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

ENVIRONMENTAL PROTECTION
97 MAR 24 PM 4:13

Date March 21, 1997
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	Fourth quarter 1996 groundwater monitoring results for ARCO service station 6113, Livermore, California

For your:		Sent by:	
	X Use		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: March 14, 1997

Re: ARCO Station #

6113 • 785 East Stanley Boulevard • Livermore, CA
Fourth 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

March 17, 1997
Project 20805-134.003

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

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

Dear Mr. Supple:

This letter presents the results of the fourth 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

REGISTERED GEOLOGIST
JOHN CHARLES YOUNG
E+E
7/95
NO. 6407
STATE OF CALIFORNIA

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

March 17, 1997

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 (Fourth- 1996):

1. Conducted quarterly groundwater monitoring and sampling for fourth quarter 1996.
2. Prepared and submitted quarterly report for third quarter 1996.

WORK PROPOSED FOR NEXT QUARTER (First- 1997):

1. Perform quarterly groundwater monitoring and sampling for first quarter 1997.
2. Prepare and submit quarterly report for fourth quarter 1996.
3. Implement a semi-annual groundwater monitoring and sampling program.

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:	16.65 feet
Groundwater Gradient (Average):	0.019 ft/ft toward north-northeast (consistent with past events)

ATTACHED:

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

cc: Susan Hugo, ACHCSA
Sum Arigala, RWQCB-SFBR
Danielle Stefani, LFD

Table 1
Groundwater Monitoring Data
Fourth Quarter 1996

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

Date: 02-06-97

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	**TPHG** LUFT Method	**Benzene** EPA 8020	**Toluene** EPA 8020	**Ethylbenzene** EPA 8020	**Total Xylenes** EPA 8020	**MTBE** EPA 8020	**MTBE** EPA 8240	**TRPH** EPA 418.1	**TPHD** LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-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-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-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-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-5	11-07-96	455.84	17.26	438.58	ND	NNE	0.019	11-13-96	5600	230	86	210	1100	<80^	- -	- -	- -
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-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-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-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-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-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-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	- -	- -	- -

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
NNE: north-northeast
^: method reporting limit was raised due to: (1) high analyte concentration requiring sample dilution, or (2) matrix interference
- -: not analyzed or not applicable

esj/h:\6113\6113mdb.xls\Table 1:imi
20805-134.003

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: 02-06-97

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	**TPHG** LUFT Method	**Benzene** EPA 8020	**Toluene** EPA 8020	**Ethylbenzene** EPA 8020	**Total Xylenes** EPA 8020	**MTBE** EPA 8020	**MTBE** EPA 8240	**TRPH** EPA 418.1	**TPHD** LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-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-1	08-08-96	457.04	16.13	440.91	ND	N	0.019	08-08-96	Not sampled: not scheduled for chemical analysis								
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-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								
MW-2	08-08-96	457.74	16.19	441.55	ND	N	0.019	08-08-96	Not sampled: not scheduled for chemical analysis								
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	--	--	--

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: 02-06-97

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	**TPHG** LUFT Method	**Benzene** EPA 8020	**Toluene** EPA 8020	**Ethylbenzene** EPA 8020	**Total Xylenes** EPA 8020	**MTBE** EPA 8020	**MTBE** EPA 8240	**TRPH** EPA 418.1	**TPHD** LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-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-3	08-08-96	456.97	16.03	440.94	ND	N	0.019	08-08-96	Not sampled: not scheduled for chemical analysis								
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-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	--	--	--
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	--	--	--

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: 02-06-97

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	**TPHG** LUFT Method	**Benzene** EPA 8020	**Toluene** EPA 8020	**Ethylbenzene** EPA 8020	**Total Xylenes** EPA 8020	**MTBE** EPA 8020	**MTBE** EPA 8240	**TRPH** EPA 418.1	**TPHD** LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-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-5	08-08-96	455.84	16.38	439.46	ND	N	0.019	08-08-96	Not sampled: not scheduled for chemical analysis								
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-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	--	--	--
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	--	--	--

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: 02-06-97

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-7	03-25-94	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-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-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								
MW-8	08-08-96	456.97	13.85	443.12	ND	N	0.019	08-08-96	Not sampled: not scheduled for chemical analysis								
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	--	--	--

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: 02-06-97

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	TPHG LUFT Method	Benzene EPA 8020	Toluene EPA 8020	Ethylbenzene EPA 8020	Total Xylenes EPA 8020	MTBE EPA 8020	MTBE EPA 8240	TRPH EPA 418.1	TPHD LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-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-9	08-08-96	456.18	14.12	442.06	ND	N	0.019	08-08-96	Not sampled: not scheduled for chemical analysis								
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-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								
MW-10	08-08-96	456.85	17.20	439.65	ND	N	0.019	08-08-96	Not sampled: not scheduled for chemical analysis								
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	--	--	--

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: 02-06-97

Well Designation	Water Level Field Date	Top of Casing Elevation	Depth to Water	Groundwater Elevation	Floating Product Thickness	Groundwater Flow Direction	Hydraulic Gradient	Water Sample Field Date	**TPHG** LUFT Method	**Benzene** EPA 8020	**Toluene** EPA 8020	**Ethylbenzene** EPA 8020	**Total Xylenes** EPA 8020	**MTBE** EPA 8020	**MTBE** EPA 8240	**TRPH** EPA 418.1	**TPHD** LUFT Method
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-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-11	08-08-96	455.07	17.77	437.30	ND	N	0.019	08-08-96	Not sampled: not scheduled for chemical analysis								
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-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	--	--	--
MW-12	08-08-96	455.04	17.30	437.74	ND	N	0.019	08-08-96	Not sampled: not scheduled for chemical analysis								
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	--	--	--

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

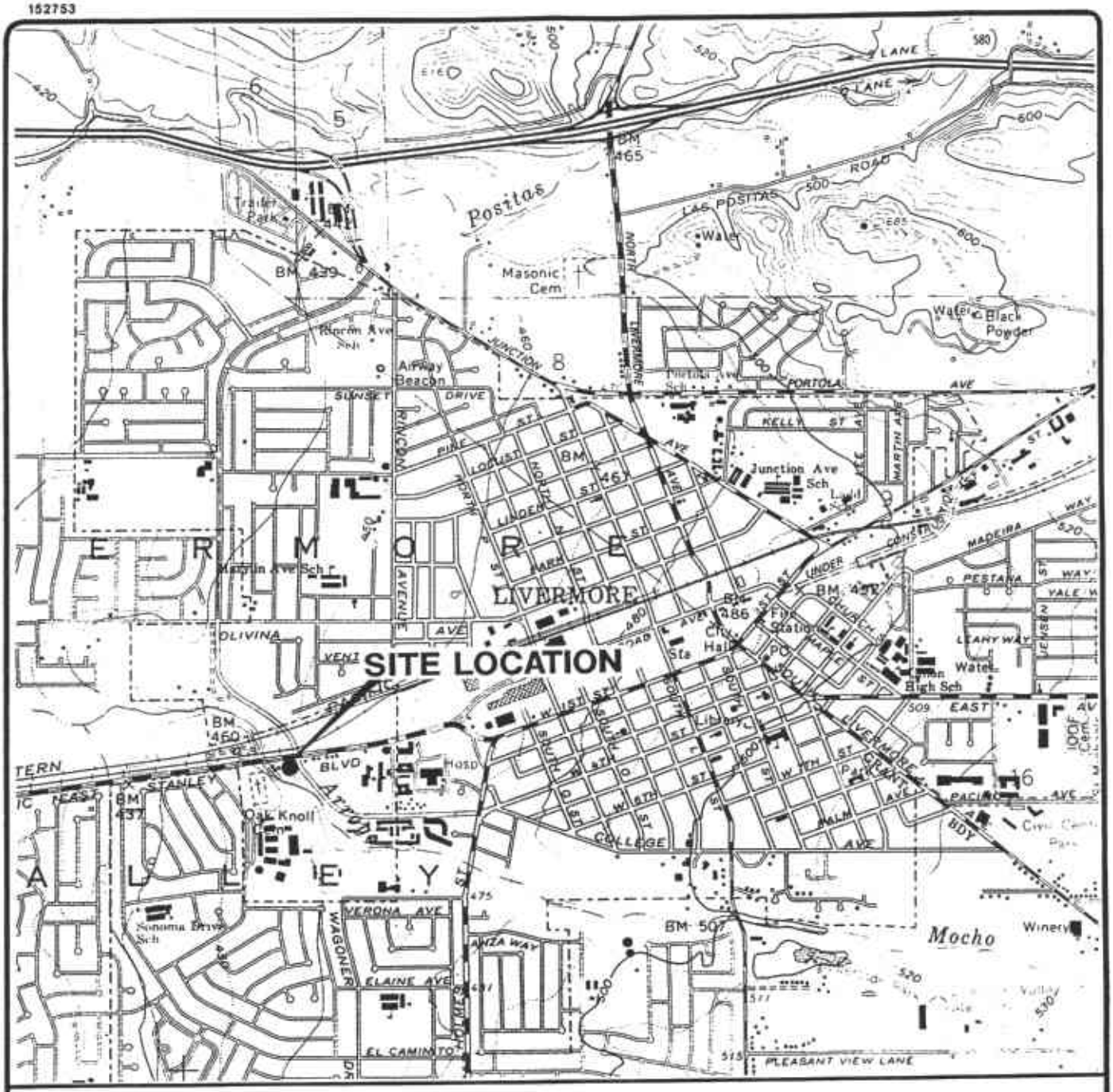
ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date: 02-06-97

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
NR: not reported; data not available
DRY: dry well; groundwater was not 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).

152753



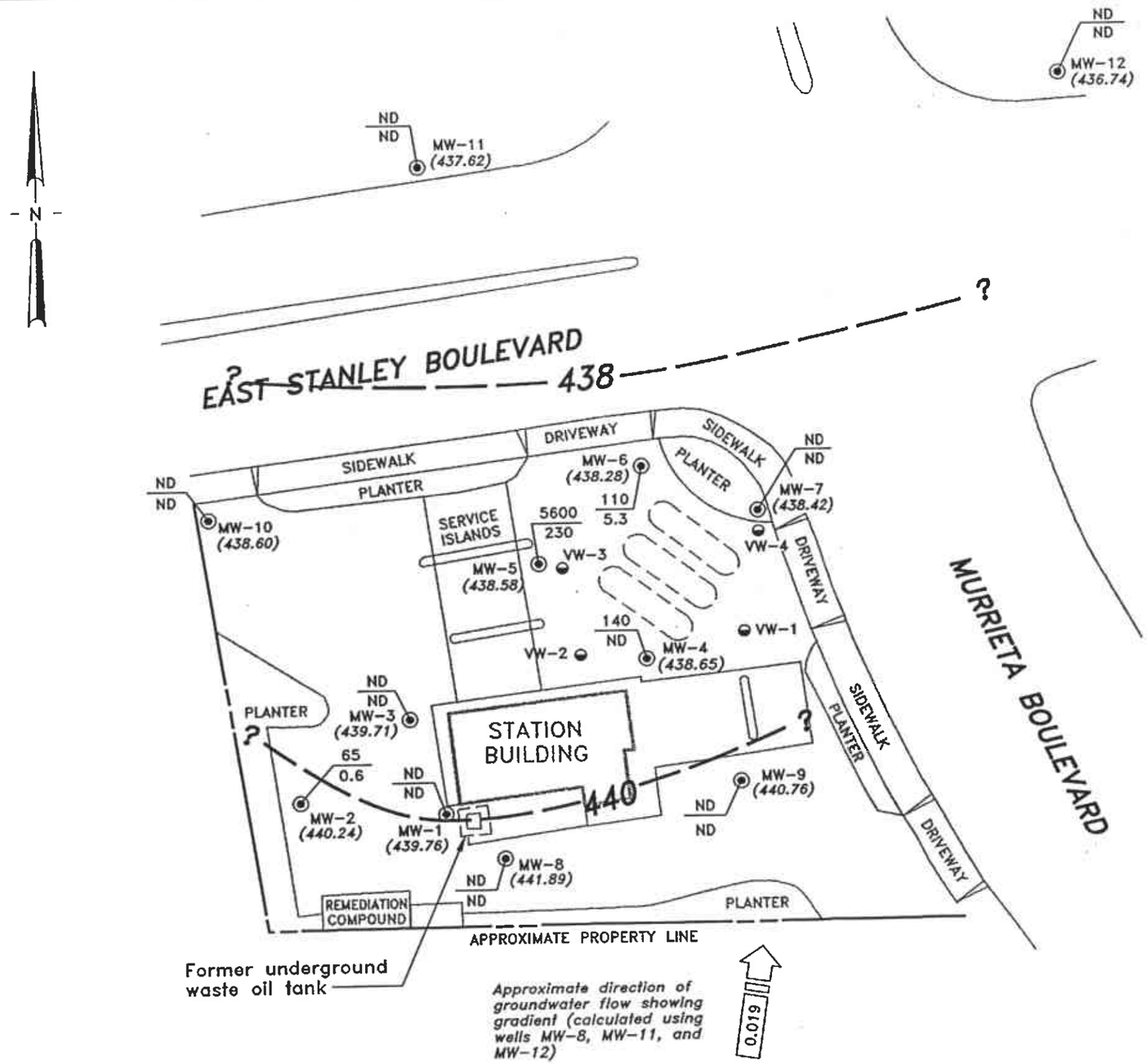
Base map from USGS 7.5' Quad. Map:
Livermore, California. (Photorevised 1980).

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
- (439.75) Groundwater elevation (Ft.–MSL) measured 11/7 to 11/13/96
- ? Groundwater elevation contour (Ft.–MSL)
- 98 / ND — TPHG concentration in groundwater (ug/L); sampled 11/7 to 11/13/96; Benzene concentration in groundwater (ug/L); sampled 11/7 to 11/13/96
- 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)

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
FOURTH QUARTER 1996

FIGURE NO.
2
PROJECT NO.
805-134.003

G:\805-134\G00 REV 0 2/4/97 15:51:58 KMM DJ

Columbia Analytical Services, Inc.

November 26, 1996 Service Request No.: S9601899

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

RE: 6113 LIVERMORE/20805-134.003/TO#19350.00

Dear Mr. Young:

The following pages contain analytical results for sample(s) received by the laboratory on November 13, 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 Analytic Report below confirms that pages 2 through 11, following, have been thoroughly reviewed an approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

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

Sincerely,

Steven L. Green
Project Chemist

COLUMBIA ANALYTICAL SERVICES, Inc.
Acronyms

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 6113 LIVERMORE/20805-134.003/TO#19350.00
Sample Matrix: Water

Service Request: S9601899
Date Collected: 11/8-13/96
Date Received: 11/13/96
Date Extracted: NA

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

	Sample Name:	**MW-1 (44)**	**MW-2 (38)**	**MW-3 (38)**
	Lab Code:	S9601899-001	S9601899-002	S9601899-003
	Date Analyzed:	11/15/96	11/15/96	11/16/96
Analyte	**MRL**			
TPH as Gasoline	50	ND	65	ND
Benzene	0.5	ND	0.6	ND
Toluene	0.5	ND	7.4	0.9
Ethylbenzene	0.5	ND	2.1	ND
Total Xylenes	0.5	ND	12	1.5
Methyl *tert*-Butyl Ether	3	ND	5	ND

3822/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 6113 LIVERMORE/20805-134.003/TO#19350.00
Sample Matrix: Water

Service Request: S9601899
Date Collected: 11/8-13/96
Date Received: 11/13/96
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-8 (66)**
	Lab Code:	S9601899-004	S9601899-005	S9601899-006
	Date Analyzed:	11/16/96	11/16/96	11/18/96
Analyte	**MRL**			
TPH as Gasoline	50	110	ND	ND
Benzene	0.5	5.3	ND	ND
Toluene	0.5	1.3	ND	ND
Ethylbenzene	0.5	3.1	ND	ND
Total Xylenes	0.5	6.6	0.8	ND
Methyl *tert*-Butyl Ether	3	ND	ND	ND

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: 6113 LIVERMORE/20805-134.003/TO#19350.00
Sample Matrix: Water

Service Request: S9601899
Date Collected: 11/8-13/96
Date Received: 11/13/96
Date Extracted: NA

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

Sample Name:	**MW-9 (67)**	**MW-10 (50)**	**MW-11 (44)**
Lab Code:	S9601899-007	S9601899-008	S9601899-009
Date Analyzed:	11/18/96	11/18/96	11/18/96

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

3822/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9601899
Project:	6113 LIVERMORE/20805-134.003/TO#19350.00	**Date Collected:**	11/8-13/96
Sample Matrix:	Water	**Date Received:**	11/13/96
		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:	S9601899-010	S9601899-011	S9601899-012
		Date Analyzed:	11/18/96	11/18/96	11/18/96
Analyte	**MRL**				
TPH as Gasoline	50		ND	140	5,600
Benzene	0.5		ND	ND	230
Toluene	0.5		ND	ND	86
Ethylbenzene	0.5		ND	<0.9 D	210
Total Xylenes	0.5		ND	1.3	1,100
Methyl *tert*-Butyl Ether	3		ND	ND	<80 D

D The MRL is elevated because of matrix interferences and because the sample required diluting.

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9601899
Project:	6113 LIVERMORE/20805-134.003/TO#19350.00	**Date Collected:**	11/8-13/96
Sample Matrix:	Water	**Date Received:**	11/13/96
		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:		S961115-WB1	S961118-WB1
Date Analyzed:		11/15/96	11/18/96
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
Project: 6113 LIVERMORE/20805-134.003/TO#19350.00
Sample Matrix: Water

Service Request: S9601899
Date Collected: 11/8-13/96
Date Received: 11/13/96
Date Extracted: NA
Date Analyzed: NA

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

Sample Name	Lab Code	PID Detector Percent Recovery 4-Bromofluorobenzene	FID Detector Percent Recovery α,α,α–Trifluorotoluene
MW-1 (44)	S9601899-001	99	100
MW-2 (38)	S9601899-002	99	100
MW-3 (38)	S9601899-003	100	100
MW-6 (66)	S9601899-004	96	104
MW-7 (67)	S9601899-005	100	100
MW-8 (66)	S9601899-006	93	95
MW-9 (67)	S9601899-007	102	100
MW-10 (50)	S9601899-008	104	99
MW-11 (44)	S9601899-009	104	97
MW-12 (33)	S9601899-010	100	99
MW-4 (26)	S9601899-011	104	100
MW-5 (62)	S9601899-012	101	102
MW-1 (24) (MS)	S9601899-001MS	100	100
MW-1 (24) (DMS)	S9601899-001DMS	98	101
Method Blank	S961115-WB1	100	95
Method Blank	S961118-WB1	99	91
CAS Acceptance Limits:		69-116	69-116

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9601899
Project:	6113 LIVERMORE/20805-134.003/TO#19350.00	**Date Collected:**	11/8-13/96
Sample Matrix:	Water	**Date Received:**	11/13/96
		Date Extracted:	NA
		Date Analyzed:	11/15/96

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

Sample Name: MW-1 (24)
Lab Code: S9601899-001MS, DMS

	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	24.5	24.4	98	98	75-135	<1
Toluene	25	25	ND	24.6	24.4	98	98	73-136	1
Ethylbenzene	25	25	ND	23.9	23.9	96	96	69-142	<1

DMSIS/0c0194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 6113 LIVERMORE/20805-134.003/TO#19350.00

Service Request: S9601899
Date Analyzed: 11/15/96

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	24.8	99	85-115
Toluene	25	24.5	98	85-115
Ethylbenzene	25	24.0	96	85-115
Xylenes, Total	75	72.6	97	85-115
Gasoline	250	249	100	90-110
Methyl *tert* -Butyl Ether	50	49	98	85-115

ICV25AL/060194

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 19350.00

Chain of Custody

ARCO Facility no. 6113	City (Facility) Livermore	Project manager (Consultant) John Young	Laboratory name CAS
ARCO engineer Paul Supple	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 (gas) 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-1(44)	(1)	2		X		X	HCl	11-8-96	1303		X											
MW-2(38)	(2)	2		X		X	HCl	11-7-96	1442		X											
MW-3(38)	(3)	2		X		X	HCl	11-7-96	1570		X											
MW-6(64)	(4)	2		X		X	HCl	11-8-96	1540		X											
MW-7(67)	(5)	2		X		X	HCl	11-8-96	1630		X											
MW-8(66)	(6)	2		X		X	HCl	11-8-96	1414		X											
MW-9(67)	(7)	2		X		X	HCl	11-8-96	1506		X											
MW-10(60)	(8)	2		X		X	HCl	11-8-96	1335		X											
MW-11( )		2		X		X	HCl				X											
MW-12( )		2		X		X	HCl	NOT RECEIVED AT THIS TIME			X											
MW-4( )		2		X		X	HCl				X											
MW-5( )		2		X		X	HCl				X											

4 pea size bubble in one VOA.

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: 9601899

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	Date 11-13-96 Time 1000	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory	Date 11-13-96 Time 1000

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

APPC-3292 (2-91)

RS

More to come . . .

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 19350.00

Chain of Custody

ARCO Facility no. 6113	City (Facility) Livermore	Project manager (Consultant) John Young	Laboratory name CAS
ARCO engineer Paul Supple	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

Method of shipment: Sampler will deliver

Special detection Limit/reporting: Lowest Possible

Special QA/QC: ARCO

Remarks: 2-40ml HCl VOAs

20805134.003

Lab number: 5960189 9

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

Lab No.	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(gas) 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 ☐		
9	MW-1 (44)		2		X		X	HCl	11/13/96	12:49		X											
10	MW-2 (33)		2		X		X	HCl		12:20		X											
11	MW-4 (26)		2		X		X	HCl		14:12		X											
12	MW-5 (8)		2		X		X	HCl		13:45		X											

Condition of sample: ok

Temperature received: Cool

	Date	Time	
Relinquished by sampler: Joseph Scott	11-13-96	1530	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory: Janice Brown — Date: 11-13-96 — Time: 15:30

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

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Complete