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

Date March 21, 1997
Project 20805-130.004

To:

Mr. Barney Chan
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harborbay Parkway, Suite 250
Alameda, California 94502-6577

We are enclosing:

Copies	Description
1	Fourth quarter 1996 groundwater monitoring results for ARCO service station 2185, Oakland, California

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

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

John C. Young
Project Manager

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

ARCO Products Company

Date: March 14, 1997

Re: ARCO Station #

2185 • 9800 East 14th Street • Oakland, 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 20805-130.004

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

Re: Fourth quarter 1996 groundwater monitoring program results, ARCO service station 2185, Oakland, California

Dear Mr. Supple:

This letter presents the results of the fourth quarter 1996 groundwater monitoring program at ARCO Products Company (ARCO) service station 2185, 9800 East 14th Street, Oakland, California (Figure 1). The quarterly monitoring program complies with Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

LIMITATIONS

No monitoring event is thorough enough to describe all geologic and hydrogeologic conditions of interest at a given site. If conditions have not been identified during the monitoring event, 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
exp 7/98
NO. 6407
STATE OF CALIFORNIA

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

March 17, 1997

ARCO QUARTERLY REPORT

Station No.: 2185	Address: 9800 East 14th Street, Oakland, California
EMCON Project No.	20805-130.004
ARCO Environmental Engineer/Phone No.:	Paul Supple /(510) 299-8891
EMCON Project Manager/Phone No.:	John C. Young /(408) 453-7300
Primary Agency/Regulatory ID No.:	ACHCSA /Barney Chan

WORK PERFORMED THIS QUARTER (Fourth- 1996):

1. Performed quarterly groundwater monitoring for fourth quarter 1996.
2. Prepared and submitted quarterly groundwater monitoring 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 groundwater monitoring 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 :	2,550 cubic yards of TPH impacted soil
Bulk Soil Removed This Quarter :	None
Water Wells or Surface Waters, within 2000 ft., impacted by site:	None
Current Remediation Techniques:	None
Approximate Depth to Groundwater:	10.50 feet
Groundwater Gradient (Average):	0.005 ft/ft toward west-southwest (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: Barney Chan, ACHCSA
Kevin Graves, RWQCB - SFBR

Table 1
Groundwater Monitoring Data
Fourth Quarter 1996

ARCO Service Station 2185
9800 East 14th Street, Oakland, 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
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-1	11-19-96	29.15	11.20	17.95	ND	WSW	0.005	11-19-96	Not sampled: well sampled annually, during the third quarter						
MW-2	11-19-96	28.47	10.96	17.51	ND	WSW	0.005	11-19-96	990	<1^	<1^	46	3	<5^	- -
MW-3	11-19-96	28.57	10.92	17.65	ND	WSW	0.005	11-19-96	2400	84	<2.5^	73	22	1300	- -
MW-4	11-19-96	29.21	11.50	17.71	ND	WSW	0.005	11-19-96	Not sampled: well sampled annually, during the third quarter						
MW-5	11-19-96	28.12	10.50	17.62	ND	WSW	0.005	11-19-96	Not sampled: well sampled semi-annually, during the first and third quarters						
MW-6	11-19-96	27.79	10.36	17.43	ND	WSW	0.005	11-19-96	Not sampled: well sampled semi-annually, during the first and third quarters						
MW-7	11-19-96	27.88	10.92	16.96	ND	WSW	0.005	11-19-96	Not sampled: well sampled annually, during the third quarter						
MW-8	11-19-96	28.08	10.58	17.50	ND	WSW	0.005	11-19-96	Not sampled: well sampled semi-annually, during the first and third quarters						
MW-9	11-19-96	27.73	11.20	16.53	ND	WSW	0.005	11-19-96	Not sampled: well sampled annually, during the third quarter						
MW-10	11-19-96	27.55	10.44	17.11	ND	WSW	0.005	11-19-96	Not sampled: well sampled annually, during the third quarter						

ft-MSL: elevation in feet, relative to mean sea level
MWN: ground-water flow direction and gradient apply to the entire monitoring well network
ft/ft: foot per foot
TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method
µg/L: micrograms per liter
EPA: United Statest Environmental Protection Agency
MTBE: methyl-tert-butyl ether
ND: none detected
WSW: west-southwest
- - : not analyzed
*: chromatogram does not match the typical gasoline fingerprint
^: method reporting limit was raised due to: (1) high analyte concentration requiring sample dilution, or (2) matrix interference

esj/h:\2185\2185mdb.xls\Table 1:imi
20805-130.004

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

ARCO Service Station 2185
9800 East 14th Street, Oakland, 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
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-1	02-08-94	29.15	11.29	17.86	ND	NR	NR								
MW-1	03-04-94	29.15	10.61	18.54	ND	NR	NR	03-04-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-1	05-10-94	29.15	11.12	18.03	ND	NR	NR	05-10-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-1	08-12-94	29.15	12.55	16.60	ND	SW	0.004	08-12-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-1	09-23-94	29.15	11.27	17.88	ND	NR	NR								
MW-1	11-22-94	29.15	11.12	18.03	ND	SW	0.003	11-22-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-1	03-15-95	29.15	8.50	20.65	ND	NW	0.01	03-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-1	05-30-95	29.15	10.28	18.87	ND	SW	0.005	05-30-95	Not sampled: not scheduled for chemical analysis						
MW-1	09-20-95	29.15	11.70	17.45	ND	WSW	0.005	09-20-95	Not sampled: not scheduled for chemical analysis						
MW-1	11-07-95	29.15	12.12	17.03	ND	WSW	0.004	11-07-95	Not sampled: not scheduled for chemical analysis						
MW-1	02-28-96	29.15	8.54	20.61	ND	NW	0.009	02-28-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-1	05-30-96	29.15	10.05	19.10	ND	W	0.007	05-31-96	Not sampled: not scheduled for chemical analysis						
MW-1	08-20-96	29.15	11.35	17.80	ND	SW	0.005	08-20-96	Not sampled: not scheduled for chemical analysis						
MW-1	11-19-96	29.15	11.20	17.95	ND	WSW	0.005	11-19-96	Not sampled: well sampled annually, during the third quarter						
MW-2	02-08-94	28.47	10.85	17.62	ND	NR	NR								
MW-2	03-04-94	28.47	10.16	18.31	ND	NR	NR	03-04-94	3100	49	<2.5	180	98	--	--
MW-2	05-10-94	28.47	10.70	17.77	ND	NR	NR	05-10-94	3100	39	<2.5	220	99	--	--
MW-2	08-12-94	28.47	12.12	16.35	ND	SW	0.004	08-12-94	1800	13	<2.5	120	35	--	--
MW-2	09-23-94	28.47	10.87	17.60	ND	NR	NR								
MW-2	11-22-94	28.47	10.65	17.82	ND	SW	0.003	11-22-94	2300	45	<0.5	190	93	--	--
MW-2	03-15-95	28.47	8.37	20.10	ND	NW	0.01	03-15-95	2100	7.4	<2.5	130	39	--	--
MW-2	05-30-95	28.47	9.95	18.52	ND	SW	0.005	05-30-95	1700	3.3	<2.5	120	31	--	--
MW-2	09-20-95	28.47	11.37	17.10	ND	WSW	0.005	09-21-95	1200	1	<1	68	16	<5	--
MW-2	11-07-95	28.47	11.73	16.74	ND	WSW	0.004	11-07-95	1100	<3	<3	74	14	<20	--
MW-2	02-28-96	28.47	8.12	20.35	ND	NW	0.009	02-29-96	2200	<3	<3	130	27	<20	--
MW-2	05-30-96	28.47	9.89	18.58	ND	W	0.007	05-31-96	970	<9	<1	29	3	<5	--
MW-2	08-20-96	28.47	11.05	17.42	ND	SW	0.005	08-20-96	670	<1	<1	16	1	<5	--
MW-2	11-19-96	28.47	10.96	17.51	ND	WSW	0.005	11-19-96	990	<1^	<1^	46	3	<5^	--

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

ARCO Service Station 2185
9800 East 14th Street, Oakland, 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
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-3	02-08-94	28.57	10.93	17.64	ND	NR	NR								
MW-3	03-04-94	28.57	10.33	18.24	ND	NR	NR	03-04-94	17000	50	<10	790	1600	--	--
MW-3	05-10-94	28.57	10.77	17.80	ND	NR	NR	05-10-94	14000	32	<10	710	1200	--	--
MW-3	08-12-94	28.57	12.07	16.50	ND	SW	0.004	08-12-94	13000	37	<10	640	970	--	--
MW-3	09-23-94	28.57	10.94	17.63	ND	NR	NR								
MW-3	11-22-94	28.57	10.76	17.81	ND	SW	0.003	11-22-94	15000	150	<10	1300	2000	--	--
MW-3	03-15-95	28.57	8.47	20.10	ND	NW	0.01	03-15-95	2000	<2.5	<2.5	88	82	--	--
MW-3	05-30-95	28.57	10.03	18.54	ND	SW	0.005	05-30-95	2000	3.2	<2.5	70	46	--	--
MW-3	09-20-95	28.57	11.30	17.27	ND	WSW	0.005	09-21-95	2100	12	<3	77	38	280	--
MW-3	11-07-95	28.57	11.65	16.92	ND	WSW	0.004	11-07-95	3000	18	<3	120	62	--	430
MW-3	02-28-96	28.57	8.35	20.22	ND	NW	0.009	02-29-96	5100	83	<5	160	57	640	--
MW-3	05-30-96	28.57	9.77	18.80	ND	W	0.007	05-31-96	2100	41	<5	57	15	890	--
MW-3	08-20-96	28.57	11.00	17.57	ND	SW	0.005	08-20-96	2500	94	<2.5	62	14	2200	--
MW-3	11-19-96	28.57	10.92	17.65	ND	WSW	0.005	11-19-96	2400	84	<2.5^	73	22	1300	--
MW-4	02-08-94	29.21	11.54	17.67	ND	NR	NR								
MW-4	03-04-94	29.21	10.84	18.37	ND	NR	NR	03-04-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	05-10-94	29.21	11.38	17.83	ND	NR	NR	05-10-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	08-12-94	29.21	12.82	16.39	ND	SW	0.004	08-12-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	09-23-94	29.21	11.54	17.67	ND	NR	NR								
MW-4	11-22-94	29.21	11.35	17.86	ND	SW	0.003	11-22-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	03-15-95	29.21	8.69	20.52	ND	NW	0.01	03-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-4	05-30-95	29.21	10.57	18.64	ND	SW	0.005	05-30-95	Not sampled: not scheduled for chemical analysis						
MW-4	09-20-95	29.21	12.02	17.19	ND	WSW	0.005	09-20-95	Not sampled: not scheduled for chemical analysis						
MW-4	11-07-95	29.21	12.42	16.79	ND	WSW	0.004	11-07-95	Not sampled: not scheduled for chemical analysis						
MW-4	02-28-96	29.21	8.66	20.55	ND	NW	0.009	02-28-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--
MW-4	05-30-96	29.21	10.34	18.87	ND	W	0.007	05-31-96	Not sampled: not scheduled for chemical analysis						
MW-4	08-20-96	29.21	11.67	17.54	ND	SW	0.005	08-20-96	Not sampled: not scheduled for chemical analysis						
MW-4	11-19-96	29.21	11.50	17.71	ND	WSW	0.005	11-19-96	Not sampled: well sampled annually, during the third quarter						

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Petroleum Hydrocarbons and Their Constituents
1994 - Present*

ARCO Service Station 2185
9800 East 14th Street, Oakland, 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
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-5	02-08-94	28.12	10.53	17.59	ND	NR	NR								
MW-5	03-04-94	28.12	9.89	18.23	ND	NR	NR	03-04-94	540	0.9	0.6	16	6.3	--	--
MW-5	05-10-94	28.12	10.37	17.75	ND	NR	NR	05-10-94	1300	11	<2.5	110	68	--	--
MW-5	08-12-94	28.12	11.60	16.52	ND	SW	0.004	08-12-94	1500	10	<2.5	110	30	--	--
MW-5	09-23-94	28.12	10.52	17.60	ND	NR	NR								
MW-5	11-22-94	28.12	10.29	17.83	ND	SW	0.003	11-22-94	84	1	<0.5	5	2	--	--
MW-5	03-15-95	28.12	8.47	19.65	ND	NW	0.01	03-15-95	170	5.6	<0.5	17	11	--	--
MW-5	05-30-95	28.12	9.69	18.43	ND	SW	0.005	05-30-95	53	0.6	<0.5	4.8	2.8	--	--
MW-5	09-20-95	28.12	10.90	17.22	ND	WSW	0.005	09-21-95	1500	47	2	120	86	70	--
MW-5	11-07-95	28.12	11.20	16.92	ND	WSW	0.004	11-07-95	140	4.5	<0.5	8.3	16	10	--
MW-5	02-28-96	28.12	8.15	19.97	ND	NW	0.009	02-29-96	900	11	<1	59	29	99	--
MW-5	05-30-96	28.12	9.48	18.64	ND	W	0.007	05-31-96	Not sampled: not scheduled for chemical analysis						
MW-5	08-20-96	28.12	10.58	17.54	ND	SW	0.005	08-20-96	67	0.7	<0.5	3.6	0.6	27	--
MW-5	11-19-96	28.12	10.50	17.62	ND	WSW	0.005	11-19-96	Not sampled: well sampled semi-annually, during the first and third quarters						
MW-6	02-08-94	27.79	10.28	17.51	ND	NR	NR								
MW-6	03-04-94	27.79	9.67	18.12	ND	NR	NR	03-04-94	5800	320	<5	510	360	--	--
MW-6	05-10-94	27.79	10.13	17.66	ND	NR	NR	05-10-94	11000	470	<10	880	650	--	--
MW-6	08-12-94	27.79	11.44	16.35	ND	SW	0.004	08-12-94	4400	170	<10	390	210	--	--
MW-6	09-23-94	27.79	10.27	17.52	ND	NR	NR								
MW-6	11-22-94	27.79	10.10	17.69	ND	SW	0.003	11-22-94	7300	390	<5	940	640	--	--
MW-6	03-15-95	27.79	7.75	20.04	ND	NW	0.01	03-15-95	3600	77	<5	420	180	--	--
MW-6	05-30-95	27.79	9.48	18.31	ND	SW	0.005	05-30-95	5000	68	<5	530	250	--	--
MW-6	09-20-95	27.79	10.75	17.04	ND	WSW	0.005	09-21-95	3300	36	<5	360	120	<30	--
MW-6	11-07-95	27.79	11.06	16.73	ND	WSW	0.004	11-07-95	3500	33	<5	410	110	<30	--
MW-6	02-28-96	27.79	7.86	19.93	ND	NW	0.009	02-29-96	520	33	<5	480	160	<30	--
MW-6	05-30-96	27.79	9.35	18.44	ND	W	0.007	05-31-96	Not sampled: not scheduled for chemical analysis						
MW-6	08-20-96	27.79	10.43	17.36	ND	SW	0.005	08-20-96	1900	3.4	<2.5	150	21	<12	--
MW-6	11-19-96	27.79	10.36	17.43	ND	WSW	0.005	11-19-96	Not sampled: well sampled semi-annually, during the first and third quarters						

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

ARCO Service Station 2185
9800 East 14th Street, Oakland, 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
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-7	02-08-94	27.88	10.83	17.05	ND	NR	NR								
MW-7	03-04-94	27.88	10.13	17.75	ND	NR	NR	03-04-94	320*	<0.5	<0.5	<0.5	<0.5	--	--
MW-7	05-10-94	27.88	10.68	17.20	ND	NR	NR	05-10-94	330*	0.6	<0.5	<0.5	<0.5	--	--
MW-7	08-12-94	27.88	12.05	15.83	ND	SW	0.004	08-12-94	360*	<0.5	<0.5	<0.5	<0.5	--	--
MW-7	09-23-94	27.88	10.85	17.03	ND	NR	NR								
MW-7	11-22-94	27.88	10.60	17.28	ND	SW	0.003	11-22-94	<50	<0.5	<0.5	<0.5	<0.5	--	--
MW-7	03-15-95	27.88	8.13	19.75	ND	NW	0.01	03-15-95	150*	<0.5	<0.5	<0.5	<0.5	--	--
MW-7	05-30-95	27.88	10.14	17.74	ND	SW	0.005	05-30-95	110*	<0.5	<0.5	<0.5	<0.5	--	--
MW-7	09-20-95	27.88	11.52	16.36	ND	WSW	0.005	09-20-95	<400*	<0.8	<0.5	<0.5	<0.5	<7	--
MW-7	11-07-95	27.88	11.70	16.18	ND	WSW	0.004	11-07-95	<500	2	<1	<1	<1	<20	--
MW-7	02-28-96	27.88	8.19	19.69	ND	NW	0.009	02-29-96	<300*	<0.5	<0.5	<0.5	<0.5	<6	--
MW-7	05-30-96	27.88	9.98	17.90	ND	W	0.007	05-31-96	<100*	<0.5	<0.5	<0.5	<0.5	<3	--
MW-7	08-20-96	27.88	11.15	16.73	ND	SW	0.005	08-20-96	<200*	<0.5	<0.5	<0.5	<0.5	<5	--
MW-7	11-19-96	27.88	10.92	16.96	ND	WSW	0.005	11-19-96	Not sampled: well sampled annually, during the third quarter						
MW-8	08-12-94	NR	11.43	NR	ND	NR	NR	08-12-94	5100	12	<5	470	53	--	--
MW-8	09-23-94	NR	10.99	NR	ND	NR	NR								
MW-8	11-22-94	NR	10.42	NR	ND	NR	NR	11-22-94	2300	16	<0.5	140	4	--	--
MW-8	03-15-95	NR	8.43	NR	ND	NR	NR	03-15-95	280	<0.5	<0.5	0.7	0.7	--	--
MW-8	05-30-95	NR	9.86	NR	ND	NR	NR	05-30-95	390	<0.5	<0.5	<2	1.6	--	--
MW-8	09-20-95	28.08	11.07	17.01	ND	WSW	0.005	09-21-95	470	<0.5	<0.5	3	1.2	52	--
MW-8	11-07-95	28.08	11.40	16.68	ND	WSW	0.004	11-07-95	280	<0.5	<0.5	0.6	<0.5	94	--
MW-8	02-28-96	28.08	8.30	19.78	ND	NW	0.009	02-29-96	160	<0.5	<0.5	<0.9	<0.6	32	--
MW-8	05-30-96	28.08	9.68	18.40	ND	W	0.007	05-31-96	100	<0.5	<0.5	<0.6	<0.5	16	--
MW-8	08-20-96	28.08	10.72	17.36	ND	SW	0.005	08-20-96	140	<0.5	<0.5	<0.5	<0.5	190	--
MW-8	11-19-96	28.08	10.58	17.50	ND	WSW	0.005	11-19-96	Not sampled: well sampled semi-annually, during the first and third quarters						

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

ARCO Service Station 2185
9800 East 14th Street, Oakland, 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
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW-9	09-20-95	27.73	11.67	16.06	ND	WSW	0.005	09-20-95	<50	<0.5	<0.5	<0.5	<0.5	<4	- -
MW-9	11-07-95	27.73	11.70	16.03	ND	WSW	0.004	11-07-95	<50	<0.5	<0.5	<0.5	<0.5	<4	- -
MW-9	02-28-96	27.73	9.23	18.50	ND	NW	0.009	02-29-96	<50	<0.5	<0.5	<0.5	<0.5	<5	- -
MW-9	05-30-96	27.73	10.50	17.23	ND	W	0.007	05-31-96	<50	0.6	<0.5	<0.5	<0.5	<8	- -
MW-9	08-20-96	27.73	11.33	16.40	ND	SW	0.005	08-20-96	<50	<0.5	<0.5	<0.5	<0.5	<7	- -
MW-9	11-19-96	27.73	11.20	16.53	ND	WSW	0.005	11-19-96	Not sampled: well sampled annually, during the third quarter						
MW-10	09-20-95	27.55	10.65	16.90	ND	WSW	0.005	09-21-95	<50	<0.5	<0.5	<0.5	<0.5	<3	- -
MW-10	11-07-95	27.55	10.85	16.70	ND	WSW	0.004	11-07-95	<50	<0.5	<0.5	<0.5	<0.5	<3	- -
MW-10	02-28-96	27.55	9.38	18.17	ND	NW	0.009	02-29-96	<50	<0.5	<0.5	<0.5	<0.5	<3	- -
MW-10	05-30-96	27.55	9.99	17.56	ND	W	0.007	05-31-96	<50	<0.5	<0.5	<0.5	<0.5	<3	- -
MW-10	08-20-96	27.55	10.47	17.08	ND	SW	0.005	08-20-96	<50	<0.5	<0.5	<0.5	<0.5	<3	- -
MW-10	11-19-96	27.55	10.44	17.11	ND	WSW	0.005	11-19-96	Not sampled: well sampled annually, during the third quarter						

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

ARCO Service Station 2185
9800 East 14th Street, Oakland, 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
		ft-MSL	feet	ft-MSL	feet	MWN	ft/ft		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L

ft-MSL: elevation in feet, relative to mean sea level
MWN: ground-water flow direction and gradient apply to the entire monitoring well network
ft/ft: foot per foot
TPHG: total petroleum hydrocarbons as gasoline, California DHS LUFT Method
µg/L: micrograms per liter
EPA: United States Environmental Protection Agency
MTBE: Methyl-tert-butyl ether
ND: none detected
NR: not reported; data not available or not measurable
SW: southwest
NW: northwest
WSW: west-southwest
W: west
*: chromatogram does not match the typical gasoline fingerprint
^: method reporting limit was raised due to: (1) high analyte concentration requiring sample dilution, or (2) matrix interference
- -: not analyzed or not applicable
**: For previous historical groundwater elevation and analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results, ARCO Service Station 2185, Oakland, California*, (EMCON, February 27, 1996).

152763

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

- N -

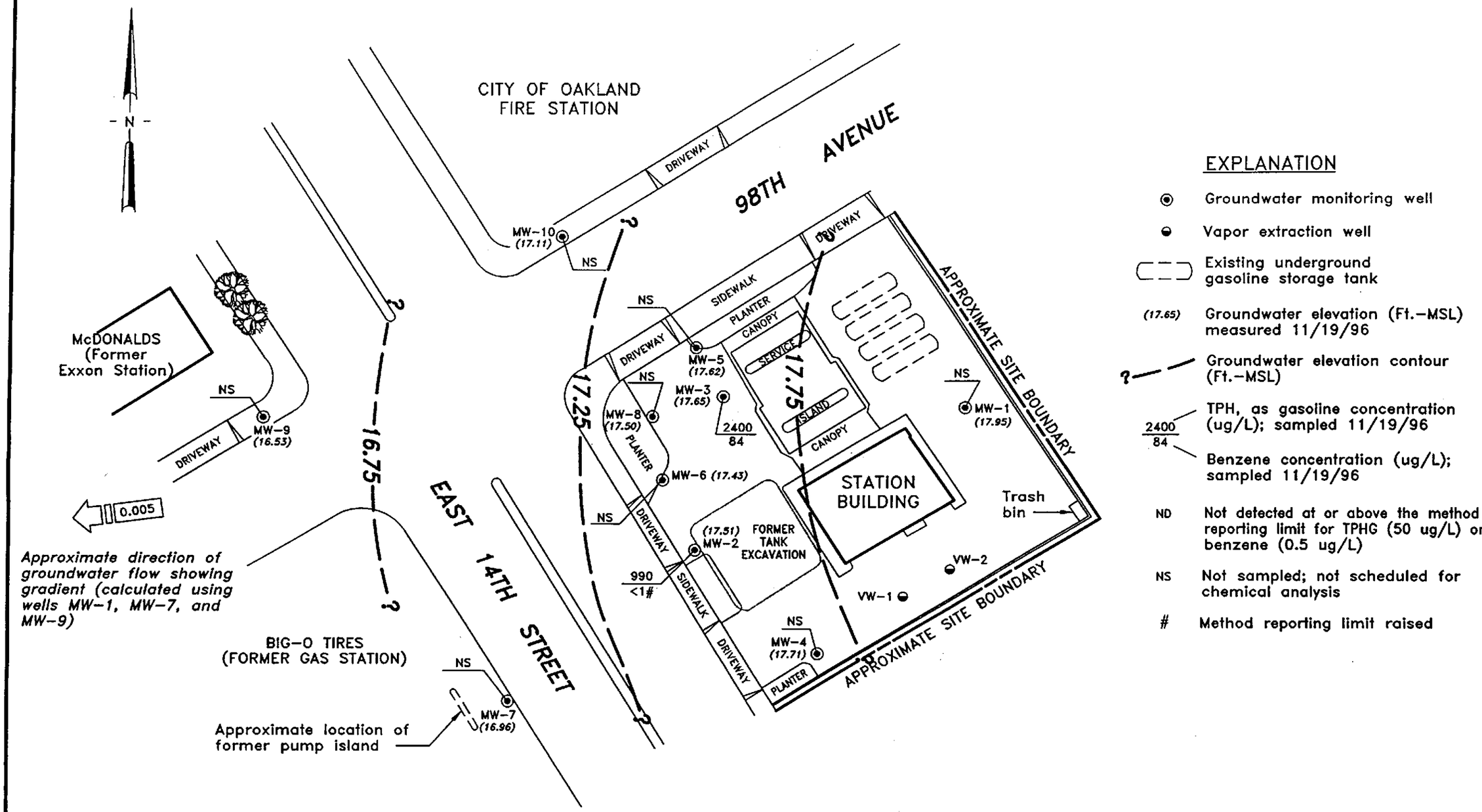
Scale : 0 2000 4000 Feet

EMCON

ARCO PRODUCTS COMPANY
SERVICE STATION 2185, 9800 E. 14TH STREET
QUARTERLY GROUNDWATER MONITORING
OAKLAND, CALIFORNIA

SITE LOCATION

FIGURE
1
PROJECT NO.
805-130.04



Base map modified from RESNA, 1994.

EMCON

SCALE: 0 40 80 FEET
(APPROXIMATE)

ARCO PRODUCTS COMPANY
SERVICE STATION 2185, 9800 E. 14TH STREET
QUARTERLY GROUNDWATER MONITORING
OAKLAND, CALIFORNIA

GROUNDWATER DATA
FOURTH QUARTER 1996

FIGURE NO.
2
PROJECT NO.
805-130.004

APPENDIX A

ANALYTICAL RESULTS AND CHAIN OF CUSTODY DOCUMENTATION, FOURTH QUARTER 1996 GROUNDWATER MONITORING EVENT

Columbia Analytical Services, Inc.

December 5, 1996 Service Request No.: S9601970

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

RE: 2185 OAKLAND/20805-130.003/TO#19350.00

Dear Mr. Young:

The following pages contain analytical results for sample(s) received by the laboratory on November 20, 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 7, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

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

Sincerely,

Steven L. Green
Project Chemist

COLUMBIA ANALYTICAL SERVICES, Inc.
Acronyms

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9601970
Project:	2185 OAKLAND/20805-130.003/TO#19350.00	**Date Collected:**	11/19/96
Sample Matrix:	Water	**Date Received:**	11/20/96
		Date Extracted:	NA

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

		Sample Name:	**MW-2 (23)**	**MW-3 (23)**	**Method Blank**
		Lab Code:	S9601970-001	S9601970-002	S961129-WB1
		Date Analyzed:	11/29/96	11/29/96	11/29/96
Analyte	**MRL**				
TPH as Gasoline	50		990	2,400	ND
Benzene	0.5		<1 C	84	ND
Toluene	0.5		<1 C	<2.5 C	ND
Ethylbenzene	0.5		46	73	ND
Total Xylenes	0.5		3	22	ND
Methyl *tert*-Butyl Ether	3		<5 C	1,300	ND

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

3S22/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9601970
Project:	2185 OAKLAND/20805-130.003/TO#19350.00	**Date Collected:**	11/19/96
Sample Matrix:	Water	**Date Received:**	11/20/96
		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-2 (23)	S9601970-001	91	112 X
MW-3 (23)	S9601970-002	99	103
Batch QC (MS)	S9601955-002MS	97	103
Batch QC (DMS)	S9601955-002DMS	96	102
Method Blank	S961129-WB1	98	98
	CAS Acceptance Limits:	69-116	69-116

X The surrogate used for this sample was 4-Bromofluorobenzene.

SUR2/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9601970
Project:	2185 OAKLAND/20805-130.003/TO#19350.00	**Date Collected:**	11/19/96
Sample Matrix:	Water	**Date Received:**	11/20/96
		Date Extracted:	NA
		Date Analyzed:	11/29/96

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

Sample Name: Batch QC
Lab Code: S9601955-002MS, 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	24.1	24.7	96	99	75-135	2
Toluene	25	25	ND	23.4	24.8	94	99	73-136	6
Ethylbenzene	25	25	ND	23.2	23.8	93	95	69-142	3

DMS1S/060194

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S9601970
Project:	2185 OAKLAND/20805-130.003/TO#19350.00	**Date Analyzed:**	11/29/96

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	24.5	98	85-115
Toluene	25	24.6	98	85-115
Ethylbenzene	25	24.1	96	85-115
Xylenes, Total	75	72.8	97	85-115
Gasoline	250	242	97	90-110
Methyl *tert*-Butyl Ether	50	53	106	85-115

ICV25AL/060194

ARCO Products Company Division of AtlanticRichfieldCompany

Task Order No. 9350.00

Chain of Custody

ARCO Facility no.	2185
City (Facility)	Oakland
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
Contract number	
Consultant name	EMCON
Address (Consultant)	1921 Ringwood Ave. San Jose, CA 95131

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 *include MTBE* 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 ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
① MW-2(23)		2		X			HCL	11-15-96	1355		X											
② MW-3(23)		2		X			HCL	↓	1429		X											

Method of shipment: Sampler will deliver

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: 2-40ml HCL VOAs

#20805-130.003

Lab number: S9601970

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: *[signature]*	Date 11-20-96 Time 1610	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory: *[signature]*	Date 11-20-96 Time 16:10

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant
APPC-3292 (2-91)

R8