order No. 2113300

Chain of Custody

Division of Atlantic Richfield Company						City (Facility)						Project manager (Consultant)						Laboratory name																	
ARCO Facility no.						San Leandro						Gary Messerotes						CAS																	
ARCO engineer						Paul Supple						Telephone no. (ARCO)						(408) 453-7300						Fax no. (Consultant)						(408) 453-0457					
Consultant name						EMCON						Address (Consultant)						1921 Ringwood Ave San Jose, CA 95131						Contract number											
Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX EPA 801/802	BTX/TPH EPA Method 8015	TPH Modified 8015 Gas Diesel	Oil and Grease 413.1 413.2	TPH EPA 418.1/SM503E	EPA 801/8010	EPA 824/8240	EPA 825/8270	Semi Metals TCLP VOA VOC	CMM Metals EPA 8010/7000 ITLC STIC	Lead Org/DHS Lead EPA 7420/7421	Method of shipment														
			Soil	Water	Other	Ice	Acid														Sampler will deliver														
MW-9(16)	①	2	X			X	HCL	8/19/97	1125		X											Special detection Limit/reporting													
MW-10(13)	②	2	X			X	HCL	8/19/97	1110		X											Lowest Possible													
MW-15(10)	③	2	X			X	HCL	8/19/97	1140		X											Special QA/QC													
																						As Normal													
																						Remarks													
																						* Report With S9701586													
																						#20905-1ZL.C													
																						Lab number													
																						S9701585													
																						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										Date	Time	Received by																							
Relinquished by										8/19/97	1400	Kristina Soulier CAS 8/19/97 1400																							
Relinquished by										Date	Time	Received by laboratory										Date	Time												
Relinquished by										Date	Time	Received by laboratory										Date	Time												

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APC-3292 (2-91)