



EMCON

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OPERATION
97 SEP 30 AM 9:13

Date September 30, 1997
Project 20805-134.004

To:

Ms. Susan Hugo
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</u> <u>for ARCO service station 6113, Livermore, 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: <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: Sum Arigala, RWQCB - SFBR
Danielle Stefani, LFD
Paul Supple, ARCO Products Company
File





Date: September 30, 1997

Re: ARCO Station #

6113 • 785 East Stanley Boulevard • Livermore, 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, flowing style.

Paul Supple
Environmental Engineer



EMCON

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

August 29, 1997
Project 20805-134.004

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

Re: Second quarter 1997 groundwater monitoring program results, ARCO service station 6113, Livermore, California

Dear Mr. Supple:

This letter presents the results of the second quarter 1997 groundwater monitoring program at ARCO Products Company (ARCO) service station 6113, 785 East Stanley Boulevard, Livermore, California (Figure 1). The semi-annual monitoring program complies with Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

LIMITATIONS

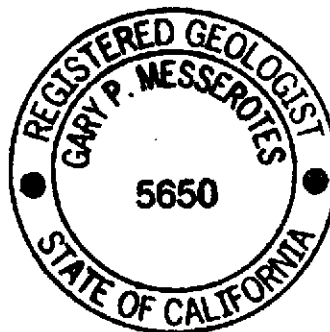
No monitoring event is thorough enough to describe all geologic and hydrogeologic conditions of interest at a given site. If conditions have not been identified during the monitoring event, results should not be construed as a guarantee of the absence of such conditions at the site, but rather as the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



August 29, 1997

ARCO SEMI-ANNUAL REPORT

Station No.: 6113 Address: 785 East Stanley Boulevard, Livermore, California
EMCON Project No. 20805-134.004
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 /Susan Hugo

WORK PERFORMED THIS QUARTER (Second- 1997):

1. Prepared and submitted quarterly groundwater monitoring report for first quarter 1997.
2. Conducted semi-annual groundwater monitoring and sampling for second quarter 1997.

WORK PROPOSED FOR NEXT QUARTER (Third- 1997):

1. Prepare status report for third quarter 1997.

WORK PROJECTED FOR 1997:

1. Perform semi-annual groundwater monitoring and sampling for fourth quarter 1997.

SEMI-ANNUAL MONITORING:

Current Phase of Project: Semi-Annual Groundwater Monitoring
Frequency of Sampling: Semi-Annual (groundwater)
Frequency of Monitoring: Semi-Annual (groundwater)
Is Floating Product (FP) Present On-site: Yes No
Bulk Soil Removed to Date : 288 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: 16.47feet
Groundwater Gradient (Average): 0.019 ft/ft toward north (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
- Table 3 - Historical Groundwater Analytical Data (VOCs), Second Quarter 1997
- 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: Susan Hugo, ACHCSA
Sum Arigala, RWQCB-SFBR
Danielle Stefani, LFD

**Table 1
Groundwater Monitoring Data
Second Quarter 1997**

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, 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	TRPH EPA 418.1 µg/L	TPHD LUFT Method µg/L
MW-1	05-19-97	457.04	16.47	440.57	ND	N	0.019	05-19-97	Not sampled; well sampled annually, during the fourth quarter								
MW-2	05-19-97	457.74	16.62	441.12	ND	N	0.019	05-19-97	Not sampled; well sampled annually, during the fourth quarter								
MW-3	05-19-97	456.97	16.40	440.57	ND	N	0.019	05-19-97	Not sampled; well sampled annually, during the fourth quarter								
MW-4	05-19-97	456.55	16.98	439.57	ND	N	0.019	05-19-97	62	<0.5	<0.5	<0.5	0.6	△3	--	--	--
MW-5	05-19-97	455.84	16.64	439.20	ND	N	0.019	05-20-97	7600	480	140	400	1200	<40^	--	--	--
MW-6	05-19-97	454.93	15.87	439.06	ND	N	0.019	05-20-97	<50	<0.5	<0.5	<0.5	<0.5	△3	--	--	--
MW-7	05-19-97	454.92	15.74	439.18	ND	N	0.019	05-20-97	<50	<0.5	<0.5	<0.5	<0.5	△3	--	--	--
MW-8	05-19-97	456.97	14.35	442.62	ND	N	0.019	05-19-97	Not sampled; well sampled annually, during the fourth quarter								
MW-9	05-19-97	456.18	14.60	441.58	ND	N	0.019	05-19-97	Not sampled; well sampled annually, during the fourth quarter								
MW-10	05-19-97	456.85	17.38	439.47	ND	N	0.019	05-19-97	Not sampled; well sampled annually, during the fourth quarter								
MW-11	05-19-97	455.07	16.80	438.27	ND	N	0.019	05-19-97	<50	1.1	4.5	<0.5	2.2	△3	--	--	--
MW-12	05-19-97	455.04	17.41	437.63	ND	N	0.019	05-19-97	<50	<0.5	<0.5	<0.5	<0.5	△3	--	--	--

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

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

ft/ft: foot per foot

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

µg/L: micrograms per liter

EPA: United States Environmental Protection Agency

MTBE: Methyl tert-butyl ether

TRPH: total recoverable petroleum hydrocarbons

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

ND: none detected

N: north

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

--: not analyzed or not applicable

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

ARCO Service Station 6113
 785 East Stanley Boulevard, Livermore, 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	TRPH EPA 418.1 µg/L	TPHD LUFT Method µg/L
MW-1	03-23-95	457.04	14.12	442.92	ND	NW	0.035	03-23-95	Not sampled: well sampled annually, during the fourth quarter								
MW-1	05-31-95	457.04	14.45	442.59	ND	NNW	0.028	05-31-95	Not sampled: well sampled annually, during the fourth quarter								
MW-1	08-31-95	457.04	17.12	439.92	ND	NNW	0.03	08-31-95	Not sampled: well sampled annually, during the fourth quarter								
MW-1	11-28-95	457.04	16.34	440.70	ND	NNW	0.025	11-28-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-1	02-22-96	457.04	13.23	443.81	ND	NNW	0.031	02-22-96	Not sampled: well sampled annually, during the fourth quarter								
MW-1	05-23-96	457.04	14.02	443.02	ND	NNW	0.025	05-23-96	Not sampled: well sampled annually, during the fourth quarter								
MW-1	08-08-96	457.04	16.13	440.91	ND	N	0.019	08-08-96	Not sampled: well sampled annually, during the fourth quarter								
MW-1	11-07-96	457.04	17.28	439.76	ND	NNE	0.019	11-08-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-1	03-27-97	457.04	14.91	442.13	ND	NNW	0.021	03-28-97	Not sampled: well sampled annually, during the fourth quarter								
MW-1	05-19-97	457.04	16.47	440.57	ND	N	0.019	05-19-97	Not sampled: well sampled annually, during the fourth quarter								
MW-2	03-23-95	457.74	14.15	443.59	ND	NW	0.035	03-23-95	Not sampled: well sampled annually, during the fourth quarter								
MW-2	05-31-95	457.74	14.67	443.07	ND	NNW	0.028	05-31-95	Not sampled: well sampled annually, during the fourth quarter								
MW-2	08-31-95	457.74	17.24	440.50	ND	NNW	0.03	08-31-95	Not sampled: well sampled annually, during the fourth quarter								
MW-2	11-28-95	457.74	16.40	441.34	ND	NNW	0.025	11-29-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-2	02-22-96	457.74	13.55	444.19	ND	NNW	0.031	02-22-96	Not sampled: well sampled annually, during the fourth quarter								
MW-2	05-23-96	457.74	14.29	443.45	ND	NNW	0.025	05-23-96	Not sampled: well sampled annually, during the fourth quarter								
MW-2	08-08-96	457.74	16.19	441.55	ND	N	0.019	08-08-96	Not sampled: well sampled annually, during the fourth quarter								
MW-2	11-07-96	457.74	17.50	440.24	ND	NNE	0.019	11-07-96	65	0.6	7.4	2.1	12	5	--	--	--
MW-2	03-27-97	457.74	15.32	442.42	ND	NNW	0.021	03-28-97	Not sampled: well sampled annually, during the fourth quarter								
MW-2	05-19-97	457.74	16.62	441.12	ND	N	0.019	05-19-97	Not sampled: well sampled annually, during the fourth quarter								

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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	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-3	03-23-95	456.97	14.13	442.84	ND	NW	0.035	03-23-95	Not sampled: well sampled annually, during the fourth quarter								
MW-3	05-31-95	456.97	14.46	442.51	ND	NNW	0.028	05-31-95	Not sampled: well sampled annually, during the fourth quarter								
MW-3	08-31-95	456.97	17.06	439.91	ND	NNW	0.03	08-31-95	Not sampled: well sampled annually, during the fourth quarter								
MW-3	11-28-95	456.97	16.27	440.70	ND	NNW	0.025	11-28-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-3	02-22-96	456.97	13.14	443.83	ND	NNW	0.031	02-22-96	Not sampled: well sampled annually, during the fourth quarter								
MW-3	05-23-96	456.97	13.95	443.02	ND	NNW	0.025	05-23-96	Not sampled: well sampled annually, during the fourth quarter								
MW-3	08-08-96	456.97	16.03	440.94	ND	N	0.019	08-08-96	Not sampled: well sampled annually, during the fourth quarter								
MW-3	11-07-96	456.97	17.26	439.71	ND	NNE	0.019	11-07-96	<50	<0.5	0.9	<0.5	1.5	<3	--	--	--
MW-3	03-27-97	456.97	14.85	442.12	ND	NNW	0.021	03-28-97	Not sampled: well sampled annually, during the fourth quarter								
MW-3	05-19-97	456.97	16.40	440.57	ND	N	0.019	05-19-97	Not sampled: well sampled annually, during the fourth quarter								
MW-4	03-23-95	456.55	15.39	441.16	ND	NW	0.035	03-23-95	210	2.1	0.6	0.8	2.1	--	--	--	--
MW-4	05-31-95	456.55	15.32	441.23	ND	NNW	0.028	05-31-95	190	1.6	<0.5	0.7	0.9	--	--	--	--
MW-4	08-31-95	456.55	17.86	438.69	ND	NNW	0.03	08-31-95	160	1.2	0.7	<0.5	<2	<3	--	--	--
MW-4	11-28-95	456.55	17.18	439.37	ND	NNW	0.025	11-29-95	150	0.7	<0.5	0.7	1.4	<3	--	--	--
MW-4	02-22-96	456.55	14.80	441.75	ND	NNW	0.031	02-22-96	100	<0.5	<0.5	<0.6	0.8	<3	--	--	--
MW-4	05-23-96	456.55	14.43	442.12	ND	NNW	0.025	05-23-96	86	<0.5	<0.5	<0.5	<0.7	<3	--	--	--
MW-4	08-08-96	456.55	16.80	439.75	ND	N	0.019	08-08-96	98	<0.5	<0.5	<0.5	1.3	<3	--	--	--
MW-4	11-07-96	456.55	17.90	438.65	ND	NNE	0.019	11-13-96	140	<0.5	<0.5	<0.9*	1.3	<3	--	--	--
MW-4	03-27-97	456.55	15.22	441.33	ND	NNW	0.021	03-28-97	<50	1.1	<0.5	<0.5	1.6	<3	--	--	--
MW-4	05-19-97	456.55	16.98	439.57	ND	N	0.019	05-19-97	62	<0.5	<0.5	<0.5	0.6	<3	--	--	--

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1995 - Present*

ARCO Service Station 6113
 785 East Stanley Boulevard, Livermore, 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	TRPH EPA 418.1 µg/L	TPHD LUFT Method µg/L	
MW-5	03-23-95	455.84	13.97	441.87	ND	NW	0.035	03-23-95	68	4.2	3.4	2.3	12	--	--	--	--	
MW-5	05-31-95	455.84	Not surveyed: well was inaccessible						05-31-95	Not sampled: well was inaccessible								
MW-5	08-31-95	455.84	Not surveyed: well was inaccessible						08-31-95	Not sampled: well was inaccessible								
MW-5	11-28-95	455.84	16.46	439.38	ND	NNW	0.025	11-29-95	960	41	24	38	210	<5	--	--	--	
MW-5	02-22-96	455.84	13.34	442.50	ND	NNW	0.031	02-22-96	Not sampled: well sampled semi-annually, during the second and fourth quarters									
MW-5	05-23-96	455.84	14.36	441.48	ND	NNW	0.025	05-23-96	7100	440	180	270	1700	<50	--	--	--	
MW-5	08-08-96	455.84	16.38	439.46	ND	N	0.019	08-08-96	Not sampled: well sampled semi-annually, during the second and fourth quarters									
MW-5	11-07-96	455.84	17.26	438.58	ND	NNE	0.019	11-13-96	5600	230	86	210	1100	<80^	--	--	--	
MW-5	03-27-97	455.84	15.95	439.89	ND	NNW	0.021	03-28-97	Not sampled: well sampled semi-annually, during the second and fourth quarters									
MW-5	05-19-97	455.84	16.64	439.20	ND	N	0.019	05-20-97	7600	480	140	400	1200	<40^	--	--	--	
MW-6	03-23-95	454.93	13.38	441.55	ND	NW	0.035	03-23-95	<50	1.5	<0.5	<0.5	0.9	--	--	--	--	
MW-6	05-31-95	454.93	13.96	440.97	ND	NNW	0.028	05-31-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	
MW-6	08-31-95	454.93	16.71	438.22	ND	NNW	0.03	08-31-95	150	9	1.8	4	12	<3	--	--	--	
MW-6	11-28-95	454.93	15.65	439.28	ND	NNW	0.025	11-29-95	<50	0.6	<0.5	<0.5	0.8	<3	--	--	--	
MW-6	02-22-96	454.93	12.53	442.40	ND	NNW	0.031	02-22-96	<50	1.9	<0.5	0.8	2.1	<3	--	--	--	
MW-6	05-23-96	454.93	13.24	441.69	ND	NNW	0.025	05-23-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	
MW-6	08-08-96	454.93	16.65	438.28	ND	N	0.019	08-08-96	<50	0.5	<0.5	<0.5	0.5	<3	--	--	--	
MW-6	11-07-96	454.93	16.65	438.28	ND	NNE	0.019	11-08-96	110	5.3	1.3	3.1	6.6	<3	--	--	--	
MW-6	03-27-97	454.93	14.25	440.68	ND	NNW	0.021	03-28-97	<50	2.3	<0.5	0.9	3.5	4	--	--	--	
MW-6	05-19-97	454.93	15.87	439.06	ND	N	0.019	05-20-97	<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 6113
 785 East Stanley Boulevard, Livermore, 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	TRPH EPA 418.1 µg/L	TPHD LUFT Method µg/L	
MW-7	03-23-95	454.92	13.29	441.63	ND	NW	0.035	03-23-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	
MW-7	05-31-95	454.92	13.72	441.20	ND	NNW	0.028	05-31-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	
MW-7	08-31-95	454.92	16.53	438.39	ND	NNW	0.03	08-31-95	<50	<0.5	<0.5	<0.5	1.2	<3	--	--	--	
MW-7	11-28-95	454.92	15.50	439.42	ND	NNW	0.025	11-29-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	
MW-7	02-22-96	454.92	12.30	442.62	ND	NNW	0.031	02-22-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	
MW-7	05-23-96	454.92	13.02	441.90	ND	NNW	0.025	05-23-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	
MW-7	08-08-96	454.92 Not surveyed: unable to locate well							08-08-96	Not sampled: unable to locate well								
MW-7	11-07-96	454.92	16.50	438.42	ND	NNE	0.019	11-08-96	<50	<0.5	<0.5	<0.5	0.8	<3	--	--	--	
MW-7	03-27-97	454.92	14.22	440.70	ND	NNW	0.021	03-28-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	
MW-7	05-19-97	454.92	15.74	439.18	ND	N	0.019	05-20-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	
MW-8	03-23-95	456.97	11.55	445.42	ND	NW	0.035	03-23-95	Not sampled: well sampled annually, during the fourth quarter									
MW-8	05-31-95	456.97	12.37	444.60	ND	NNW	0.028	05-31-95	Not sampled: well sampled annually, during the fourth quarter									
MW-8	08-31-95	456.97	15.68	441.29	ND	NNW	0.03	08-31-95	Not sampled: well sampled annually, during the fourth quarter									
MW-8	11-28-95	456.97	14.15	442.82	ND	NNW	0.025	11-28-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	
MW-8	02-22-96	456.97	10.97	446.00	ND	NNW	0.031	02-22-96	Not sampled: well sampled annually, during the fourth quarter									
MW-8	05-23-96	456.97	11.90	445.07	ND	NNW	0.025	05-23-96	Not sampled: well sampled annually, during the fourth quarter									
MW-8	08-08-96	456.97	13.85	443.12	ND	N	0.019	08-08-96	Not sampled: well sampled annually, during the fourth quarter									
MW-8	11-07-96	456.97	15.08	441.89	ND	NNE	0.019	11-08-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--	
MW-8	03-27-97	456.97	12.96	444.01	ND	NNW	0.021	03-28-97	Not sampled: well sampled annually, during the fourth quarter									
MW-8	05-19-97	456.97	14.35	442.62	ND	N	0.019	05-19-97	Not sampled: well sampled annually, during the fourth quarter									

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

ARCO Service Station 6113
 785 East Stanley Boulevard, Livermore, 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	Analytical Data								
									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	03-23-95	456.18	13.18	443.00	ND	NW	0.035	03-23-95	Not sampled: well sampled annually, during the fourth quarter								
MW-9	05-31-95	456.18	12.66	443.52	ND	NNW	0.028	05-31-95	Not sampled: well sampled annually, during the fourth quarter								
MW-9	08-31-95	456.18	14.40	441.78	ND	NNW	0.03	08-31-95	Not sampled: well sampled annually, during the fourth quarter								
MW-9	11-28-95	456.18	14.26	441.92	ND	NNW	0.025	11-29-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-9	02-22-96	456.18	12.05	444.13	ND	NNW	0.031	02-22-96	Not sampled: well sampled annually, during the fourth quarter								
MW-9	05-23-96	456.18	12.07	444.11	ND	NNW	0.025	05-23-96	Not sampled: well sampled annually, during the fourth quarter								
MW-9	08-08-96	456.18	14.12	442.06	ND	N	0.019	08-08-96	Not sampled: well sampled annually, during the fourth quarter								
MW-9	11-07-96	456.18	15.42	440.76	ND	NNE	0.019	11-08-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-9	03-27-97	456.18	13.01	443.17	ND	NNW	0.021	03-28-97	Not sampled: well sampled annually, during the fourth quarter								
MW-9	05-19-97	456.18	14.60	441.58	ND	N	0.019	05-19-97	Not sampled: well sampled annually, during the fourth quarter								
MW-10	03-23-95	456.85	14.86	441.99	ND	NW	0.035	03-23-95	Not sampled: well sampled annually, during the fourth quarter								
MW-10	05-31-95	456.85	15.63	441.22	ND	NNW	0.028	05-31-95	Not sampled: well sampled annually, during the fourth quarter								
MW-10	08-31-95	456.85	14.40	442.45	ND	NNW	0.03	08-31-95	Not sampled: well sampled annually, during the fourth quarter								
MW-10	11-28-95	456.85	17.24	439.61	ND	NNW	0.025	11-29-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-10	02-22-96	456.85	14.30	442.55	ND	NNW	0.031	02-22-96	Not sampled: well sampled annually, during the fourth quarter								
MW-10	05-23-96	456.85	14.93	441.92	ND	NNW	0.025	05-23-96	Not sampled: well sampled annually, during the fourth quarter								
MW-10	08-08-96	456.85	17.20	439.65	ND	N	0.019	08-08-96	Not sampled: well sampled annually, during the fourth quarter								
MW-10	11-07-96	456.85	18.25	438.60	ND	NNE	0.019	11-08-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-10	03-27-97	456.85	15.77	441.08	ND	NNW	0.021	03-28-97	Not sampled: well sampled annually, during the fourth quarter								
MW-10	05-19-97	456.85	17.38	439.47	ND	N	0.019	05-19-97	Not sampled: well sampled annually, during the fourth quarter								

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

ARCO Service Station 6113
 785 East Stanley Boulevard, Livermore, 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	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN											
MW-11	03-23-95	455.07	17.34	437.73	ND	NW	0.035	03-23-95	Not sampled: well sampled semi-annually, during the second and fourth quarters								
MW-11	05-31-95	455.07	16.68	438.39	ND	NNW	0.028	05-31-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-11	08-31-95	455.07	20.20	434.87	ND	NNW	0.03	08-31-95	Not sampled: well sampled semi-annually, during the second and fourth quarters								
MW-11	11-28-95	455.07	17.80	437.27	ND	NNW	0.025	11-28-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-11	02-22-96	455.07	15.97	439.10	ND	NNW	0.031	02-22-96	Not sampled: well sampled semi-annually, during the second and fourth quarters								
MW-11	05-23-96	455.07	15.50	439.57	ND	NNW	0.025	05-23-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-11	08-08-96	455.07	17.77	437.30	ND	N	0.019	08-08-96	Not sampled: well sampled semi-annually, during the second and fourth quarters								
MW-11	11-07-96	455.07	17.45	437.62	ND	NNE	0.019	11-13-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-11	03-27-97	455.07	15.77	439.30	ND	NNW	0.021	03-28-97	Not sampled: well sampled semi-annually, during the second and fourth quarters								
MW-11	05-19-97	455.07	16.80	438.27	ND	N	0.019	05-19-97	<50	1.1	4.5	<0.5	2.2	<3	--	--	--
MW-12	03-23-95	455.04	15.54	439.50	ND	NW	0.035	03-23-95	Not sampled: well sampled semi-annually, during the second and fourth quarters								
MW-12	05-31-95	455.04	15.66	439.38	ND	NNW	0.028	05-31-95	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-12	08-31-95	455.04	18.23	436.81	ND	NNW	0.03	08-31-95	Not sampled: well sampled semi-annually, during the second and fourth quarters								
MW-12	11-28-95	455.04	17.53	437.51	ND	NNW	0.025	11-28-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-12	02-22-96	455.04	14.45	440.59	ND	NNW	0.031	02-22-96	Not sampled: well sampled semi-annually, during the second and fourth quarters								
MW-12	05-23-96	455.04	14.88	440.16	ND	NNW	0.025	05-23-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-12	08-08-96	455.04	17.30	437.74	ND	N	0.019	08-08-96	Not sampled: well sampled semi-annually, during the second and fourth quarters								
MW-12	11-07-96	455.04	18.30	436.74	ND	NNE	0.019	11-13-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--	--	--
MW-12	03-27-97	455.04	15.69	439.35	ND	NNW	0.021	03-28-97	Not sampled: well sampled semi-annually, during the second and fourth quarters								
MW-12	05-19-97	455.04	17.41	437.63	ND	N	0.019	05-19-97	<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 6113
 785 East Stanley Boulevard, Livermore, 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	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

N: north

NW: northwest

NNW: north-northwest

NNE: north-northeast

- -: not analyzed or not applicable

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

*: For previous historical groundwater elevation and analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results, ARCO Service Station 6113, Livermore, California*, (EMCON, February 26, 1996).

Table 3
 Historical Groundwater Analytical Data
 Volatile Organic Compounds (VOCs) and Metals

ARCO Service Station 6113

785 East Stanley Boulevard, Livermore, California

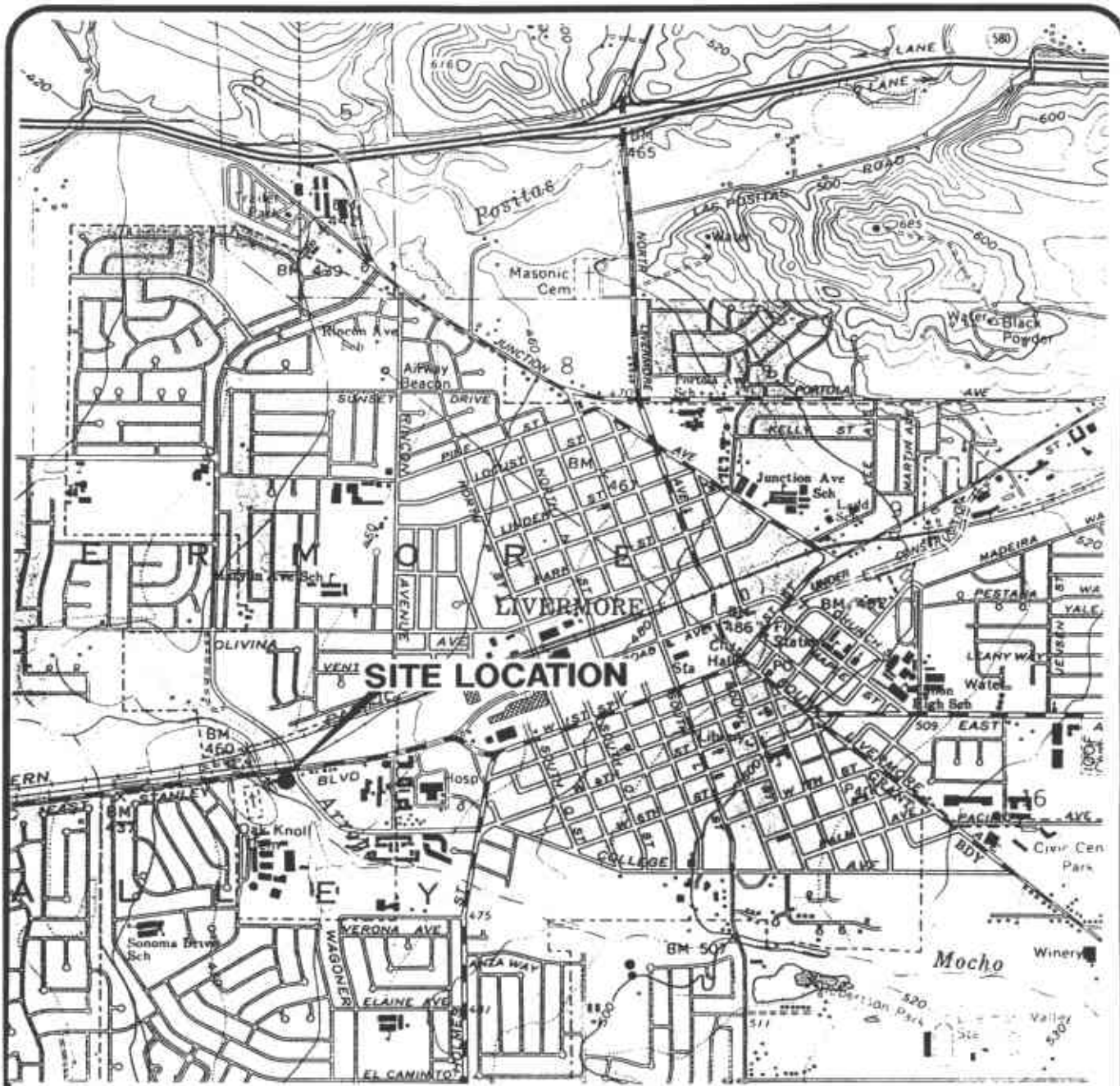
Date: 08-22-97

Well Designation	Water Sample Field Date	Total VOCs EPA 5030/601 µg/L	Cadmium EPA 6010 µg/L	Chromium EPA 6010 µg/L	Lead EPA 7421 µg/L	Zinc EPA 6010 µg/L	Nickel EPA 6010 µg/L
MW-1	09-20-89	Not analyzed: sampling for additional parameters was not initiated					
MW-2	09-20-89	Not analyzed: sampling for additional parameters was not initiated					
MW-3	09-20-89	Not analyzed: sampling for additional parameters was not initiated					
MW-4	02-21-91	Not analyzed: sampling for additional parameters was not initiated					
MW-5	06-29-92	Not analyzed: sampling for additional parameters was not initiated					
MW-6	06-29-92	Not analyzed: sampling for additional parameters was not initiated					
MW-7	06-29-92	Not analyzed: sampling for additional parameters was not initiated					
MW-8	06-29-92	ND	<3	1780	143	1310	5100
MW-8	09-11-92	--	13	3580	308	2620	10300
MW-8	11-12-92	--	28	3440	221	2550	9840
MW-8	03-30-93	Not analyzed: sampling for additional parameters was discontinued					
MW-9	06-29-92	--	--	--	--	--	--
MW-9	09-11-92	--	--	--	--	--	--
MW-9	11-12-92	--	10	1080	101	859	3070
MW-9	03-31-93	Not analyzed: sampling for additional parameters was discontinued					
MW-10	03-31-93	Not analyzed: sampling for additional parameters was not initiated					
MW-11	03-31-93	Not analyzed: sampling for additional parameters was not initiated					
MW-12	03-31-93	Not analyzed: sampling for additional parameters was not initiated					

µg/L: micrograms per liter

-- : not analyzed

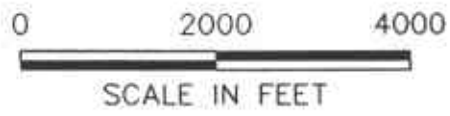
ND: not detected (31 compounds tested for VOCs were nondetectable)



EA-SANJOSE-CAD/DRAWINGS: I:\02002\SITELOC.dwg Xrefs: <NONE>
 Scale: 1 = 1.00 DimsScale: 1 = 1.00 Date: 3/12/97 Time: 5:19 PM Operator: KAJ

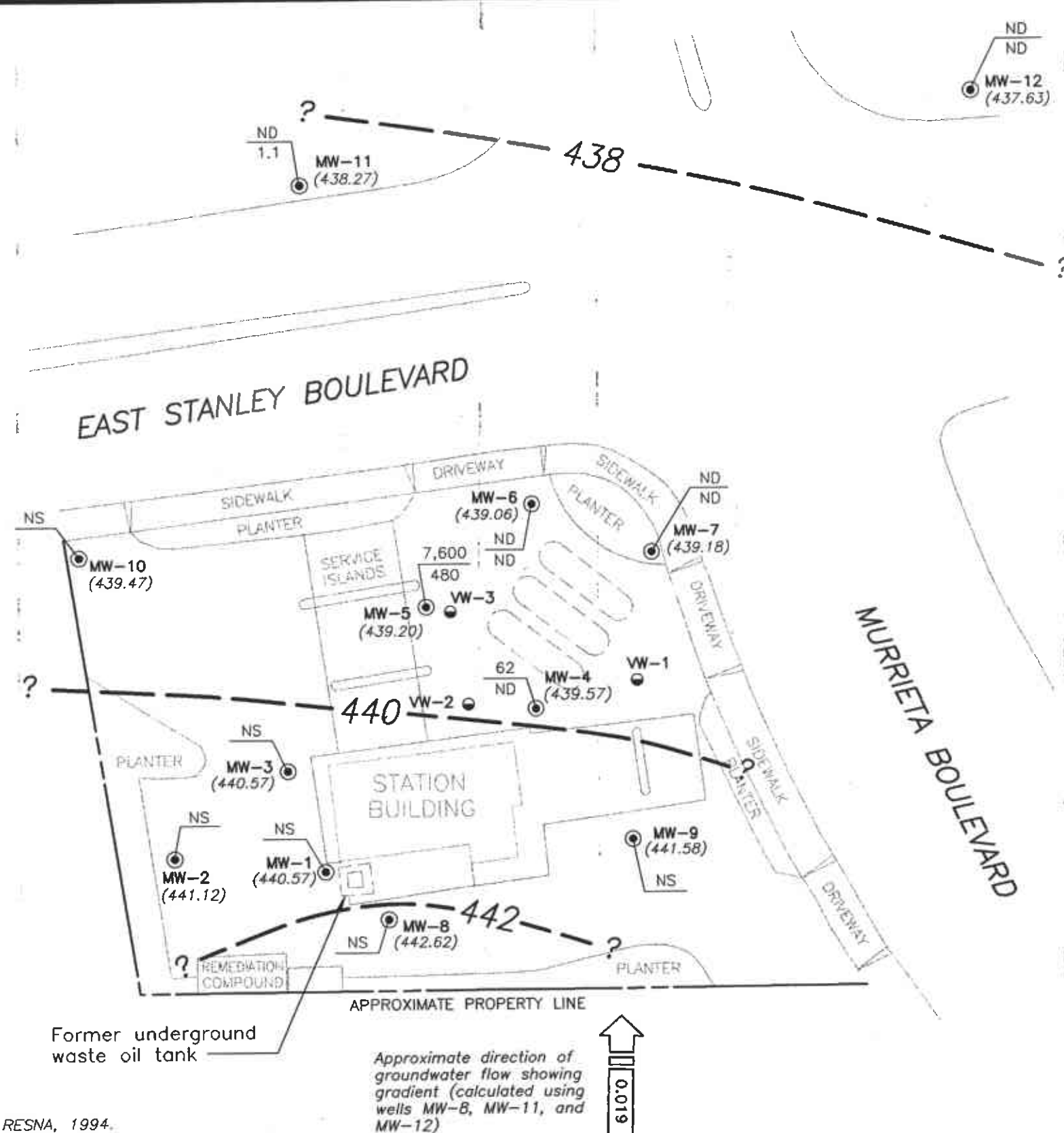
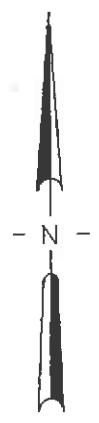


Base map from USGS 7.5' Quad. Map:
Livermore, California. Photorevised 1980.



DATE APR. 1997
 DWN KAJ
 APP _____
 REV _____
 PROJECT NO.
 805-134.004

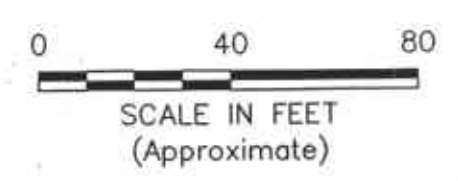
FIGURE 1
 ARCO PRODUCTS COMPANY
 SERVICE STATION 6113, 785 E. STANLEY BLVD.
 LIVERMORE, CALIFORNIA
**QUARTERLY GROUNDWATER MONITORING
 SITE LOCATION**



- EXPLANATION**
- Groundwater monitoring well
 - Vapor extraction well
 - Existing underground gasoline storage tank
 - (439.57) Groundwater elevation (Ft.-MSL) measured 5/19/97
 - ? - - - Groundwater elevation contour (Ft.-MSL)
 - 62 / ND TPHG concentration in groundwater (ug/L); sampled 5/19-20/97
 - NS Benzene concentration in groundwater (ug/L); sampled 5/19-20/97
 - NS Not sampled; not scheduled for chemical analysis
 - ND Not detected at or above the method reporting limit for TPHG (50 ug/L) or benzene (0.5 ug/L)

Former underground waste oil tank

Approximate direction of groundwater flow showing gradient (calculated using wells MW-8, MW-11, and MW-12)



DATE AUG. 1997
 DWN KAJ
 APP _____
 REV _____
 PROJECT NO. 805-134.004

FIGURE 2
 ARCO PRODUCTS COMPANY
 SERVICE STA. 6113, 785 E. STANLEY BLVD.
 LIVERMORE, CALIFORNIA
**QUARTERLY GROUNDWATER MONITORING
 GROUNDWATER DATA - 2ND QUARTER 1997**

Base map modified from RESNA, 1994.



EA-SANJOSE-CAD/DRAWINGS: C:\805-134\SIGWELEV.dwg Xrefs: <NONE>
 Scale: 1" = 40.00' DimScale: 1" = 40.00' Date: 9/2/97 Time: 1:13 PM Operator: KAJ



June 5, 1997

Service Request No.: S9700932

Ms. Ivy Inouye
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

RE: 20805-134.004/TO#21133.00/6113 LIVERMORE

Dear Ms. Inouye:

The following pages contain analytical results for sample(s) received by the laboratory on May 21, 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 14, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

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

Sincerely,

A handwritten signature in black ink, appearing to read "Steven L. Green", is written over a large, stylized, and somewhat abstract graphic element that resembles a signature or a logo.

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: 20805-134.004/TO#21133.00/6113 LIVERMORE
Sample Matrix: Water

Service Request: S9700932
Date Collected: 5/19/97
Date Received: 5/21/97

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-11 (43)
Lab Code: S9700932-001
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	5/29/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	5/29/97	1.1	
Toluene	EPA 5030	8020	0.5	1	NA	5/29/97	4.5	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	5/29/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	5/29/97	2.2	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	5/29/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-134.004/TO#21133.00/6113 LIVERMORE
Sample Matrix: Water

Service Request: S9700932
Date Collected: 5/19/97
Date Received: 5/21/97

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-12 (32)
Lab Code: S9700932-002
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	5/29/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	5/29/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	5/29/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	5/29/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	5/29/97	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	5/29/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-134.004/TO#21133.00/6113 LIVERMORE
Sample Matrix: Water

Service Request: S9700932
Date Collected: 5/20/97
Date Received: 5/21/97

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-7 (65)
Lab Code: S9700932-003
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	5/30/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	5/30/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	5/30/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	5/30/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	5/30/97	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	5/30/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-134.004/TO#21133.00/6113 LIVERMORE
Sample Matrix: Water

Service Request: S9700932
Date Collected: 5/20/97
Date Received: 5/21/97

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-6 (65)
Lab Code: S9700932-004
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	5/30/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	5/30/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	5/30/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	5/30/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	5/30/97	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	5/30/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-134.004/TO#21133.00/6113 LIVERMORE
Sample Matrix: Water

Service Request: S9700932
Date Collected: 5/19/97
Date Received: 5/21/97

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-4 (25)
Lab Code: S9700932-005
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	5/29/97	62	
Benzene	EPA 5030	8020	0.5	1	NA	5/29/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	5/29/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	5/29/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	5/29/97	0.6	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	5/29/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-134.004/TO#21133.00/6113 LIVERMORE
Sample Matrix: Water

Service Request: S9700932
Date Collected: 5/20/97
Date Received: 5/21/97

BTEX, MTBE and TPH as Gasoline

Sample Name: MW-5 (60)
Lab Code: S9700932-006
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	10	NA	5/30/97	7600	
Benzene	EPA 5030	8020	0.5	10	NA	5/30/97	480	
Toluene	EPA 5030	8020	0.5	10	NA	5/30/97	140	
Ethylbenzene	EPA 5030	8020	0.5	10	NA	5/30/97	400	
Xylenes, Total	EPA 5030	8020	0.5	10	NA	5/30/97	1200	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	10	NA	5/30/97	<40	M1

M1 The MRL was elevated because of matrix interferences.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-134.004/TO#21133.00/6113 LIVERMORE
Sample Matrix: Water

Service Request: S9700932
Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
Lab Code: S970529-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	5/29/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	5/29/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	5/29/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	5/29/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	5/29/97	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	5/29/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 20805-134.004/TO#21133.00/6113 LIVERMORE
Sample Matrix: Water

Service Request: S9700932
Date Collected: NA
Date Received: NA

BTEX, MTBE and TPH as Gasoline

Sample Name: Method Blank
Lab Code: S970530-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	5/30/97	ND	
Benzene	EPA 5030	8020	0.5	1	NA	5/30/97	ND	
Toluene	EPA 5030	8020	0.5	1	NA	5/30/97	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	5/30/97	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	5/30/97	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	3	1	NA	5/30/97	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-134.004/TO#21133.00/6113 LIVERMORE
Sample Matrix: Water

Service Request: S9700932
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-11 (43)	S9700932-001		96	97
MW-12 (32)	S9700932-002		99	96
MW-7 (65)	S9700932-003		100	91
MW-6 (65)	S9700932-004		103	90
MW-4 (25)	S9700932-005		102	92
MW-5 (60)	S9700932-006		98	99
MW-11 (43)	S9700932-001MS		98	99
MW-11 (43)	S9700932-001DMS		98	93
Method Blank	S970529-WB1		100	96
Method Blank	S970530-WB1		100	99

CAS Acceptance Limits: 69-116 69-116

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-134.004/TO#21133.00/6113 LIVERMORE
Sample Matrix: Water

Service Request: S9700932
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 5/29/97

Matrix Spike/Duplicate Matrix Spike Summary
 BTE

Sample Name: MW-11 (43) Units: ug/L (ppb)
Lab Code: S9700932-001MS, S9700932-001DMS Basis: NA
Test Notes:

Percent Recovery

Analyte	Prep Method	Analysis Method	MRL	Spike Level		Sample Result	Spike Result		Percent Recovery		CAS Acceptance Limits	Relative Percent Difference
				MS	DMS		MS	DMS	MS	DMS		
Benzene	EPA 5030	8020	0.5	25	25	ND	26	26	104	104	75-135	<1
Toluene	EPA 5030	8020	0.5	25	25	ND	30	29	120	116	73-136	3
Ethylbenzene	EPA 5030	8020	0.5	25	25	ND	25	25	100	100	69-142	<1

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 20805-134.004/TO#21133.00/6113 LIVERMORE

Service Request: S9700932
Date Analyzed: 5/29/97

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	Percent Recovery	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	250	230	92	
Benzene	EPA 5030	8020	25	24	96	
Toluene	EPA 5030	8020	25	24	96	
Ethylbenzene	EPA 5030	8020	25	24	96	
Xylenes, Total	EPA 5030	8020	75	74	99	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8020	25	24	96	

ARCO Facility no. 6113 City (Facility) Livermore Project manager (Consultant) Paul Supple
 ARCO engineer Paul Supple Telephone no. (ARCO) Telephone no. (Consultant) (408) 453-7300 Fax no. (Consultant) (408) 453-0457
 Consultant name EMCON Address (Consultant) 1971 Ringwood Ave, San Jose, CA 95131

Laboratory name CAS
Contract number

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX EPA 801/802	BTEX/TPH EPA 801/802/806/815	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 418.1/5A/505E	EPA 801/8010	EPA 824/8240	EPA 825/8270	TCLP Metals <input type="checkbox"/> VOA <input type="checkbox"/> VOA <input type="checkbox"/>	Semi Metals <input type="checkbox"/> VOA <input type="checkbox"/> VOA <input type="checkbox"/>	CAM Metals EPA 801/7006 TTL <input type="checkbox"/> STL <input type="checkbox"/>	Lead Org. DHS Lead EPA 7420/7421 <input type="checkbox"/>				
			Soil	Water	Other	Ice	Acid																		
1	MW-11(13)	2	X			X	HCL	5/19/97	1205		X														
2	MW-12(32)	7	X			X	HCL	5/19/97	1130		X														
3	MW-7(65)	2	X			X	HCL	5/20/97	1345		X														
4	MW-6(65)	2	X			X	HCL	5/20/97	1345		X														
5	MW-4(25)	2	X			X	HCL	5/19/97	1330		X														
6	MW-5(60)	2	X			X	HCL	5/20/97	1440		X														

Method of shipment
Sampler will deliver

Special detection Limit/reporting
Lowest Possible

Special QA/QC
As Normal

Remarks
2-40ml HCL
VOAs
MTBE by 8020
H20805-134.00

Condition of sample: INTACT Temperature received: cool
 Relinquished by sampler Mike Ran Date 5/21/97 Time 0830 Received by R 9
 Relinquished by _____ Date _____ Time _____ Received by _____
 Relinquished by _____ Date _____ Time _____ Received by laboratory Paul Baker Date 5/21/97 Time 0840

Lab number S9700932
Turnaround time
Priority Rush 1 Business Day
Rush 2 Business Days
Expedited 5 Business Days
Standard 10 Business Days