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

ENVIRONMENTAL PROTECTION
96 AUG 26 PM 4:13

STP 3883

Date August 22, 1996
Project 20805-134.003

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
1	Second quarter 1996 groundwater monitoring results for ARCO service station 6113, Livermore, California

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

Comments:

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

John C. Young
Project Manager

cc: Sum Arigala, RWQCB - SFBR
Danielle Stefani, LFD
Paul Supple, ARCO Products Company
File

ARCO Products Company

Date: August 22, 1996

Re: ARCO Station #

6113 • 785 East Stanley Boulevard • Livermore, CA
Second Quarter 1996 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:

Paul Supple
Environmental Engineer

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

August 8, 1996
Project 20805-134.003

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

Re: Second quarter 1996 groundwater monitoring program results, ARCO service station 6113, Livermore, California

Dear Mr. Supple:

This letter presents the results of the second quarter 1996 groundwater monitoring program at ARCO Products Company (ARCO) service station 6113, 785 East Stanley Boulevard, Livermore, California (Figure 1). The quarterly monitoring program complies with Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

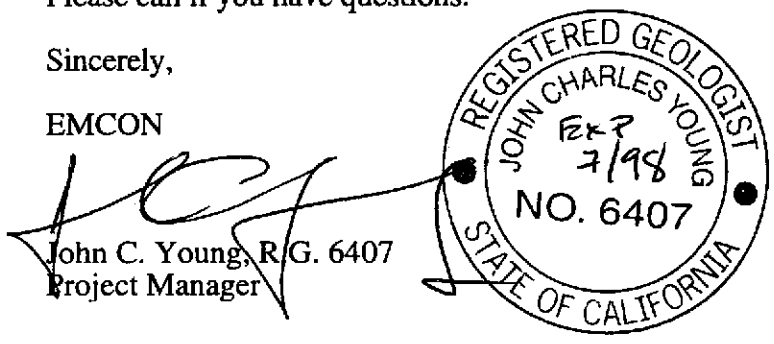
LIMITATIONS

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

Please call if you have questions.

Sincerely,

EMCON



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

SJ/I:\ARCO\MI0155B.DOC-96 ljt:1

August 8, 1996

ARCO QUARTERLY REPORT

Station No.: 6113 Address: 785 East Stanley Boulevard, Livermore, California
EMCON Project No. 20805-134.003
ARCO Environmental Engineer/Phone No.: Paul Supple /(510) 299-8891
EMCON Project Manager/Phone No.: John Young /(408) 453-7300
Primary Agency/Regulatory ID No.: ACHCSA /Susan Hugo

WORK PERFORMED THIS QUARTER (Second- 1996):

1. Conducted quarterly groundwater monitoring and sampling for second quarter 1996.
2. Prepared and submitted quarterly report for first quarter 1996.

WORK PROPOSED FOR NEXT QUARTER (Third- 1996):

1. Perform quarterly groundwater monitoring and sampling for third quarter 1996.
2. Prepare and submit quarterly report for second quarter 1996.

QUARTERLY MONITORING:

Current Phase of Project: Quarterly Groundwater Monitoring
Frequency of Sampling: Quarterly (groundwater)
Frequency of Monitoring: Quarterly (groundwater)
Is Floating Product (FP) Present On-site: ☐ Yes ☒ No
Bulk Soil Removed to Date : 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
Approximate Depth to Groundwater: 13.02 feet
Groundwater Gradient (Average): 0.025 ft/ft toward north-northwest (consistent with past events)

ATTACHED:

- Table 1 - Groundwater Monitoring Data, Second Quarter 1996
- Table 2 - Historical Groundwater Elevation and Analytical Data, Petroleum Hydrocarbons and Their Constituents
- Figure 1 - Site Location
- Figure 2 - Groundwater Data, Second Quarter 1996
- Appendix A - Field Data Sheets, Second Quarter 1996 Groundwater Monitoring Event
- Appendix B - Analytical Results and Chain of Custody Documentation, Second Quarter 1996 Groundwater Monitoring Event

cc: [redacted], ACHCSA
Sum Arigala, RWQCB-SFBR
Danielle Stefani, LFD

Table 1
Groundwater Monitoring Data
Second Quarter 1996

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 07-15-96

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-1	05-23-96	457.04	14.02	443.02	ND	NNW	0.025	05-23-96	Not sampled: not scheduled for chemical analysis								
MW-2	05-23-96	457.74	14.29	443.45	ND	NNW	0.025	05-23-96	Not sampled: not scheduled for chemical analysis								
MW-3	05-23-96	456.97	13.95	443.02	ND	NNW	0.025	05-23-96	Not sampled: not scheduled for chemical analysis								
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-5	05-23-96	455.84	14.36	441.48	ND	NNW	0.025	05-23-96	7100	440	180	270	1700	<50	--	--	--
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-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-8	05-23-96	456.97	11.90	445.07	ND	NNW	0.025	05-23-96	Not sampled: not scheduled for chemical analysis								
MW-9	05-23-96	456.18	12.07	444.11	ND	NNW	0.025	05-23-96	Not sampled: not scheduled for chemical analysis								
MW-10	05-23-96	456.85	14.93	441.92	ND	NNW	0.025	05-23-96	Not sampled: not scheduled for chemical analysis								
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-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	--	--	--

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 Statest 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
NNW: north-northwest
- -: not analyzed or not applicable

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994 - Present*

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 07-15-96

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-1	03-25-94	457.04	17.54	439.50	ND	NR	NR	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	<600	--
MW-1	06-02-94	457.04	21.30	435.74	ND	NR	NR	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	<500	--
MW-1	09-16-94	457.04	19.98	437.06	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	<500	--
MW-1	11-29-94	457.04	19.12	437.92	ND	N	0.025	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	<500	--
MW-1	03-23-95	457.04	14.12	442.92	ND	NW	0.035	03-23-95	Not sampled: not scheduled for chemical analysis								
MW-1	05-31-95	457.04	14.45	442.59	ND	NNW	0.028	05-31-95	Not sampled: not scheduled for chemical analysis								
MW-1	08-31-95	457.04	17.12	439.92	ND	NNW	0.03	08-31-95	Not sampled: not scheduled for chemical analysis								
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: not scheduled for chemical analysis								
MW-1	05-23-96	457.04	14.02	443.02	ND	NNW	0.025	05-23-96	Not sampled: not scheduled for chemical analysis								
MW-2	03-25-94	457.74	17.26	440.48	ND	NR	NR	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-2	06-02-94	457.74	21.23	436.51	ND	NR	NR	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-2	09-16-94	457.74	19.64	438.10	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-2	11-29-94	457.74	18.89	438.85	ND	N	0.025	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-2	03-23-95	457.74	14.15	443.59	ND	NW	0.035	03-23-95	Not sampled: not scheduled for chemical analysis								
MW-2	05-31-95	457.74	14.67	443.07	ND	NNW	0.028	05-31-95	Not sampled: not scheduled for chemical analysis								
MW-2	08-31-95	457.74	17.24	440.50	ND	NNW	0.03	08-31-95	Not sampled: not scheduled for chemical analysis								
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: not scheduled for chemical analysis								
MW-2	05-23-96	457.74	14.29	443.45	ND	NNW	0.025	05-23-96	Not sampled: not scheduled for chemical analysis								

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994 - Present*

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 07-15-96

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-3	03-25-94	456.97	17.57	439.40	ND	NR	NR	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-3	06-02-94	456.97	21.30	435.67	ND	NR	NR	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-3	09-16-94	456.97	20.03	436.94	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-3	11-29-94	456.97	19.13	437.84	ND	N	0.025	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-3	03-23-95	456.97	14.13	442.84	ND	NW	0.035	03-23-95	Not sampled: not scheduled for chemical analysis								
MW-3	05-31-95	456.97	14.46	442.51	ND	NNW	0.028	05-31-95	Not sampled: not scheduled for chemical analysis								
MW-3	08-31-95	456.97	17.06	439.91	ND	NNW	0.03	08-31-95	Not sampled: not scheduled for chemical analysis								
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: not scheduled for chemical analysis								
MW-3	05-23-96	456.97	13.95	443.02	ND	NNW	0.025	05-23-96	Not sampled: not scheduled for chemical analysis								
MW-4	03-25-94	456.55	18.59	437.96	ND	NR	NR	03-25-94	480	5.4	<0.5	1.6	1.7	--	--	--	--
MW-4	06-02-94	456.55	21.41	435.14	ND	NR	NR	06-02-94	270	4.2	<0.5	1	<1.7	--	--	--	--
MW-4	09-16-94	456.55	20.51	436.04	ND	N	0.014	09-16-94	250	1	<0.5	<0.6	<1	--	--	--	--
MW-4	11-29-94	456.55	19.77	436.78	ND	N	0.025	11-29-94	280	1.8	<0.5	<1.2	<0.8	--	--	--	--
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	--	--	--

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994 - Present*

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 07-15-96

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-5	03-25-94	455.84	17.95	437.89	ND	NR	NR	03-25-94	780	36	1.5	4.8	5.7	--	--	--	--
MW-5	06-02-94	455.84	21.32	434.52	ND	NR	NR	06-02-94	500	25	7.4	6	33	--	--	--	--
MW-5	09-16-94	455.84	20.41	435.43	ND	N	0.014	09-16-94	1500	370	28	110	120	--	--	--	--
MW-5	11-29-94	455.84	19.72	436.12	ND	N	0.025	11-29-94	1100	280	11	82	31	--	--	--	--
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: not scheduled for chemical analysis								
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-6	03-25-94	454.93	17.13	437.80	ND	NR	NR	03-25-94	530	<2.5	<2.5	<2.5	4.6	--	--	--	--
MW-6	06-02-94	454.93	20.45	434.48	ND	NR	NR	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-6	09-16-94	454.93	19.62	435.31	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-6	11-29-94	454.93	18.89	436.04	ND	N	0.025	11-29-94	<50	1.3	<0.5	<0.5	<0.5	--	--	--	--
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	--	--	--

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Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994 - Present*

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

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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	03-25-94	454.92	16.91	438.01	ND	NR	NR	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-7	06-02-94	454.92	20.31	434.61	ND	NR	NR	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-7	09-16-94	454.92	19.47	435.45	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-7	11-29-94	454.92	18.73	436.19	ND	N	0.025	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
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-8	03-25-94	456.97	15.04	441.93	ND	NR	NR	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-8	06-02-94	456.97	18.43	438.54	ND	NR	NR	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-8	09-16-94	456.97	17.02	439.95	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-8	11-29-94	456.97	16.83	440.14	ND	N	0.025	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-8	03-23-95	456.97	11.55	445.42	ND	NW	0.035	03-23-95	Not sampled: not scheduled for chemical analysis								
MW-8	05-31-95	456.97	12.37	444.60	ND	NNW	0.028	05-31-95	Not sampled: not scheduled for chemical analysis								
MW-8	08-31-95	456.97	15.68	441.29	ND	NNW	0.03	08-31-95	Not sampled: not scheduled for chemical analysis								
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: not scheduled for chemical analysis								
MW-8	05-23-96	456.97	11.90	445.07	ND	NNW	0.025	05-23-96	Not sampled: not scheduled for chemical analysis								

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994 - Present*

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 07-15-96

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-9	03-25-94	456.18	15.78	440.40	ND	NR	NR	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-9	06-02-94	456.18	19.03	437.15	ND	NR	NR	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-9	09-16-94	456.18	17.84	438.34	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-9	11-29-94	456.18	17.32	438.86	ND	N	0.025	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-9	03-23-95	456.18	13.18	443.00	ND	NW	0.035	03-23-95	Not sampled: not scheduled for chemical analysis								
MW-9	05-31-95	456.18	12.66	443.52	ND	NNW	0.028	05-31-95	Not sampled: not scheduled for chemical analysis								
MW-9	08-31-95	456.18	14.40	441.78	ND	NNW	0.03	08-31-95	Not sampled: not scheduled for chemical analysis								
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: not scheduled for chemical analysis								
MW-9	05-23-96	456.18	12.07	444.11	ND	NNW	0.025	05-23-96	Not sampled: not scheduled for chemical analysis								
MW-10	03-25-94	456.85	18.84	438.01	ND	NR	NR	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-10	06-02-94	456.85	22.40	434.45	ND	NR	NR	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-10	09-16-94	456.85	21.25	435.60	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-10	11-29-94	456.85	20.50	436.35	ND	N	0.025	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-10	03-23-95	456.85	14.86	441.99	ND	NW	0.035	03-23-95	Not sampled: not scheduled for chemical analysis								
MW-10	05-31-95	456.85	15.63	441.22	ND	NNW	0.028	05-31-95	Not sampled: not scheduled for chemical analysis								
MW-10	08-31-95	456.85	14.40	442.45	ND	NNW	0.03	08-31-95	Not sampled: not scheduled for chemical analysis								
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: not scheduled for chemical analysis								
MW-10	05-23-96	456.85	14.93	441.92	ND	NNW	0.025	05-23-96	Not sampled: not scheduled for chemical analysis								

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994 - Present*

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 07-15-96

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-11	03-25-94	455.07	18.28	436.79	ND	NR	NR	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-11	06-02-94	455.07	21.78	433.29	ND	NR	NR	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-11	09-16-94	455.07	20.98	434.09	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-11	11-29-94	455.07	20.67	434.40	ND	N	0.025	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-11	03-23-95	455.07	17.34	437.73	ND	NW	0.035	03-23-95	Not sampled: not scheduled for chemical analysis								
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: not scheduled for chemical analysis								
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: not scheduled for chemical analysis								
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-12	03-25-94	455.04	18.74	436.30	ND	NR	NR	03-25-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-12	06-02-94	455.04	22.21	432.83	ND	NR	NR	06-02-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-12	09-16-94	455.04	21.62	433.42	ND	N	0.014	09-16-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-12	11-29-94	455.04	20.82	434.22	ND	N	0.025	11-29-94	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--
MW-12	03-23-95	455.04	15.54	439.50	ND	NW	0.035	03-23-95	Not sampled: not scheduled for chemical analysis								
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: not scheduled for chemical analysis								
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: not scheduled for chemical analysis								
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	--	--	--

Table 2
Historical Groundwater Elevation and Analytical Data
Petroleum Hydrocarbons and Their Constituents
1994 - Present*

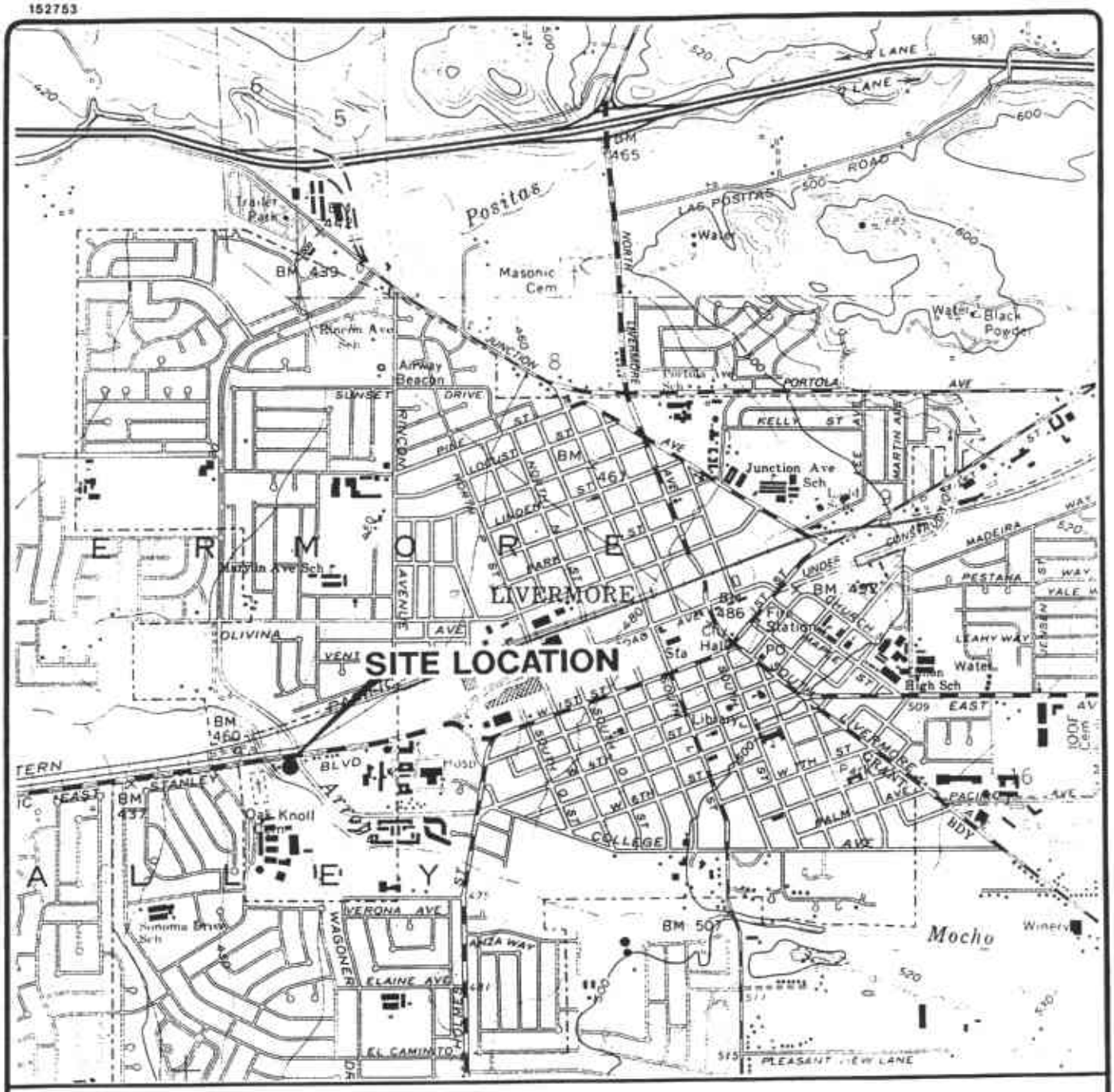
ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 07-15-96

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
NR: not reported; data not available
DRY: dry well; groundwater was not detected
N: north
NW: northwest
NNW: north-northwest
- -: not analyzed or not applicable
*: For previous historical groundwater elevation and analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results, ARCO Service Station 6113, Livermore, California,* (EMCON, February 26, 1996).

152753

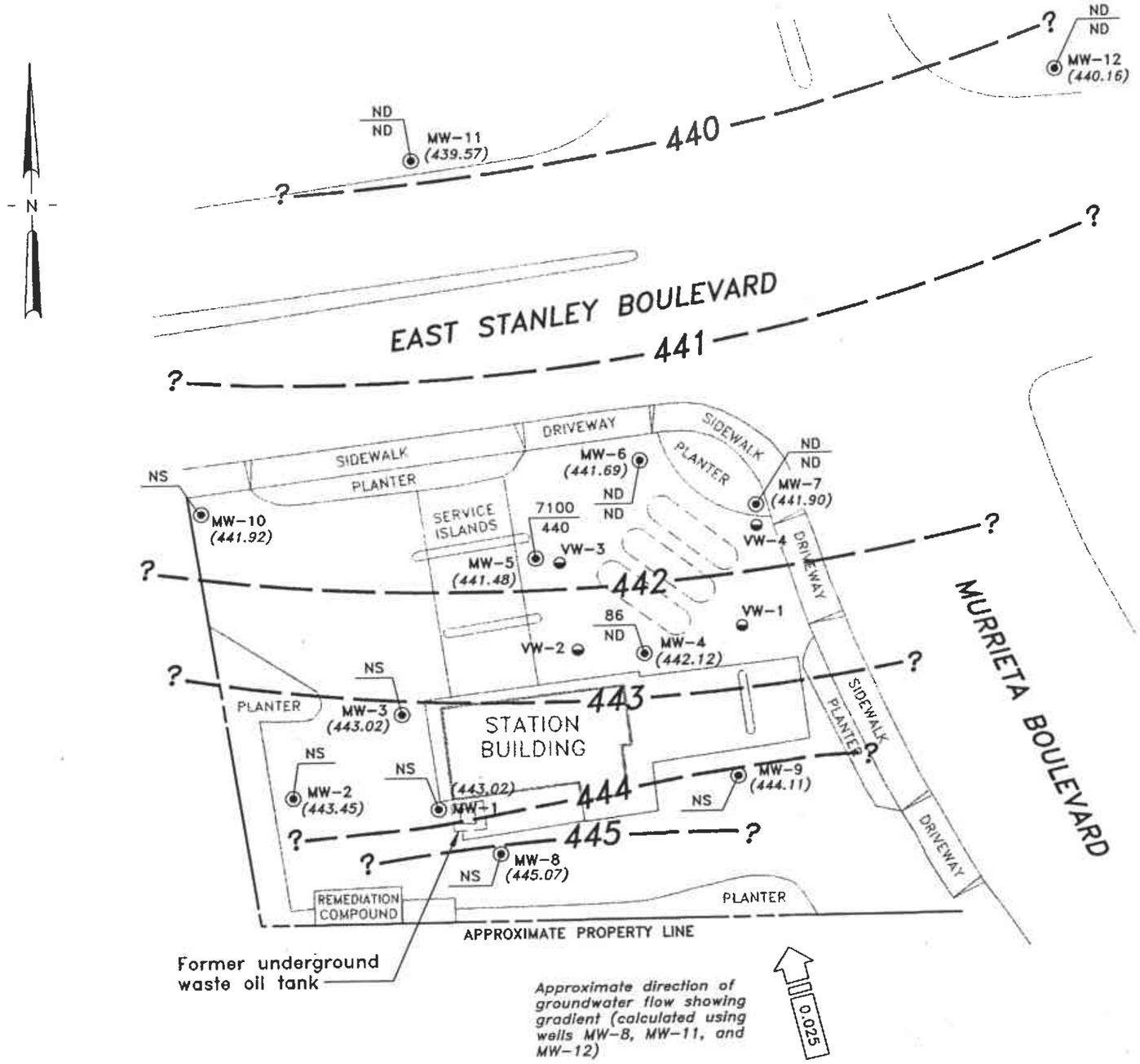


EMCON

ARCO PRODUCTS COMPANY
SERVICE STATION 6113, 785 E. STANLEY BLVD.
QUARTERLY GROUNDWATER MONITORING
LIVERMORE, CALIFORNIA

SITE LOCATION

FIGURE
1
PROJECT NO.
805-134.03



EXPLANATION

- ⊙ Groundwater monitoring well
- ◒ Vapor extraction well
- Existing underground gasoline storage tank
- (441.90) Groundwater elevation (Ft.–MSL) measured 5/23/96
- ? Groundwater elevation contour (Ft.–MSL)
- 7100 / 440 TPHG concentration in groundwater (ug/L); sampled 5/23/96 / Benzene concentration in groundwater (ug/L); sampled 5/23/96
- 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)
- * Not used in contouring

Base map modified from RESNA, 1994.

EMCON

SCALE: 0 40 80 FEET
(Approximate)

ARCO PRODUCTS COMPANY
SERVICE STATION 6113, 785 E. STANLEY BLVD.
QUARTERLY GROUNDWATER MONITORING
LIVERMORE, CALIFORNIA

GROUNDWATER DATA
SECOND QUARTER 1996

FIGURE NO.
2
PROJECT NO.
805–134.003

G:\805-134\GW0 REV 0 07/09/96 13:25:53 DD DJ

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 21775-248.002 STATION ADDRESS : 785 East Stanley Blvd., Livermore DATE : 5-23-96

ARCO STATION # : 6113 FIELD TECHNICIAN : Joe Williams DAY :

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-1	OK	YES	OK	ARCO	OK	14.02	14.02	ND	ND		
2	MW-2	OK	YES	OK	ARCO	OK	14.29	14.29	ND	ND		BAD CAP
3	MW-3	OK	YES	OK	ARCO	OK	13.95	13.95	ND	ND		
4	MW-6	OK	YES	OK	ARCO	OK	13.24	13.24	ND	ND		
5	MW-7	OK	YES	OK		OK	13.02	13.02	ND	ND		
6	MW-8	OK	YES	OK	ARCO	OK	11.90	11.90	ND	ND		
7	MW-9	OK	YES	OK	ARCO	OK	12.07	12.07	ND	ND		
8	MW-10	OK	YES	OK	ARCO	OK	14.93	14.93	ND	ND		
9	MW-11	OK	YES	OK	ARCO	OK	15.50	15.50	ND	ND	44.35	
10	MW-12	OK	YES	OK	ARCO	OK	14.58	14.88	ND	ND	33.10	
11	MW-4	OK	YES	OK	ARCO	OK	14.43	14.43	ND	ND		
12	MW-5	OK	YES	OK	ARCO	OK	[illegible]	[illegible]	ND	ND		LID
						0	14.36	14.36	ND	ND		

SURVEY POINTS ARE TOP OF WELL CASINGS

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-248-002 SAMPLE ID: MW-4(26')

PURGED BY: ~~[illegible]~~ J. Williams CLIENT NAME: ARCO #6113

SAMPLED BY: ✓ LOCATION: Livermore, CA

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

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

CASING ELEVATION (feet/MSL): N/A VOLUME IN CASING (gal.): 7.95

DEPTH TO WATER (feet): 14.43 CALCULATED PURGE (gal.): 23.85

DEPTH OF WELL (feet): 26.6 ACTUAL PURGE VOL. (gal.): 24.0

DATE PURGED: 5-23-94 Start (2400 Hr) 1545 End (2400 Hr) 1554

DATE SAMPLED: ✓ Start (2400 Hr) 1600 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1548	8.0	6.93	604	65.9	Cloudy	Light
1551	16.0	6.82	589	64.7	Brown	Mod
1554	24.0	6.77	583	64.7	↓	↓

D. O. (ppm): N/A ODOR: Strong

N/A (COBALT 0 - 500) N/A (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: N/A

Parameters field filtered at this well: N/A

PURGING EQUIPMENT

___ 2" Bladder Pump
___ Centrifugal Pump
X ~~Submersible Pump~~
___ Well Wizard™
___ Bailer (Teflon®)
X Bailer (PVC)
___ Bailer (Stainless Steel)
___ Dedicated
Other: ___

SAMPLING EQUIPMENT

___ 2" Bladder Pump
___ DDL Sampler
___ Dipper
___ Well Wizard™
X Bailer (Teflon®)
___ Bailer (Stainless Steel)
___ Submersible Pump
___ Dedicated
Other: ___

WELL INTEGRITY: Good LOCK #: ARCO-164

REMARKS: QA/QC Samples taken

Meter Calibration: Date: 5/23/94 Time: ___ Meter Serial #: 9204 Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-4

Signature: [signature] Reviewed By: [signature] Page 1 of 6

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-248.02 SAMPLE ID: MW-5 (62')

PURGED BY: T. Williams CLIENT NAME: ARCO #6113

SAMPLED BY: ↓ LOCATION: Livermore, CA

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

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

CASING ELEVATION (feet/MSL): N/A VOLUME IN CASING (gal.): 31.51

DEPTH TO WATER (feet): 14.36 CALCULATED PURGE (gal.): 94.55

DEPTH OF WELL (feet): 62.6 ACTUAL PURGE VOL. (gal.): 95.0

DATE PURGED: 5-23-94 Start (2400 Hr) 1536 End (2400 Hr) 1600

DATE SAMPLED: ↓ Start (2400 Hr) 1605 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1544	31.5	7.07	826	67.4	Clear	Light
1552	63.0	6.87	802	65.7	Clear	Clear
1600	95.0	6.90	802	65.8	↓	↓

D. O. (ppm): N/R ODOR: Strong

COLOR (visual): N/R (COBALT 0 - 500)

TURBIDITY (visual): N/R (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: N/R

Parameters field filtered at this well: N/R

PURGING EQUIPMENT

___ 2" Bladder Pump
___ Centrifugal Pump
X Submersible Pump
___ Well Wizard™
___ Bailer (Teflon®)
___ Bailer (PVC)
___ Bailer (Stainless Steel)
___ Dedicated
Other: ___

SAMPLING EQUIPMENT

___ 2" Bladder Pump
___ DDL Sampler
___ Dipper
___ Well Wizard™
X Bailer (Teflon®)
___ Bailer (Stainless Steel)
___ Submersible Pump
___ Dedicated
Other: ___

WELL INTEGRITY: Good LOCK #: ARCO-1624

REMARKS: All samples taken

Meter Calibration: Date: 5/23/94 Time: ___ Meter Serial #: 9204 Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-6

Signature: [signature] Reviewed By: SF

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-248-002 SAMPLE ID: MW-6 (6.6')

PURGED BY: J. Williams CLIENT NAME: ARCO #6113

SAMPLED BY: ↓ LOCATION: Livermore CA

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

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

CASING ELEVATION (feet/MSL):	N/A	VOLUME IN CASING (gal.):	34.92
DEPTH TO WATER (feet):	13.24	CALCULATED PURGE (gal.):	104.78
DEPTH OF WELL (feet):	66.7	ACTUAL PURGE VOL. (gal.):	105.0

DATE PURGED: 5-23-96 Start (2400 Hr) 1329 End (2400 Hr) 1356

DATE SAMPLED: ↓ Start (2400 Hr) 1400 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1338	35.0	7.48	756	68.1	Clear	Clear
1347	70.0	7.05	749	67.4	↓	↓
1356	105.0	7.08	754	68.2	↓	↓

D. O. (ppm): N/R ODOR: none

N/A (COBALT 0 - 500) N/R (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: N/A

Parameters field filtered at this well: N/A

PURGING EQUIPMENT

___ 2" Bladder Pump ___ Bailer (Teflon®)
___ Centrifugal Pump ___ Bailer (PVC)
X Submersible Pump ___ Bailer (Stainless Steel)
___ Well Wizard™ ___ Dedicated
Other: ___

SAMPLING EQUIPMENT

___ 2" Bladder Pump X Bailer (Teflon®)
___ DDL Sampler ___ Bailer (Stainless Steel)
___ Dipper ___ Submersible Pump
___ Well Wizard™ ___ Dedicated
Other: ___

WELL INTEGRITY: Good LOCK #: ARCO-Key

REMARKS: Oil Sample Taken

Meter Calibration: Date: 5/20/96 Time: 1320 Meter Serial #: 5205 Temperature °F: 74.1

(EC 1000 1037 / 1000) (DI ___) (pH 7 699 / 7.00) (pH 10 9.94 / 10.00) (pH 4 4.00 / 4.00)

Location of previous calibration: ___

Signature: [signature] Reviewed By: SF Page 3 of 6

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 2177-248.002 SAMPLE ID: MW-7 (671)

PURGED BY: J. Williams CLIENT NAME: ARCO #6113

SAMPLED BY: ↓ LOCATION: Livermore, CA

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 35.72

DEPTH TO WATER (feet): 13.02 CALCULATED PURGE (gal.): 107.17

DEPTH OF WELL (feet): 27.7 ACTUAL PURGE VOL. (gal.): 107.5

DATE PURGED: 5-23-94 Start (2400 Hr) 1408 End (2400 Hr) 1435

DATE SAMPLED: ↓ Start (2400 Hr) 1440 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1417	36.0	7.04	751	68.2	clear	clear
1426	72.0	7.00	745	67.4		
1435	107.5	7.01	750	67.4	↓	↓

D. O. (ppm): NR ODOR: none

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

Field QC samples collected at this well: NR

Parameters field filtered at this well: NR

PURGING EQUIPMENT

___ 2" Bladder Pump ___ Bailer (Teflon®)
___ Centrifugal Pump ___ Bailer (PVC)
X Submersible Pump ___ Bailer (Stainless Steel)
___ Well Wizard™ ___ Dedicated
Other: ___

SAMPLING EQUIPMENT

___ 2" Bladder Pump X Bailer (Teflon®)
___ DDL Sampler ___ Bailer (Stainless Steel)
___ Dipper ___ Submersible Pump
___ Well Wizard™ ___ Dedicated
Other: ___

WELL INTEGRITY: Good LOCK #: ARCO-Key

REMARKS: All Samples to Kar

Meter Calibration: Date: 5/23/94 Time: ___ Meter Serial #: 9204 Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-4

Signature: [signature] Reviewed By: SH Page 4 of 6

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-245-002 SAMPLE ID: MW-11 (4Q91)

PURGED BY: T. Williams CLIENT NAME: ARCO #6113

SAMPLED BY: ✓ LOCATION: Livermore, CA

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

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

CASING ELEVATION (feet/MSL):	N/A	VOLUME IN CASING (gal.):	4.70
DEPTH TO WATER (feet):	15.50	CALCULATED PURGE (gal.):	14.11
DEPTH OF WELL (feet):	44.3	ACTUAL PURGE VOL. (gal.):	6.0

DATE PURGED: 5-23-96 Start (2400 Hr) 1454 End (2400 Hr) 1456

DATE SAMPLED: ✓ Start (2400 Hr) 1500 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
~~1456~~ 1456	5.0	7.27	834	68.6	BRN	Heavy
46	Dowell	Discd at	6.0	gallons		
1502	Recharge	7.32	852	68.7	✓	✓

D. O. (ppm): N/R ODOR: none

N/R (COBALT 0 - 500) N/R (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: N/R

Parameters field filtered at this well: N/R

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	X Bailer (Teflon®)
___ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
X Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: Good LOCK #: ARCO-166

REMARKS: All Samples taken

Meter Calibration: Date: 5/23/96 Time: ___ Meter Serial #: 9204 Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: MW-6

Signature: [signature] Reviewed By: [signature] Page 5 of 6

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775.248.002 SAMPLE ID: MW-12 (331)

PURGED BY: ~~K~~ T. Williams CLIENT NAME: ARCO 6113

SAMPLED BY: ✓ LOCATION: Livermore, CA

TYPE: Ground Water ✓ Surface Water ____ Treatment Effluent ____ Other ____

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

CASING ELEVATION (feet/MSL): N/A VOLUME IN CASING (gal.): 2.97

DEPTH TO WATER (feet): 14.92 CALCULATED PURGE (gal.): 8.92

DEPTH OF WELL (feet): 331 ACTUAL PURGE VOL. (gal.): 9.0

DATE PURGED: 5-23-96 Start (2400 Hr) 1514 End (2400 Hr) 1517

DATE SAMPLED: ✓ Start (2400 Hr) 1520 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1515	3.0	7.02	706	67.2	Brn	mod
1514	6.0	6.95	722	65.6	cloudy	mod
1517	9.0	6.93	715	65.0	cloudy	Light

D. O. (ppm): N/R ODOR: None

N/A (COBALT 0 - 500) N/A (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: N/A

Parameters field filtered at this well: N/R

PURGING EQUIPMENT

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

Other: ____

SAMPLING EQUIPMENT

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

Other: ____

WELL INTEGRITY: Good LOCK #: ARCO - KEY

REMARKS: Gal Sample Taken

Meter Calibration: Date: 5-23-96 Time: ____ Meter Serial #: 9204 Temperature °F: ____

(EC 1000 ____ / ____) (DI ____) (pH 7 ____ / ____) (pH 10 ____ / ____) (pH 4 ____ / ____)

Location of previous calibration: MW-6

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

Columbia Analytical Services, Inc.

June 11, 1996

Service Request No: S9600830

Mr. John Young
EMCON
1921 Ringwood Ave.
San Jose, Ca 95131

Re: 6113 Livermore / Project No. 20805-134.003/TO#19350.00

Dear Mr. Young:

The following pages contain analytical results for sample(s) received by the laboratory on May 24, 1996. 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.

If you have questions or further needs, please call me at (408) 428-1283.

Sincerely,

Steven L. Green
Project Chemist

Cristina V. Rayburn for
Greg Anderson
Regional QA Coordinator

sg/sh

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	**Service Request:**	S9600830
Project:	6113 Livermore / #20805-134.003/TO#19350.00	**Date Collected:**	5/23/96
Sample Matrix:	Water	**Date Received:**	5/24/96
		Date Extracted:	NA

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

	Sample Name:	**MW-6(66)**	**MW-7(67)**	**MW-11(44)**
	Lab Code:	S9600830-001	S9600830-002	S9600830-003
	Date Analyzed:	5/31/96	5/31/96	5/31/96
Analyte	**MRL**			
TPH as Gasoline	50	ND	ND	ND
Benzene	0.5	ND	ND	ND
Toluene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Total Xylenes	0.5	ND	ND	ND
Methyl *tert*-Butyl Ether	3	ND	ND	ND

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9600830
Project:	6113 Livermore / #20805-134.003/TO#19350.00	**Date Collected:**	5/23/96
Sample Matrix:	Water	**Date Received:**	5/24/96
		Date Extracted:	NA

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

		Sample Name:	**MW-12(33)**	**MW-4(26)**	**MW-5(62)**
		Lab Code:	S9600830-004	S9600830-005	S9600830-006
		Date Analyzed:	5/31/96	5/31/96	5/31/96
Analyte	**MRL**				
TPH as Gasoline	50		ND	86	7,100
Benzene	0.5		ND	ND	440
Toluene	0.5		ND	ND	180
Ethylbenzene	0.5		ND	ND	270
Total Xylenes	0.5		ND	<0.7*	1,700
Methyl *tert*-Butyl Ether	3		ND	ND	<50**

* Raised MRL due to matrix interference

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9600830
Project:	6113 Livermore / #20805-134.003/TO#19350.00	**Date Collected:**	5/23/96
Sample Matrix:	Water	**Date Received:**	5/24/96
		Date Extracted:	NA

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

		Sample Name:	**Method Blank**	**Method Blank**
		Lab Code:	S960531-WB1	S960603-WB1
		Date Analyzed:	5/31/96	6/3/96
Analyte	**MRL**			
TPH as Gasoline	50		ND	ND
Benzene	0.5		ND	ND
Toluene	0.5		ND	ND
Ethylbenzene	0.5		ND	ND
Total Xylenes	0.5		ND	ND
Methyl *tert*-Butyl Ether	3		ND	ND

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9600830
Project:	6113 Livermore / #20805-134.003/TO#19350.00	**Date Collected:**	5/23/96
Sample Matrix:	Water	**Date Received:**	5/24/96
		Date Extracted:	NA
		Date Analyzed:	

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

Sample Name	Lab Code	PID Detector Percent Recovery 4-Bromofluorobenzene	FID Detector Percent Recovery α,α,α–Trifluorotoluene
MW-6(66)	S9600830-001	103	103
MW-7(67)	S9600830-002	101	107
MW-11(44)	S9600830-003	103	104
MW-12(33)	S9600830-004	102	105
MW-4(26)	S9600830-005	106	103
MW-5(62)	S9600830-006	107	106
MW-11(44) (MS)	S9600830-003MS	104	101
MW-11(44) (DMS)	S9600830-003DMS	106	99
Method Blank	S960531-WB1	100	100
Method Blank	S960603-WB1	105	105
CAS Acceptance Limits:		69-116	69-116

SUR2/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9600830
Project:	6113 Livermore / #20805-134.003/TO#19350.00	**Date Collected:**	5/23/96
Sample Matrix:	Water	**Date Received:**	5/24/96
		Date Extracted:	NA
		Date Analyzed:	5/31/96

Matrix Spike/Duplicate Matrix Spike Summary
BTE
EPA Methods 5030/8020
Units: ug/L (ppb)

Sample Name: MW-11(44)
Lab Code: S9600830-003

	Spike Level		Sample	Spike Result		Percent Recovery		CAS Acceptance	Relative Percent
Analyte	MS	DMS	**Result**	MS	DMS	MS	DMS	Limits	**Difference**
Benzene	25	25	ND	24.0	25.0	96	100	75-135	4
Toluene	25	25	ND	24.4	25.3	98	101	73-136	4
Ethylbenzene	25	25	ND	24.4	25.5	98	102	69-142	4

DMS1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9600830
Project:	6113 Livermore / #20805-134.003/TO#19350.00	**Date Analyzed:**	5/31/96

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

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Benzene	25	24.9	100	85-115
Toluene	25	25.1	100	85-115
Ethylbenzene	25	25.3	101	85-115
Xylenes, Total	75	76.4	102	85-115
Gasoline	250	245	98	90-110
Methyl *tert*-Butyl Ether	50	49	98	85-115

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 9350.00

Chain of Custody

ARCO Facility no. 6113	City (Facility) Livermore	Project manager (Consultant) John Young	Laboratory name CAS
ARCO engineer Mike Whelan	Telephone no. (ARCO)	Telephone no. (Consultant) (408) 453-7300	Fax no. (Consultant) (408) 453-0452
Consultant name EMCON	Address (Consultant) 1921 Ringwood Ave, San Jose, CA 95131		Contract number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
MW-6(66)	①	2		X		X	HCl	5-23-96	1400		X									
MW-7(67)	②	2		X		X	HCl		1440		X									
MW-11(44)	③	2		X		X	HCl		1500		X									
MW-12(33)	④	2		X		X	HCl		1520		X									
MW-4(29)	⑤	2		X		X	HCl		1600		X									
MW-5(62)	⑥	2		X		X	HCl	↓	1605		X									

Method of shipment: Sampler will deliver

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: 2-40ml HCl VOAs

#20805-134.003

Lab number: 59600830

Turnaround time

- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☒

Condition of sample: ok		Temperature received: cool	
Relinquished by sampler: Joe Galt	Date 5-24-96 Time 0945	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory: Joanne Howe	Date 5-24-96 Time 0945

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

APC-3292 (2-91)