



**EMCON**

1921 Ringwood Avenue • San Jose, California 95131-1721 • (408) 453-7300 • Fax (408) 437-9626

ENVIRONMENTAL  
PROTECTION

96 DEC 20 AM 8:35

Date December 16, 1996  
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

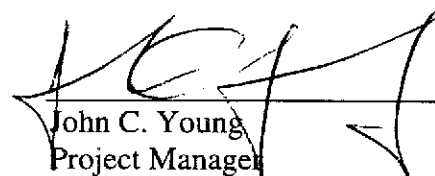
We are enclosing:

Copies	Description
<u>1</u>	<u>Third quarter 1996 groundwater monitoring results</u>
<u>      </u>	<u>for ARCO service station 2185, Oakland, California</u>
<u>      </u>	<u>      </u>
<u>      </u>	<u>      </u>

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

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





Date: December 12, 1996

Re: ARCO Station #

2185 • 9800 East 14th Street • Oakland, CA  
Third 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:

A handwritten signature in black ink that reads "Paul Supple". The signature is written in a cursive, flowing style.

Paul Supple  
Environmental Engineer



EMCON

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

December 16, 1996  
Project 20805-130.004

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

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

Dear Mr. Supple:

This letter presents the results of the third 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.

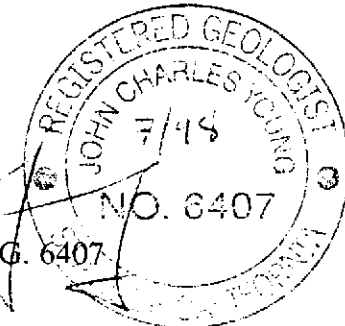
Please call if you have questions.

Sincerely,

EMCON



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



EMCON



**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 (Third- 1996):**

1. Performed quarterly groundwater monitoring for third quarter 1996.
2. Prepared and submitted quarterly groundwater monitoring report for second quarter 1996.

**WORK PROPOSED FOR NEXT QUARTER (Fourth- 1996):**

1. Perform quarterly groundwater monitoring and sampling for fourth quarter 1996.
2. Prepare and submit quarterly groundwater monitoring report for third quarter 1996.
3. Groundwater monitoring wells MW-7, MW-9, and MW-10 will be sampled annually, during the first quarter of each year and well MW-8 will be sampled semi-annually, during the first and third quarters of each year.

**WORK PROJECTED FOR 1997:**

1. Prepare a risk-based corrective action evaluation.

**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: 10.58 feet  
 Groundwater Gradient (Average): 0.005 ft/ft toward southwest (consistent with past events)

**ATTACHED:**

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

cc: Barney Chan, ACHCSA  
 Kevin Graves, RWQCB - SFBR

**EMCON**

Table 1  
Groundwater Monitoring Data  
Third Quarter 1996

ARCO Service Station 2185  
9800 East 14th Street, Oakland, California

Date: 11-21-96

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
		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	08-20-96	29.15	11.35	17.80	ND	SW	0.005	08-20-96	Not sampled: not scheduled for chemical analysis						
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-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-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-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-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-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-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-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-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	--

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  
SW: southwest  
--: not analyzed  
\*: chromatogram does not match the typical gasoline fingerprint

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: 11-21-96

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
		ft-MSL	feet	ft-MSL	feet	MWN									
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-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	--

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: 11-21-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient ft/ft	Water Sample Field Date	TPHG LUFT Method µg/L	Benzene EPA 8020 µg/L	Toluene EPA 8020 µg/L	Ethylbenzene EPA 8020 µg/L	Total Xylenes EPA 8020 µg/L	MTBE EPA 8020 µg/L	MTBE EPA 8240 µg/L
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-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						

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: 11-21-96

Well Designation	Water Level Field Date	Top of Casing Elevation ft-MSL	Depth to Water feet	Groundwater Elevation ft-MSL	Floating Product Thickness feet	Groundwater Flow Direction MWN	Hydraulic Gradient ft/ft	Water Sample Field Date	TPHG LUFT Method µg/L	Benzene EPA 8020 µg/L	Toluene EPA 8020 µg/L	Ethylbenzene EPA 8020 µg/L	Total Xylenes EPA 8020 µg/L	MTBE EPA 8020 µg/L	MTBE EPA 8240 µg/L
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-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	--



**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: 11-21-96

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
		ft-MSL	feet	ft-MSL	feet	MWN									
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-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	--

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: 11-21-96

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
		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-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	--

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  
 -: 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).





**APPENDIX A**

**FIELD DATA SHEETS, THIRD QUARTER 1996  
GROUNDWATER MONITORING EVENT**

**FIELD REPORT  
DEPTH TO WATER / FLOATING PRODUCT SURVEY**

PROJECT # : 21775-236.002 STATION ADDRESS : 9800 East 14th Street, Oakland

DATE : 8-20-96

ARCO STATION # : 2185

FIELD TECHNICIAN : M. GALLEGOS / D. GAMBLER

DAY : Tuesday

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket Present	Lock Number	Type Of 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-9	Good	Good	Good	ARCO	WC	11.33	11.33	NR	NA	22.6	
2	MW-10	↓	↓	↓	↓	↓	10.47	10.47	↓	↓	23.00	
3	MW-1	↓	↓	↓	↓	↓	11.35	11.35	↓	↓	23.6	
4	MW-4	↓	↓	↓	↓	↓	11.67	11.67	↓	↓	23.7	
5	MW-7	↓	↓	↓	↓	↓	11.15	11.15	↓	↓	25.3	
6	MW-8	↓	↓	↓	↓	↓	10.77	10.77	↓	↓	22.4	
7	MW-6	↓	↓	↓	↓	↓	10.43	10.43	↓	↓	27.8	
8	MW-5	↓	↓	↓	↓	↓	10.58	10.58	↓	↓	26.7	
9	MW-2	↓	↓	↓	↓	↓	11.05	11.05	↓	↓	25.5	
10	MW-3	↓	↓	↓	↓	↓	11.00	11.00	↓	↓	23.2	
<b>SURVEY POINTS ARE TOP OF WELL CASINGS</b>												



EMCON ASSOCIATES

# WATER SAMPLE FIELD DATA SHEET

Rev. 3, 2/94

PROJECT NO: 21775-236-002

SAMPLE ID: MW-2(23')

PURGED BY: M.G. / D.G.

CLIENT NAME: ARCO# 2185

SAMPLED BY: ↓

LOCATION: OAKLAND, CA

TYPE: Ground Water  Surface Water  Treatment Effluent  Other

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

CASING ELEVATION (feet/MSL): <u>NR</u>	VOLUME IN CASING (gal.): <u>8.13</u>
DEPTH TO WATER (feet): <u>110.5</u>	CALCULATED PURGE (gal.): <u>24.40</u>
DEPTH OF WELL (feet): <u>23.5</u>	ACTUAL PURGE VOL (gal.): <u>24.5</u>

DATE PURGED: <u>8-20-94</u>	Start (2400 Hr) <u>1408</u>	End (2400 Hr) <u>1412</u>
DATE SAMPLED: <u>↓</u>	Start (2400 Hr) <u>1416</u>	End (2400 Hr) <u>—</u>

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1409</u>	<u>8.0</u>	<u>6.57</u>	<u>663</u>	<u>71.8</u>	<u>cloudy</u>	<u>Light</u>
<u>1410</u>	<u>16.0</u>	<u>6.59</u>	<u>659</u>	<u>71.4</u>	<u>↓</u>	<u>↓</u>
<u>1412</u>	<u>24.5</u>	<u>6.62</u>	<u>659</u>	<u>71.0</u>	<u>↓</u>	<u>NR</u>

D. O. (ppm): NR      ODOR: Strong      NR      NR

Field QC samples collected at this well: NR      Parameters field filtered at this well: NR

- | PURGING EQUIPMENT                                    |                                                   | SAMPLING EQUIPMENT                       |                                                      |
|------------------------------------------------------|---------------------------------------------------|------------------------------------------|------------------------------------------------------|
| <input type="checkbox"/> 2" Bladder Pump             | <input type="checkbox"/> Bailor (Teflon®)         | <input type="checkbox"/> 2" Bladder Pump | <input checked="" type="checkbox"/> Bailor (Teflon®) |
| <input checked="" type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Bailor (PVC)             | <input type="checkbox"/> DDL Sampler     | <input type="checkbox"/> Bailor (Stainless Steel)    |
| <input type="checkbox"/> Submersible Pump            | <input type="checkbox"/> Bailor (Stainless Steel) | <input type="checkbox"/> Dipper          | <input type="checkbox"/> Submersible Pump            |
| <input type="checkbox"/> Well Wizard™                | <input type="checkbox"/> Dedicated                | <input type="checkbox"/> Well Wizard™    | <input type="checkbox"/> Dedicated                   |
| Other: _____                                         |                                                   | Other: _____                             |                                                      |

WELL INTEGRITY: Good      LOCK #: ARCO-key

REMARKS: All samples taken

Meter Calibration: Date: 8-20-94 Time: \_\_\_\_\_ Meter Serial #: 9204 Temperature °F: \_\_\_\_\_  
 ( EC 1000 \_\_\_\_\_ / \_\_\_\_\_ ) ( DI \_\_\_\_\_ ) ( pH 7 \_\_\_\_\_ / \_\_\_\_\_ ) ( pH 10 \_\_\_\_\_ / \_\_\_\_\_ ) ( pH 4 \_\_\_\_\_ / \_\_\_\_\_ )

Location of previous calibration: MW-9

Signature: [Signature]      Reviewed By: [Signature]      Page 1 of 8



EMCON ASSOCIATES

# WATER SAMPLE FIELD DATA SHEET

Rev. 3, 2/94

PROJECT NO: 21775-236-002

SAMPLE ID: MW-3(23)

PURGED BY: M.G. / D.G.

CLIENT NAME: ARCO# 2185

SAMPLED BY: ↓

LOCATION: OAKLAND, CA

TYPE: Ground Water  Surface Water  Treatment Effluent  Other

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 7.97  
 DEPTH TO WATER (feet): 11.00 CALCULATED PURGE (gal.): 23.91  
 DEPTH OF WELL (feet): 25.2 ACTUAL PURGE VOL. (gal.): 24.0

DATE PURGED: 8-20-94 Start (2400 Hr) 1421 End (2400 Hr) 1424  
 DATE SAMPLED: ↓ Start (2400 Hr) 1430 End (2400 Hr)     

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1422</u>	<u>8.0</u>	<u>6.81</u>	<u>562</u>	<u>70.4</u>	<u>Clear</u>	<u>light</u>
<u>1423</u>	<u>16.0</u>	<u>6.75</u>	<u>615</u>	<u>70.3</u>	<u>"</u>	<u>"</u>
<u>1424</u>	<u>24.0</u>	<u>6.74</u>	<u>618</u>	<u>70.4</u>	<u>FAH</u>	<u>mod</u>

D. O. (ppm): NR ODOR: Strong NR NR  
 (COBALT 0 - 500) (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
  - Centrifugal Pump
  - Submersible Pump
  - Well Wizard™
  - Bailer (Teflon®)
  - Bailer (PVC)
  - Bailer (Stainless Steel)
  - Dedicated
- Other: \_\_\_\_\_

### SAMPLING EQUIPMENT

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

WELL INTEGRITY: Good LOCK #: ARCO-key

REMARKS: all samples taken

Meter Calibration: Date: 8-20-94 Time: \_\_\_\_\_ Meter Serial #: 9204 Temperature °F: \_\_\_\_\_  
 ( EC 1000 \_\_\_\_\_ / \_\_\_\_\_ ) ( DI \_\_\_\_\_ ) ( pH 7 \_\_\_\_\_ / \_\_\_\_\_ ) ( pH 10 \_\_\_\_\_ / \_\_\_\_\_ ) ( pH 4 \_\_\_\_\_ / \_\_\_\_\_ )  
 Location of previous calibration: MW-9

Signature: M.L. Fupiller Reviewed By: GA Page 2 of 8





EMCON ASSOCIATES

# WATER SAMPLE FIELD DATA SHEET

Rev. 3, 2/94

PROJECT NO: 21775-236-002

SAMPLE ID: MW-5(26')

PURGED BY: M.G. / D.G.

CLIENT NAME: ARCO# 2185

SAMPLED BY: ↓

LOCATION: OAKLAND, CA

TYPE: Ground Water  Surface Water  Treatment Effluent  Other

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 10.53  
 DEPTH TO WATER (feet): 10.58 CALCULATED PURGE (gal.): 31.59  
 DEPTH OF WELL (feet): 26.7 ACTUAL PURGE VOL (gal.): 18.0

DATE PURGED: 8-20-94 Start (2400 Hr) 1349 End (2400 Hr) 1353  
 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)
<u>1351</u>	<u>10.5</u>	<u>7.02</u>	<u>539</u>	<u>69.7</u>	<u>cloudy</u>	<u>Light</u>
	<u>21.0</u>	<u>well dried at</u>	<u>18.0 gallons</u>			
	<u>32.0</u>					
<u>1402</u>	<u>18.0</u>	<u>6.89</u>	<u>548</u>	<u>69.4</u>	<u>↓</u>	<u>↓</u>
D. O. (ppm):	<u>NR</u>	ODOR:	<u>Slight</u>		<u>NR</u>	<u>NR</u>
Field QC samples collected at this well:	<u>NR</u>	Parameters field filtered at this well:	<u>NR</u>		(COBALT 0 - 500)	(NTU 0 - 200 or 0 - 1000)

### PURGING EQUIPMENT

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

### SAMPLING EQUIPMENT

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

WELL INTEGRITY: Good LOCK #: ARCO-2185

REMARKS: all samples taken

Meter Calibration: Date: 8-20-94 Time: \_\_\_\_\_ Meter Serial #: 9204 Temperature °F: \_\_\_\_\_  
 ( EC 1000 \_\_\_\_\_ / \_\_\_\_\_ ) ( DI \_\_\_\_\_ ) ( pH 7 \_\_\_\_\_ / \_\_\_\_\_ ) ( pH 10 \_\_\_\_\_ / \_\_\_\_\_ ) ( pH 4 \_\_\_\_\_ / \_\_\_\_\_ )  
 Location of previous calibration: 10760-9

Signature: [Signature] Reviewed By: [Signature] Page 3 of 8



EMCON ASSOCIATES

# WATER SAMPLE FIELD DATA SHEET

Rev. 3, 2/94

PROJECT NO: 21775-236-002

SAMPLE ID: MW-(127)

PURGED BY: M.G. / D.G.

CLIENT NAME: ARCO # 2185

SAMPLED BY: [Signature]

LOCATION: OAKLAND, CA

TYPE: Ground Water  Surface Water  Treatment Effluent  Other

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 11.34  
 DEPTH TO WATER (feet): 10.43 CALCULATED PURGE (gal.): 34.04  
 DEPTH OF WELL (feet): 27.8 ACTUAL PURGE VOL (gal.): 34.5

DATE PURGED: 8-20-96 Start (2400 Hr) 1333 End (2400 Hr) 1338  
 DATE SAMPLED: [Signature] Start (2400 Hr) 1344 End (2400 Hr) ---

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1334</u>	<u>11.5</u>	<u>6.83</u>	<u>648</u>	<u>69.5</u>	<u>clear</u>	<u>clear</u>
<u>1336</u>	<u>23.0</u>	<u>6.89</u>	<u>664</u>	<u>69.3</u>	<u>cloudy</u>	<u>MOD</u>
<u>1338</u>	<u>34.5</u>	<u>6.85</u>	<u>663</u>	<u>69.7</u>	<u>11</u>	<u>11</u>
---	---	---	---	---	---	---

D. O. (ppm): NR ODOR: sl. bit NR NR  
 (COBALT 0 - 500) (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
- Centrifugal Pump
- Submersible Pump
- Well Wizard™
- Bailer (Teflon®)
- Bailer (PVC)
- Bailer (Stainless Steel)
- Dedicated

### SAMPLING EQUIPMENT

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

Other: \_\_\_\_\_

WELL INTEGRITY: Good LOCK #: ARCO key

REMARKS: All samples taken

Meter Calibration: Date: 8-20-96 Time: \_\_\_\_\_ Meter Serial #: 9204 Temperature °F: \_\_\_\_\_  
 ( EC 1000 \_\_\_\_\_ / \_\_\_\_\_ ) ( DI \_\_\_\_\_ ) ( pH 7 \_\_\_\_\_ / \_\_\_\_\_ ) ( pH 10 \_\_\_\_\_ / \_\_\_\_\_ ) ( pH 4 \_\_\_\_\_ / \_\_\_\_\_ )  
 Location of previous calibration: M/W-9

Signature: [Signature] Reviewed By: SA Page 4 of 8





EMCON ASSOCIATES

# WATER SAMPLE FIELD DATA SHEET

Rev. 3, 2/94

PROJECT NO: 21775-236-002

SAMPLE ID: MW-8(22')

PURGED BY: M.G. / D.G.

CLIENT NAME: ARCO# 2185

SAMPLED BY: ↓

LOCATION: OAKLAND, CA

TYPE: Ground Water  Surface Water  Treatment Effluent  Other

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 7.63  
 DEPTH TO WATER (feet): 10.72 CALCULATED PURGE (gal.): 22.89  
 DEPTH OF WELL (feet): 22.4 ACTUAL PURGE VOL (gal.): 23.0

DATE PURGED: 8-20-94 Start (2400 Hr) 1321 End (2400 Hr) 1325  
 DATE SAMPLED: ↓ Start (2400 Hr) 1330 End (2400 Hr) ---

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1322</u>	<u>7.5</u>	<u>6.78</u>	<u>567</u>	<u>69.9</u>	<u>cloudy</u>	<u>light</u>
<u>1324</u>	<u>15.0</u>	<u>6.80</u>	<u>567</u>	<u>70.0</u>	<u>↓</u>	<u>↓</u>
<u>1325</u>	<u>23.0</u>	<u>6.85</u>	<u>570</u>	<u>69.3</u>	<u>Band</u>	<u>Heavy</u>
---	---	---	---	---	---	---
---	---	---	---	---	---	---

D. O. (ppm): NR ODOR: Moderate NR NR  
 Field QC samples collected at this well: NR Parameters field filtered at this well: NR  
 (COBALT 0 - 500) (NTU 0 - 200 or 0 - 1000)

### PURGING EQUIPMENT

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

### SAMPLING EQUIPMENT

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

WELL INTEGRITY: Good LOCK #: ARCO-key

REMARKS: All samples taken

Meter Calibration: Date: 8-20-94 Time: \_\_\_\_\_ Meter Serial #: 9204 Temperature °F: \_\_\_\_\_  
 ( EC 1000 \_\_\_\_\_ / \_\_\_\_\_ ) ( DI \_\_\_\_\_ ) ( pH 7 \_\_\_\_\_ / \_\_\_\_\_ ) ( pH 10 \_\_\_\_\_ / \_\_\_\_\_ ) ( pH 4 \_\_\_\_\_ / \_\_\_\_\_ )  
 Location of previous calibration: MW-9

Signature: [Signature] Reviewed By: [Signature] Page 6 of 8



# WATER SAMPLE FIELD DATA SHEET

Rev. 3, 2/94

PROJECT NO: 21775-236-002

SAMPLE ID: MW-9 (22')

PURGED BY: M.G. / D.G.

CLIENT NAME: ARC0#2185

SAMPLED BY: ↓

LOCATION: OAKLAND, CA

TYPE: Ground Water  Surface Water  Treatment Effluent  Other

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

CASING ELEVATION (feet/MSL):	<u>NR</u>	VOLUME IN CASING (gal.):	<u>1.84</u>
DEPTH TO WATER (feet):	<u>11.33</u>	CALCULATED PURGE (gal.):	<u>5.52</u>
DEPTH OF WELL (feet):	<u>22.6</u>	ACTUAL PURGE VOL (gal.):	<u>6.0</u>

DATE PURGED:	<u>8-20-96</u>	Start (2400 Hr)	<u>1153</u>	End (2400 Hr)	<u>1200</u>
DATE SAMPLED:	<u>↓</u>	Start (2400 Hr)	<u>1208</u>	End (2400 Hr)	<u>—</u>

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1155</u>	<u>2.0</u>	<u>6.12</u>	<u>722</u>	<u>71.7</u>	<u>BPM</u>	<u>HEAVY</u>
<u>1157</u>	<u>4.0</u>	<u>6.45</u>	<u>737</u>	<u>71.4</u>	<u>↓</u>	<u>↓</u>
<u>1200</u>	<u>6.0</u>	<u>6.47</u>	<u>729</u>	<u>71.1</u>	<u>↓</u>	<u>↓</u>

D. O. (ppm): NR      ODOR: none.      NR      NR  
 (COBALT 0 - 500)      (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: NR      Parameters field filtered at this well: NR

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
<input type="checkbox"/> 2" Bladder Pump	<input type="checkbox"/> Bailer (Teflon®)	<input type="checkbox"/> 2" Bladder Pump	<input checked="" type="checkbox"/> Bailer (Teflon®)
<input type="checkbox"/> Centrifugal Pump	<input type="checkbox"/> Bailer (PVC)	<input type="checkbox"/> DDL Sampler	<input type="checkbox"/> Bailer (Stainless Steel)
<input type="checkbox"/> Submersible Pump	<input type="checkbox"/> Bailer (Stainless Steel)	<input type="checkbox"/> Dipper	<input type="checkbox"/> Submersible Pump
<input type="checkbox"/> Well Wizard™	<input type="checkbox"/> Dedicated	<input type="checkbox"/> Well Wizard™	<input type="checkbox"/> Dedicated
Other: _____		Other: _____	

WELL INTEGRITY: Good      LOCK #: ARC0-key

REMARKS: all samples taken

Meter Calibration: Date: 8-20-96 Time: 1150 Meter Serial #: 9204 Temperature °F: 68.0  
 (EC 1000 963, 1000) (DI \_\_\_\_\_) (pH 7.699, 7.00) (pH 10 1000, 1000) (pH 4 4.00, 4.00)  
 Location of previous calibration: \_\_\_\_\_

Signature: [Signature]      Reviewed By: JA      Page 7 of 8



# WATER SAMPLE FIELD DATA SHEET

Rev. 3, 2/94

EMCON ASSOCIATES

PROJECT NO: 21775-236-002

SAMPLE ID: MW-10(23)

PURGED BY: M.G. / D.G.

CLIENT NAME: ARCO # 2185

SAMPLED BY: ↓

LOCATION: OAKLAND, CA

TYPE: Ground Water  Surface Water \_\_\_\_\_ Treatment Effluent \_\_\_\_\_ Other \_\_\_\_\_

CASING DIAMETER (inches): 2  3 \_\_\_\_\_ 4 \_\_\_\_\_ 4.5 \_\_\_\_\_ 6 \_\_\_\_\_ Other \_\_\_\_\_

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 2.04

DEPTH TO WATER (feet): 10.47 CALCULATED PURGE (gal.): 6.13

DEPTH OF WELL (feet): 23.0 ACTUAL PURGE VOL (gal.): 6.5

DATE PURGED: 8-20-96

Start (2400 Hr) 1257

End (2400 Hr) 1301

DATE SAMPLED: ↓

Start (2400 Hr) 1307

End (2400 Hr) \_\_\_\_\_

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1258</u>	<u>2.0</u>	<u>6.65</u>	<u>560</u>	<u>69.7</u>	<u>RED</u>	<u>Heavy</u>
<u>1300</u>	<u>4.0</u>	<u>6.75</u>	<u>571</u>	<u>69.9</u>	<u>↓</u>	<u>↓</u>
<u>1301</u>	<u>6.5</u>	<u>6.77</u>	<u>569</u>	<u>69.7</u>	<u>↓</u>	<u>↓</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

D. O. (ppm): NR

ODOR: None

NR NR

Field QC samples collected at this well:

Parameters field filtered at this well:

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

### PURGING EQUIPMENT

### SAMPLING EQUIPMENT

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

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

Other: \_\_\_\_\_

Other: \_\_\_\_\_

WELL INTEGRITY: Good

LOCK #: ARCO-KEV

REMARKS: all samples taken

Meter Calibration: Date: 8-20-96 Time: \_\_\_\_\_ Meter Serial #: 9204 Temperature °F: \_\_\_\_\_  
( EC 1000 \_\_\_\_\_ / \_\_\_\_\_ ) ( DI \_\_\_\_\_ ) ( pH 7 \_\_\_\_\_ / \_\_\_\_\_ ) ( pH 10 \_\_\_\_\_ / \_\_\_\_\_ ) ( pH 4 \_\_\_\_\_ / \_\_\_\_\_ )

Location of previous calibration: MW-9

Signature: [Signature]

Reviewed By: [Signature]

Page 8 of 8

**APPENDIX B**

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

**Columbia  
Analytical  
Services<sup>inc.</sup>**

September 3, 1996

Service Request No.: S9601370

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

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

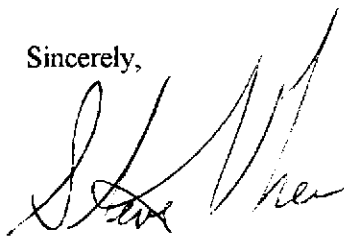
Dear Mr. Young:

Attached are the results of the samples submitted to our lab on August 20, 1996.  
For you reference, our service request number for this work is S9601370.

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 10, 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

SG/sh



**COLUMBIA ANALYTICAL SERVICES, Inc.**

**Acronyms**

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

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Report

**Client:** ARCO Products Company  
**Project:** 2185 OAKLAND/20805-130.003/TO#19350.00  
**Sample Matrix:** Water

**Service Request:** S9601370  
**Date Collected:** 8/20/96  
**Date Received:** 8/20/96  
**Date Extracted:** NA

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

Sample Name:	<b>MW-9 (22)</b>	<b>MW-10 (23)</b>	<b>MW-7 (25)</b>
Lab Code:	S9601370-001	S9601370-002	S9601370-003
Date Analyzed:	8/21/96	8/21/96	8/21/96

Analyte	MRL			
TPH as Gasoline	50	ND	ND	<200 M
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 <i>tert</i> -Butyl Ether	3	<7D	ND	<5 D

M      Raised MRL due to matrix interference. The sample contains non-fuel components eluting in the gasoline range, quantified as gasoline. The chromatogram does not match the typical gasoline fingerprint.

D      Raised MRL due to matrix interference.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company  
Project: 2185 OAKLAND/20805-130.003/TO#19350.00  
Sample Matrix: Water

Service Request: S9601370  
Date Collected: 8/20/96  
Date Received: 8/20/96  
Date Extracted: NA

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

Sample Name:	MW-8 (22)	MW-6 (27)	MW-5 (26)
Lab Code:	S9601370-004	S9601370-005	S9601370-006
Date Analyzed:	8/21-22/96	8/22/96	8/22/96

Analyte	MRL			
TPH as Gasoline	50	140	1,900	67
Benzene	0.5	ND	3.4	0.7
Toluene	0.5	ND	<2.5**	ND
Ethylbenzene	0.5	ND	150	3.6
Total Xylenes	0.5	ND	21	0.6
Methyl <i>tert</i> -Butyl Ether	3	190	<12**	27

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

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Report

<b>Client:</b>	ARCO Products Company	<b>Service Request:</b>	S9601370
<b>Project:</b>	2185 OAKLAND/20805-130.003/TO#19350.00	<b>Date Collected:</b>	8/20/96
<b>Sample Matrix:</b>	Water	<b>Date Received:</b>	8/20/96
		<b>Date Extracted:</b>	NA

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

Sample Name:	<b>MW-2 (23)</b>	<b>MW-3 (23)</b>	<b>Method Blank</b>
Lab Code:	S9601370-007	S9601370-008	S960821-WB1
Date Analyzed:	8/22/96	8/22/96	8/21/96

Analyte	MRL			
TPH as Gasoline	50	670	2,500	ND
Benzene	0.5	<1**	94	ND
Toluene	0.5	<1**	<2.5**	ND
Ethylbenzene	0.5	16	62	ND
Total Xylenes	0.5	1	14	ND
Methyl <i>tert</i> -Butyl Ether	3	<5**	2,200	ND

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

**Client:** ARCO Products Company  
**Project:** 2185 OAKLAND/20805-130.003/TO#19350.00  
**Sample Matrix:** Water

**Service Request:** S9601370  
**Date Collected:** 8/20/96  
**Date Received:** 8/20/96  
**Date Extracted:** NA

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

**Sample Name:** Method Blank  
**Lab Code:** S960822-WB1  
**Date Analyzed:** 8/22/96

Analyte	MRL	
TPH as Gasoline	50	ND
Benzene	0.5	ND
Toluene	0.5	ND
Ethylbenzene	0.5	ND
Total Xylenes	0.5	ND
Methyl <i>tert</i> -Butyl Ether	3	ND

**COLUMBIA ANALYTICAL SERVICES, INC.**

QA/QC Report

<b>Client:</b>	ARCO Products Company	<b>Service Request:</b>	S9601370
<b>Project:</b>	2185 OAKLAND/20805-130.003/TO#19350.00	<b>Date Collected:</b>	8/20/96
<b>Sample Matrix:</b>	Water	<b>Date Received:</b>	8/20/96
		<b>Date Extracted:</b>	NA
		<b>Date Analyzed:</b>	8/21-22/96

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

Sample Name	Lab Code	PID Detector	FID Detector
		Percent Recovery 4-Bromofluorobenzene	Percent Recovery m,p-C <sub>6</sub> H <sub>4</sub> -Trifluorotoluene
MW-9 (22)	S9601370-001	107	100
MW-10 (23)	S9601370-002	106	98
MW-7 (25)	S9601370-003	101	101
MW-8 (22)	S9601370-004	106	104
MW-6 (27)	S9601370-005	106	106
MW-5 (26)	S9601370-006	107	102
MW-2 (23)	S9601370-007	95	96*
MW-3(25)	S9601370-008	101	102
Batch QC (MS)	S9601350-001MS	101	105
Batch QC (DMS)	S9601350-001DMS	101	112
Method Blank	S960821-WB1	104	99
Method Blank	S960822-WB2	105	99
	CAS Acceptance Limits:	69-116	69-116

\* The surrogate used for this sample was 4-Bromofluorobenzene.

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

**Client:** ARCO Products Company **Service Request:** S9601370  
**Project:** 2185 OAKLAND/20805-130.003/TO#19350.00 **Date Collected:** 8/20/96  
**Sample Matrix:** Water **Date Received:** 8/20/96  
**Date Extracted:** NA  
**Date Analyzed:** 8/21/96

Matrix Spike/Duplicate Matrix Spike Summary  
TPH as Gasoline  
EPA Methods 5030/California DHS LUFT Method  
Units: ug/L (ppb)

**Sample Name:** Batch QC  
**Lab Code:** S961350-001

Analyte	Spike Level		Sample Result	Spike Result		Percent Recovery		
	MS	DMS		MS	DMS	MS	DMS	CAS Acceptance Limits
Gasoline	250	250	ND	250	250	100	100	67-121

**COLUMBIA ANALYTICAL SERVICES, INC.**

**QA/QC Report**

**Client:** ARCO Products Company  
**Project:** 2185 OAKLAND/20805-130.003/TO#19350.00

**Service Request:** S9601370  
**Date Analyzed:** 8/21/96

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

<b>Analyte</b>	<b>True Value</b>	<b>Result</b>	<b>Percent Recovery</b>	<b>CAS Percent Recovery Acceptance Limits</b>
Benzene	25	24.4	98	85-115
Toluene	25	23.6	94	85-115
Ethylbenzene	25	24.2	97	85-115
Xylenes, Total	75	73.8	98	85-115
Gasoline	250	258	103	90-110
Methyl <i>tert</i> -Butyl Ether	50	57	114	85-115



ARCO Facility no. 2185 City (Facility) Oakland Project manager (Consultant) John Young  
 ARCO engineer Mike Whelan Telephone no. (ARCO) \_\_\_\_\_ Telephone no. (Consultant) (408) 453-7300 Fax no. (Consultant) (408) 453-0152  
 Consultant name EMCON Address (Consultant) 1921 Ringwood Ave. San Jose, CA 95131

Laboratory name CAS  
Contract number \_\_\_\_\_

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX EPA 802/EPA 8020	BTEX/TPH EPA 1631/EPA 1631/MB EPA 1631/MB	TPH Modified 8015 Gas <input type="checkbox"/> Diesel <input type="checkbox"/>	Oil and Grease 413.1 <input type="checkbox"/> 413.2 <input type="checkbox"/>	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals <input type="checkbox"/> VOA <input type="checkbox"/> VOA <input type="checkbox"/>	CAN Metals EPA 601/7000 TTL <input type="checkbox"/> STL <input type="checkbox"/>	Lead Org. DHS Lead EPA 7420/7421 <input type="checkbox"/>	
			Soil	Water	Other	Ice	Acid														
1 MW-9(22)	2	2		X		X	HCL	8/20/96	1208		X										
2 MW-10(23)	2	2		X		X	HCL		1307		X										
3 MW-7(25)	2	2		X		X	HCL		1238		X										
4 MW-8(22)	2	2		X		X	HCL		1330		X										
5 MW-6(27)	2	2		X		X	HCL		1344		X										
6 MW-5(26)	2	2		X		X	HCL		1400		X										
7 MW-7(23)	2	2		X		X	HCL		1410		X										
8 MW-3(23)	2	2		X		X	HCL	↓	1430		X										

Method of shipment  
Sampler will deliver

Special detection Limit/reporting  
Lowest Possible

Special QA/QC  
As Normal

Remarks  
2-40m HCL  
VOAs

Lab number  
59601370

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

Condition of sample: \_\_\_\_\_ Temperature received: \_\_\_\_\_

Relinquished by sampler [Signature] Date 8/20/96 Time 1510 Received by \_\_\_\_\_

Relinquished by \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by \_\_\_\_\_

Relinquished by \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by laboratory Jeanne Brown Date 8-20-96 Time 15:10