

C A M B R I A

July 23, 2001

*ST-10-3942 ✓*

Mr. Amir Gholami,  
Alameda County Health Care Services Agency  
1131 Harbor Bay Parkway, 2nd Floor  
Alameda, California 94502

*Review 8/18/01*  
*(AC)*

Re: **Second Quarter 2001 Monitoring Report**  
Former ARCO Service Station No. 6002  
6235 Seminary Avenue  
Oakland, California  
Cambria Project #438-1609



Dear Mr. Gholami:

On behalf of ARCO, Cambria Environmental Technology, Inc. (Cambria) is submitting the attached report which presents the results of the second quarter 2001 groundwater monitoring program at former ARCO Service Station No. 6002, located at 6235 Seminary Avenue, Oakland, California. The monitoring program complies with the Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

Please call if you have questions.

Sincerely,

**Cambria Environmental Technology, Inc.**

*Ron Scheele*

Ron Scheele, RG  
Senior Project Manager

Attachment: Quarterly Groundwater Monitoring Report, Second Quarter 2001

cc: Mr. Paul Supple, ARCO, PO Box 6549 Moraga, CA 94570

Oakland, CA  
San Ramon, CA  
Sonoma, CA

**Cambria  
Environmental  
Technology, Inc.**

1144 65th Street  
Suite B  
Oakland, CA 94608  
Tel (510) 420-0700  
Fax (510) 420-9170

C A M B R I A

## Quarterly Groundwater Monitoring Report

### Second Quarter 2001

Former Arco Service Station 6002  
6235 Seminary Avenue  
Oakland, California  
Cambria Project #438-1609



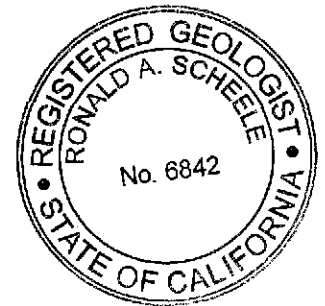
Prepared For:

Mr. Paul Supple  
ARCO

July 23, 2001

Prepared By:

Cambria Environmental Technology, Inc.  
6262 Hollis Street  
Emeryville, California 94608



Written by:

Sara Dwight  
Sara Dwight  
Staff Environmental Scientist

Ron Scheele  
Ron Scheele, RG  
Senior Project Manager

**ARCO QUARTERLY GROUNDWATER MONITORING REPORT**

Station No.: 6002 Address: 6235 Seminary Avenue, Oakland, California  
 ARCO Environmental Engineer Paul Supple  
 Consulting Co./Contact Person: Cambria Environmental Technology, Inc./Ron Scheele, RG  
 Consultant Project No.: 438-1609  
 Primary Agency/Regulatory ID No.: ACHCSA

**WORK PERFORMED THIS QUARTER (SECOND - 2001):**

1. Submitted quarterly groundwater monitoring report for first quarter 2001.
2. Performed second quarter groundwater monitoring and sampling on April 13, 2001.

**WORK PROPOSED FOR NEXT QUARTER (THIRD - 2001):**

1. Prepare and submit quarterly groundwater monitoring report for second quarter 2001.
2. Perform quarterly groundwater monitoring and sampling for third quarter 2001.

**QUARTERLY MONITORING:**

Current Phase of Project:	<u>Quarterly Groundwater Monitoring</u>
Frequency of Sampling:	<u>Annual (2nd Quarter): MW-3, MW-6</u> <u>Quarterly: MW-4, MW-5, MW-7, MW-8, VW-1, VW-4</u>
Frequency of Monitoring:	<u>Quarterly (groundwater)</u>
Is Floating Product (FP) Present On-site:	<u>No</u>
Bulk Soil Removed to Date :	<u>Approximately 370 cubic yards of TPH impacted soil</u>
Bulk Soil Removed This Quarter :	<u>None</u>
Water Wells or Surface Waters, within 2000 ft., impacted by site:	<u>None</u>
Current Remediation Techniques:	<u>Natural Attenuation</u>
Average Depth to Groundwater:	<u>7.77 ft</u>
Groundwater Flow Direction and Gradient (Average):	<u>0.085 ft/ft toward West</u>

**DISCUSSION:**

Based on field measurements collected on April 13, 2001, groundwater beneath the site flows towards the west at a gradient of 0.085 ft/ft. This is consistent with the historic groundwater flow direction and gradient.

Hydrocarbon concentrations detected this quarter are consistent with the previous sampling event. The maximum TPHg and benzene concentrations were detected in well MW-5 at 9,020 and 54.2 micrograms per liter (µg/L), respectively. The maximum MTBE concentration was detected in well VW-4 at 2,450 µg/L.

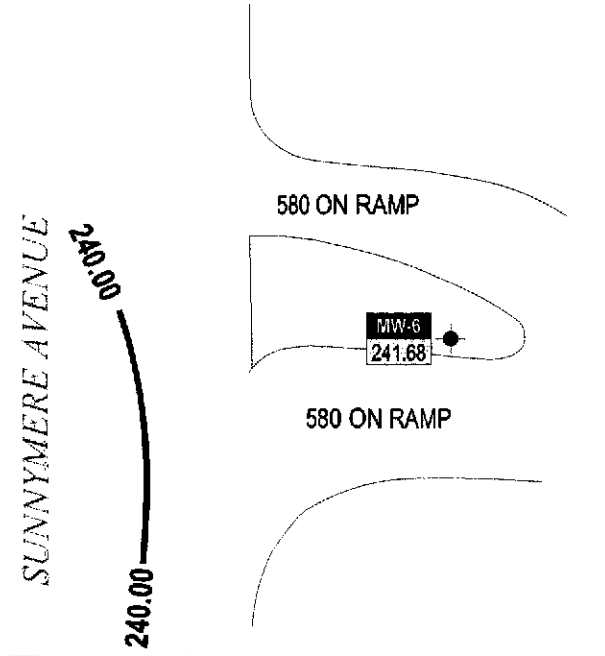
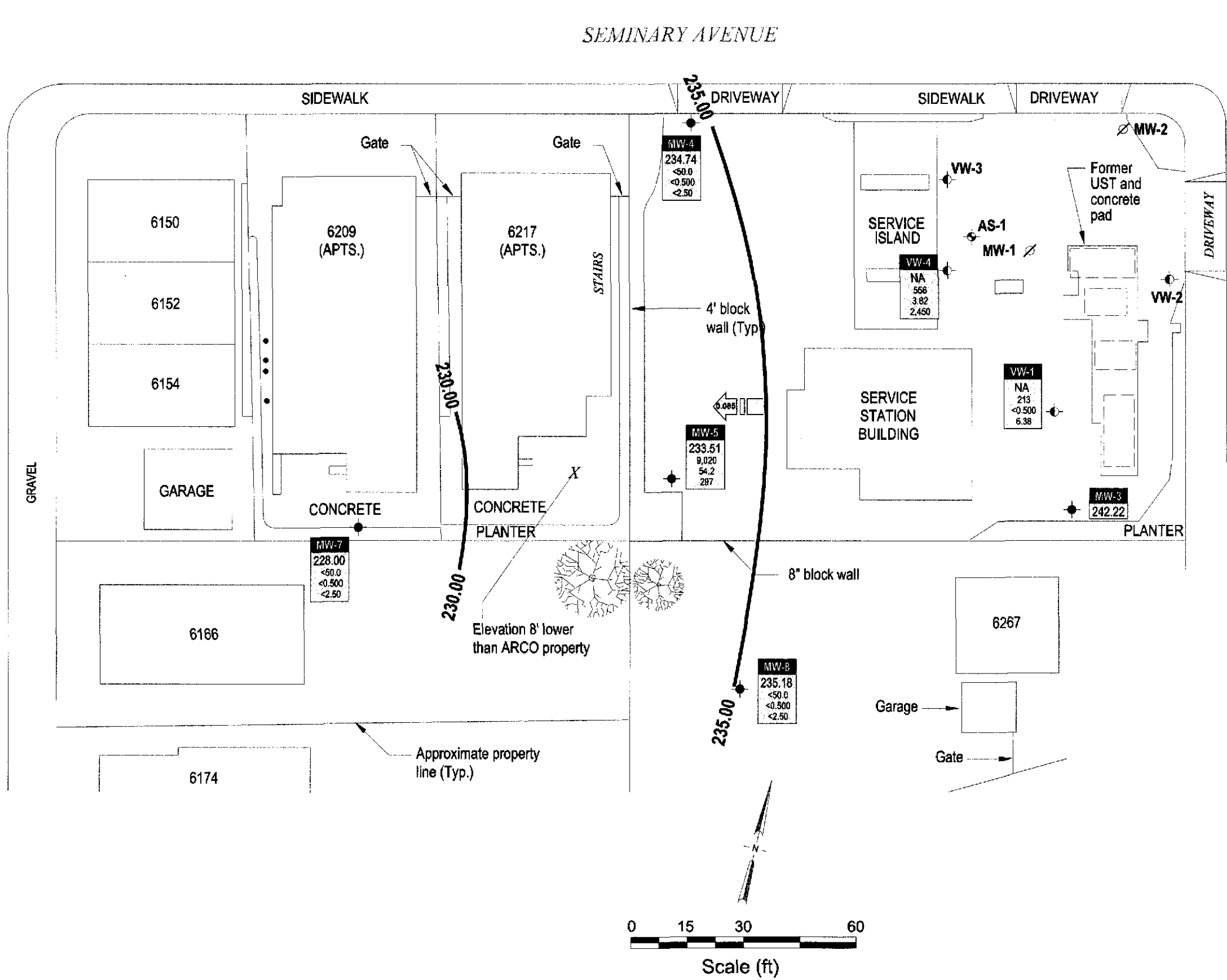


**ATTACHMENTS:**

- Figure 1 - Groundwater Elevation Contour and Analytical Summary Map
- Table 1 - Historical Groundwater Elevation and Analytical Data, Petroleum Hydrocarbons and Their Constituents
- Table 2 - Groundwater Flow Direction and Gradient
- Appendix A - Sampling and Analysis Procedures
- Appendix B - Certified Analytical Reports and Chain-of-Custody Documentation
- Appendix C - Field Data Sheets



OVERDALE AVENUE



**EXPLANATION**

- MW-2 ◆ Monitoring Well Location
- MW-1 ◊ Decommissioned monitoring well
- VW-1 ◆ Vapor extraction well
- AS-1 ◆ Air sparge well

Well ID	ELEV	TPHg	Benzene	MTBE
MW-4	234.74	<50.0	<0.500	<2.50
MW-5	233.51	9.020	54.2	297
MW-7	228.00	<50.0	<0.500	<2.50
MW-8	235.18	<50.0	<0.500	<2.50
MW-3	242.22			
VW-4	NA	566	3.82	2,450
VW-1	NA	213	<0.500	6.38
MW-6	241.68			

- NA Not Available, well casing not surveyed
- ◆ Improperly screened well, data not used for contouring
- 240.00 Groundwater elevation contour
- ◄ Approximate groundwater flow direction and gradient
- \* Data anomalous, not used for contouring

FIGURE 1

Basemap from IT Corporation



H:\ARCO\6002\FIGURES\6002\1200-01.DWG

**Table 1**  
**Historical Groundwater Elevation and Analytical Data**  
**Petroleum Hydrocarbons and Their Constituents**  
**1995 - Present\*\***

**ARCO Service Station 6002**  
**6235 Seminary Avenue, Oakland, California**

Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	FP Thickness (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8021B* (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-1	03-15-95	247.06	7.37	0.00	239.69	03-15-95	13,000	1,200	44	770	1,100	--	--		
MW-1	05-30-95	247.06	8.48	0.00	238.58	05-30-95	19,000	1,600	30	890	1,400	--	--		
MW-1	09-01-95	247.06	9.47	0.00	237.59	09-01-95	14,000	1,300	28	480	780	24,000	--		
MW-1	11-13-95	247.06	8.78	0.01	238.29[1]	11-13-95	11,000	570	17	260	410	--	25,000[2]		
MW-1	02-23-96	247.06	Well was decommissioned on 2-12-96												
MW-2	03-15-95	249.30	8.25	0.00	241.05	03-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--		
MW-2	05-30-95	249.30	9.93	0.00	239.37	05-30-95	<50	<0.5	<0.5	<0.5	<0.5	--	--		
MW-2	09-01-95	249.30	10.69	0.00	238.61	09-01-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-2	11-13-95	249.30	10.32	0.00	238.98	11-13-95	<50	<0.5	<0.5	<0.5	<0.5	--	--		
MW-2	02-23-96	249.30	Well was decommissioned on 2-12-96												
MW-3	03-15-95	248.35	6.76	0.00	241.59	03-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--		
MW-3	05-30-95	248.35	7.81	0.00	240.54	05-30-95	<50	<0.5	<0.5	<0.5	<0.5	--	--		
MW-3	09-01-95	248.35	8.65	0.00	239.70	09-01-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-3	11-13-95	248.35	8.25	0.00	240.10	11-13-95	120	45	0.7	<0.5	6.2	--	--		
MW-3	02-23-96	248.35	6.64	0.00	241.71	03-01-96	<50	<0.5	<0.5	0.6	1.9	<3	--		
MW-3	05-10-96	248.35	7.95	0.00	240.40	05-10-96	Not sampled: well sampled annually, during the first quarter								
MW-3	08-09-96	248.35	8.06	0.00	240.29	08-09-96	Not sampled: well sampled annually, during the first quarter								
MW-3	11-08-96	248.35	Not surveyed: inaccessible			11-11-96	Not sampled: inaccessible								
MW-3	03-21-97	248.35	8.21	0.00	240.14	03-21-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-3	05-27-97	248.35	8.25	0.00	240.10	05-27-97	Not sampled: well sampled annually, during the first quarter								
MW-3	08-05-97	248.35	8.29	0.00	240.06	08-05-97	Not sampled: well sampled annually, during the first quarter								
MW-3	10-29-97	248.35	8.58	0.00	239.77	10-29-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-3	02-25-98	248.35	7.69	0.00	240.66	02-25-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-3	05-12-98	248.35	8.20	0.00	240.15	05-12-98	Not sampled: well sampled annually, during the first quarter								
MW-3	07-28-98	248.35	8.55	0.00	239.80	07-28-98	Not sampled: well sampled annually, during the first quarter								
MW-3	10-27-98	248.35	8.30	0.00	240.05	10-27-98	Not sampled: well sampled annually, during the first quarter								
MW-3	02-08-99	248.35	7.90	0.00	240.45	02-08-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--		

**Table 1**  
**Historical Groundwater Elevation and Analytical Data**  
**Petroleum Hydrocarbons and Their Constituents**  
**1995 - Present\*\***

**ARCO Service Station 6002**  
**6235 Seminary Avenue, Oakland, California**

Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	FP Thickness (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8021B* (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/Not Purged (P/NP)	
MW-3	06-01-99	248.35	8.40	0.00	239.95	06-01-99	Not sampled: well sampled annually, during the first quarter									
MW-3	08-25-99	248.35	8.49	0.00	239.86	08-25-99	Not sampled: well sampled annually, during the first quarter								1.67	
MW-3	10-29-99	248.35	8.52	0.00	239.83	10-29-99	Not sampled: well sampled annually, during the first quarter								6.90	
MW-3	02-16-00	248.35	8.03	0.00	240.32	02-16-00	<50	<0.5	0.8	<0.5	<1	<3	--	8.51	NP	
MW-3	06-23-00	248.35	7.55	0.00	240.80	06-23-00	Not sampled: well sampled annually, during the first quarter								2.10	
MW-3	08-17-00	248.35	8.65	0.00	239.70	08-17-00	Not sampled: well sampled annually, during the first quarter								1.10	
MW-3	11-10-00	248.35	7.19	0.00	241.16	11-10-00	Not sampled: well sampled annually, during the first quarter								NM	
MW-3	02-12-01	248.35	8.60	0.00	239.75	02-12-01	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50		0.81	NP	
MW-3	04-13-01	248.35	6.13	0.00	242.22	04-13-01	Not sampled: well sampled annually, during the first quarter									
MW-4	03-15-95	242.91	9.37	0.00	233.54	03-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--			
MW-4	05-30-95	242.91	11.47	0.00	231.44	05-30-95	<50	<0.5	<0.5	<0.5	<0.5	--	--			
MW-4	09-01-95	242.91	12.28	0.00	230.63	09-01-95	78	<0.5	0.7	<0.5	<0.5	<3	--			
MW-4	11-13-95	242.91	11.75	0.00	231.16	11-13-95	<50	<0.5	<0.5	<0.5	<0.5	--	--			
MW-4	02-23-96	242.91	8.51	0.00	234.40	03-01-96	59	1.2	7.4	1.6	9.3	3	--			
MW-4	05-10-96	242.91	11.35	0.00	231.56	05-10-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--			
MW-4	08-09-96	242.91	9.70	0.00	233.21	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--			
MW-4	11-08-96	242.91	11.79	0.00	231.12	11-08-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--			
MW-4	03-21-97	242.91	10.94	0.00	231.97	03-21-97	<50	<0.5	<0.5	<0.5	<0.5	81	--			
MW-4	05-27-97	242.91	11.51	0.00	231.40	05-27-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--			
MW-4	08-05-97	242.91	11.90	0.00	231.01	08-05-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--			
MW-4	10-29-97	242.91	12.00	0.00	230.91	10-29-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--			
MW-4	02-25-98	242.91	8.34	0.00	234.57	02-25-98	<50	<0.5	0.9	<0.5	0.9	4	--			
MW-4	05-12-98	242.91	10.93	0.00	231.98	05-12-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--			
MW-4	07-28-98	242.91	12.08	0.00	230.83	07-28-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--			
MW-4	10-27-98	242.91	11.40	0.00	231.51	10-27-98	<5,000	<50	<50	160	64	6,400	--			
MW-4	02-08-99	242.91	8.40	0.00	234.51	02-08-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--			
MW-4	06-01-99	242.91	11.93	0.00	230.98	06-01-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--	4.0	NP	
MW-4	08-25-99	242.91	12.21	0.00	230.70	08-25-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--	1.29	NP	

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Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	FP Thickness (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8021B* (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/Not Purged (P/NP)
MW-4	10-29-99	242.91	12.37	0.00	230.54	10-29-99	<50	<0.5	<0.5	<0.5	<1	<3	--	1.50	NP
MW-4	02-16-00	242.91	7.45	0.00	235.46	02-16-00	<50	<0.5	<0.5	<0.5	<1	<3	--	2.38	NP
MW-4	06-23-00	242.91	12.31	0.00	230.60	06-23-00	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	2.80	NP
DUP	08-17-00	--	--	--	--	08-17-00	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	--	--
MW-4	08-17-00	242.91	11.92	0.00	230.99	08-17-00	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	2.38	NP
MW-4	11-10-00	242.91	10.80	0.00	232.11	11-10-00	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	1.55	NP
MW-4	02-12-01	242.91	11.65	0.00	231.26	02-12-01	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	1.12	NP
MW-4	04-13-01	242.91	8.17	0.00	234.74	04-13-01	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	--	NP
DUP	04-13-01	--	--	--	--	04-13-01	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	--	--
MW-5	03-15-95	244.82	11.99	0.00	232.83	03-15-95	21,000	870	22	1,600	1,900	--	--		
MW-5	05-30-95	244.82	12.97	0.00	231.85	05-30-95	17,000	2,100	250	1,000	520	--	--		
MW-5	09-01-95	244.82	14.03	0.00	230.79	09-01-95	19,000	1,500	25	1,600	880	8,300	--		
MW-5	11-13-95	244.82	13.65	0.00	231.17	11-13-95	21,000	1,300	22	1,400	630	--	--		
MW-5	02-23-96	244.82	11.93	0.00	232.89	03-01-96	27,000	1,300	<50	1,600	1,500	730	--		
MW-5	05-10-96	244.82	13.05	0.00	231.77	05-10-96	17,000	460	21	760	480	1,000	--		
MW-5	08-09-96	244.82	13.22	0.00	231.60	08-09-96	16,000	420	14	870	390	1,500	--		
MW-5	11-08-96	244.82	Not surveyed: inaccessible				11-11-96	Not sampled: well inaccessible							
MW-5	03-21-97	244.82	13.24	0.00	231.58	03-21-97	18,000	110	<50	730	1,500	1,800	--		
MW-5	05-27-97	244.82	13.10	0.00	231.72	05-27-97	21,000	86	<20	810	610	1,700	--		
MW-5	08-05-97	244.82	13.14	0.00	231.68	08-05-97	340	2.2	<0.5	15	8.8	39	--		
MW-5	10-29-97	244.82	13.03	0.00	231.79	10-29-97	19,000	130	<20	1,400	620	1,700	--		
MW-5	02-25-98	244.82	11.33	0.00	233.49	02-25-98	8,500	19	13	190	100	170	--		
MW-5	05-12-98	244.82	12.81	0.00	232.01	05-12-98	10,000	34	<10	390	220	610	--		
MW-5	07-28-98	244.82	13.12	0.00	231.70	07-28-98	15,000	68	<10	690	620	1,000	--		
MW-5	10-27-98	244.82	12.90	0.00	231.92	10-27-98	15,000	60	<10	770	400	890	--		
MW-5	02-08-99	244.82	11.08	0.00	233.74	02-08-99	8,200	23	<10	290	120	<60	--		
MW-5	06-01-99	244.82	12.95	0.00	231.87	06-01-99	11,000	33	3.3	340	180	580	--	1.0	NP
MW-5	08-25-99	244.82	12.99	0.00	231.83	08-25-99	9,200	26	14	420	270	1,100	--	0.37	NP



**Table 1**  
**Historical Groundwater Elevation and Analytical Data**  
**Petroleum Hydrocarbons and Their Constituents**  
**1995 - Present\*\***

**ARCO Service Station 6002**  
**6235 Seminary Avenue, Oakland, California**

Well Number	Date Gauged	TOC	Depth to	FP	Groundwater	Date Sampled	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8021B* (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/Not Purged (P/NP)
		Elevation (ft-MSL)	Water (feet)	Thickness (feet)	Elevation (ft-MSL)										
MW-5	10-29-99	244.82	13.10	0.00	231.72	10-29-99	11,000	19	9.8	260	150	590	--	1.27	NP
MW-5	02-16-00	244.82	8.21	0.00	236.61	02-16-00	12,000	8.1	10	340	160	130	--	1.42	NP
MW-5	06-23-00	244.82	12.90	0.00	231.92	06-23-00	9,680	38.0	<20.0	212	114	930	--	1.40	NP
MW-5	08-17-00	244.82	13.00	0.00	231.82	08-17-00	10,500	15.0	7.98	223	118	430	--	0.68	NP
MW-5	11-10-00	244.82	12.50	0.00	232.32	11-10-00	7,030	19.7	<10.0	190	43.6	445	--	1.27	NP
MW-5	02-12-01	244.82	12.81	0.00	232.01	02-12-01	8,840	33.9	<10.0	186	56.4	352	--	0.40	NP
MW-5	04-13-01	244.82	11.31	0.00	233.51	04-13-01	9,020	54.2	43.3	137	96.0	297	--	--	NP
MW-6	06-29-95	NR	6.63	0.00	NR	06-30-95	<50	<0.5	<0.5	<0.5	<0.5	--	--		
MW-6	09-01-95	NR	Not surveyed			09-01-95	Not sampled								
MW-6	11-13-95	NR	7.70	0.00	NR	11-13-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-6	02-23-96	NR	9.82	0.00	NR	03-01-96	<50	<0.5	0.8	<0.5	0.6	<3	--		
MW-6	05-10-96	NR	15.25	0.00	NR	05-10-96	Not sampled: well sampled annually, during the first quarter								
MW-6	08-09-96	252.20	11.11	0.00	241.09	08-09-96	Not sampled: well sampled annually, during the first quarter								
MW-6	11-08-96	252.20	9.31	0.00	242.89	11-11-96	Not sampled: well sampled annually, during the first quarter								
MW-6	03-21-97	252.20	9.40	0.00	242.80	03-21-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-6	05-27-97	252.20	7.08	0.00	245.12	05-27-97	Not sampled: well sampled annually, during the first quarter								
MW-6	08-05-97	252.20	7.12	0.00	245.08	08-05-97	Not sampled: well sampled annually, during the first quarter								
MW-6	10-29-97	252.20	7.42	0.00	244.78	10-29-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-6	02-25-98	252.20	10.35	0.00	241.85	02-25-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-6	05-12-98	252.20	15.83	0.00	236.37	05-12-98	Not sampled: well sampled annually, during the first quarter								
MW-6	07-28-98	252.20	11.84	0.00	240.36	07-28-98	Not sampled: well sampled annually, during the first quarter								
MW-6	10-27-98	252.20	9.73	0.00	242.47	10-27-98	Not sampled: well sampled annually, during the first quarter								
MW-6	02-08-99	252.20	8.10	0.00	244.10	02-08-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-6	06-01-99	252.20	17.84	0.00	234.36	06-01-99	Not sampled: well sampled annually, during the first quarter								
MW-6	08-25-99	252.20	11.00	0.00	241.20	08-25-99	Not sampled: well sampled annually, during the first quarter								
MW-6	10-29-99	252.20	9.03	0.00	243.17	10-29-99	Not sampled: well sampled annually, during the first quarter								
MW-6	02-16-00	252.20	7.71	0.00	244.49	02-16-00	<50	<0.5	<0.5	<0.5	<1	<3	--	2.42	P
MW-6	06-23-00	252.20	6.69	0.00	245.51	06-23-00	Not sampled: well sampled annually, during the first quarter								

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

**ARCO Service Station 6002**  
**6235 Seminary Avenue, Oakland, California**

Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	FP Thickness (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8021B* (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-6	08-17-00	252.20	6.95	0.00	245.25	08-17-00	Not sampled: well sampled annually, during the first quarter							2.51	
MW-6	11-10-00	252.20	11.79	0.00	240.41	11-10-00	Not sampled: well sampled annually, during the first quarter							NM	
MW-6	02-12-01	252.20	7.35	0.00	244.85	02-12-01	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	1.66	P
DUP	02-12-01	--	--	--	--	02-12-01	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	--	
<b>MW-6</b>	<b>04-13-01</b>	<b>252.20</b>	<b>10.52</b>	<b>0.00</b>	<b>241.68</b>	<b>04-13-01</b>	<b>Not sampled: well sampled annually, during the first quarter</b>								
MW-7	08-09-96	235.95	Not surveyed: well was dry			08-09-96	Not sampled: well was dry								
MW-7	11-08-96	235.95	Not surveyed: well was dry			11-11-96	Not sampled: well was dry								
MW-7	01-27-97	235.95	NR	0.00	NR	01-27-97	2,900	29	<5	<5	580	220	--		
MW-7	03-21-97	235.95	7.13	0.00	228.82	03-21-97	590	3.5	<0.5	<0.5	1.3	90	--		
MW-7	05-27-97	235.95	9.02	0.00	226.93	05-27-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-7	08-05-97	235.95	12.33	0.00	223.62	08-05-97	110	0.5	<0.5	<0.5	0.8	81	--		
MW-7	10-29-97	235.95	Not surveyed: well was dry			10-29-97	Not sampled: well was dry								
MW-7	02-25-98	235.95	8.04	0.00	227.91	02-25-98	<50	<0.5	0.6	<0.5	0.7	<3	--		
MW-7	05-12-98	235.95	8.88	0.00	227.07	05-12-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-7	07-28-98	235.95	10.50	0.00	225.45	07-28-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-7	10-27-98	235.95	8.75	0.00	227.20	10-27-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-7	02-08-99	235.95	9.35	0.00	226.60	02-08-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-7	06-01-99	235.95	9.85	0.00	226.10	06-01-99	250	<0.5	0.6	<0.5	1.6	18	--	1.0	NP
MW-7	08-25-99	235.95	11.31	0.00	224.64	08-25-99	119	<0.5	5.7	<0.5	<0.5	11	--	0.41	NP
MW-7	10-29-99	235.95	9.08	0.00	226.87	10-29-99	<50	<0.5	<0.5	<0.5	<1	<3	--	1.29	NP
MW-7	02-25-00	235.95	8.02	0.00	227.93	02-25-00	<50	<0.5	<0.5	<0.5	<1	38	--	2.10	NP
MW-7	06-23-00	235.95	10.68	0.00	225.27	06-23-00	<50.0	<0.500	<0.500	<0.500	<0.500	14.4	--	1.60	NP
MW-7	08-17-00	235.95	11.85	0.00	224.10	08-17-00	70.0	<0.500	0.678	<0.500	1.07	14.2	--	1.59	NP
MW-7	11-10-00	235.95	9.62	0.00	226.33	11-10-00	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	1.09	NP
MW-7	02-12-01	235.95	12.10	0.00	223.85	02-12-01	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	0.84	NP
<b>MW-7</b>	<b>04-13-01</b>	<b>235.95</b>	<b>7.95</b>	<b>0.00</b>	<b>228.00</b>	<b>04-13-01</b>	<b>&lt;50.0</b>	<b>&lt;0.500</b>	<b>&lt;0.500</b>	<b>&lt;0.500</b>	<b>&lt;0.500</b>	<b>&lt;2.50</b>	<b>--</b>	<b>--</b>	<b>P</b>
MW-8	08-09-96	240.37	9.41	0.00	230.96	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--		

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**Historical Groundwater Elevation and Analytical Data**  
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**1995 - Present\*\***

**ARCO Service Station 6002**  
**6235 Seminary Avenue, Oakland, California**

Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	FP Thickness (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8021B* (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/Not Purged (P/NP)
MW-8	11-08-96	240.37	9.19	0.00	231.18	11-11-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-8	03-21-97	240.37	8.55	0.00	231.82	03-21-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-8	05-27-97	240.37	11.06	0.00	229.31	05-27-97	91	0.6	<0.5	<0.5	0.6	66	--		
MW-8	08-05-97	240.37	9.32	0.00	231.05	08-05-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-8	10-29-97	240.37	9.35	0.00	231.02	10-29-97	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-8	02-25-98	240.37	7.08	0.00	233.29	02-25-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-8	05-12-98	240.37	8.61	0.00	231.76	05-12-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-8	07-28-98	240.37	9.63	0.00	230.74	07-28-98	<50	<0.5	<0.5	<0.5	<0.5	4	--		
MW-8	10-27-98	240.37	9.30	0.00	231.07	10-27-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-8	02-08-99	240.37	5.56	0.00	234.81	02-17-99	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-8	06-01-99	240.37	Not surveyed: inaccessible			06-01-99	Not sampled: well inaccessible								
MW-8	08-25-99	240.37	Not surveyed: inaccessible			08-25-99	Not sampled: well inaccessible								
MW-8	10-29-99	240.37	Not surveyed: inaccessible			10-29-99	Not sampled: well inaccessible								
MW-8	02-16-00	240.37	Not surveyed: inaccessible			02-16-00	Not sampled: well inaccessible								
MW-8	06-23-00	240.37	9.45	0.00	230.92	06-23-00	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	1.90	NP
MW-8	08-17-00	240.37	6.40	0.00	233.97	08-17-00	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	2.56	NP
MW-8	11-10-00	240.37	6.25	0.00	234.12	11-10-00	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	1.93	NP
DUP	11-10-00	--	--	--	--	11-10-00	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	--	
MW-8	02-12-01	240.37	8.11	0.00	232.26	02-12-01	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	1.65	NP
MW-8	04-13-01	240.37	5.19	0.00	235.18	04-13-01	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	--	P
AS-1	06-29-95	NR	9.20	0.00	NR	06-30-95	<50	1.6	<0.5	0.9	0.9	--	--		
VW-1	02-23-96	NR	5.29	0.00	NR	03-01-96	21,000	490	57	520	1,500	240	--		
VW-1	05-10-96	NR	6.80	0.00	NR	05-10-96	3,700	61	<5	100	50	200	--		
VW-1	08-09-96	NR	7.03	0.00	NR	08-09-96	970	2.7	<2.5	2.7	3.7	180	--		
VW-1	11-08-96	NR	Not surveyed: inaccessible			11-11-96	Not sampled: well inaccessible								
VW-1	03-21-97	NR	7.51	0.00	NR	03-21-97	640	<4	<1	1	3	194	--		
VW-1	05-27-97	NR	7.51	0.00	NR	05-27-97	Not sampled: well sampled semi-annually, during the first and third quarters								

**Table 1**  
**Historical Groundwater Elevation and Analytical Data**  
**Petroleum Hydrocarbons and Their Constituents**  
**1995 - Present\*\***

**ARCO Service Station 6002**  
**6235 Seminary Avenue, Oakland, California**

Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	FP Thickness (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8021B* (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/Not Purged (P/NP)
VW-1	08-05-97	NR	7.51	0.00	NR	08-05-97	630	<1	<1	3	2	120	--		
VW-1	10-29-97	NR	7.53	0.00	NR	10-29-97	600	<0.5	<0.5	<0.5	1.6	84	--		
VW-1	02-25-98	NR	6.77	0.00	NR	02-25-98	230	<4	<0.7	1.2	0.5	27	--		
VW-1	05-12-98	NR	7.43	0.00	NR	05-12-98	340	<0.5	0.5	2.3	0.8	29	--		
VW-1	07-28-98	NR	7.00	0.00	NR	07-28-98	240	<0.5	<0.5	<0.5	1.1	54	--		
VW-1	10-27-98	NR	7.52	0.00	NR	10-27-98	230	<0.5	<0.5	<0.5	<0.5	65	--		
VW-1	02-08-99	NR	7.05	0.00	NR	02-08-99	<50	<0.5	<0.5	<0.5	<0.5	<3	36[3]		
VW-1	06-01-99	NR	7.55	0.00	NR	06-01-99	180	<0.5	<0.5	<0.5	<0.5	23	--	1.0	NP
VW-1	08-25-99	NR	7.66	0.00	NR	08-25-99	130	<0.5	5.6	<0.5	<0.5	40	--	0.39	NP
VW-1	10-29-99	NR	7.59	0.00	NR	10-29-99	200	1.0	<0.5	0.6	1.6	36	--	0.89	NP
VW-1	02-16-00	NR	7.03	0.00	NR	02-16-00	210	<0.5	0.9	2.2	1.9	11	--	1.41	NP
VW-1	06-23-00	NR	7.71	0.00	NR	06-23-00	175	1.04	<0.500	<0.500	<0.500	14.4	--	1.90	NP
VW-1	08-17-00	NR	7.75	0.00	NR	08-17-00	180	<0.500	<0.500	0.622	0.760	23.7	--	0.63	NP
VW-1	11-10-00	NR	6.83	0.00	NR	11-10-00	157	0.955	<0.500	0.973	<0.500	32.5	--	1.03	NP
VW-1	02-12-01	NR	7.85	0.00	NR	02-12-01	273	0.627	<0.500	<0.500	0.507	9.19	--	0.47	NP
<b>VW-1</b>	<b>04-13-01</b>	<b>NR</b>	<b>5.11</b>	<b>0.00</b>	<b>NR</b>	<b>04-13-01</b>	<b>213</b>	<b>&lt;0.500</b>	<b>&lt;0.500</b>	<b>&lt;0.500</b>	<b>&lt;0.500</b>	<b>6.38</b>	<b>--</b>	<b>--</b>	<b>P</b>
VW-2	02-23-96	NR	6.92	0.00	NR	03-01-96	Not sampled: well not part of sampling program								
VW-4	05-10-96	NR	8.58	0.00	NR	05-10-96	13,000	2,500	41	420	660	43,000	--		
VW-4	08-09-96	NR	11.70	0.00	NR	08-09-96	<50	<0.5	<0.5	<0.5	<0.5	6,200	--		
VW-4	11-08-96	NR	9.38	0.00	NR	11-08-96	7,800	510	7	180	370	21,000	--		
VW-4	03-21-97	NR	9.11	0.00	NR	03-21-97	10,000	290	10	270	230	8,900	--		
VW-4	05-27-97	NR	9.34	0.00	NR	05-27-97	Not sampled: well sampled semi-annually, during the first and third quarters								
VW-4	08-05-97	NR	9.47	0.00	NR	08-05-97	<10,000	180	<100	<100	110	12,000	--		
VW-4	10-29-97	NR	9.35	0.00	NR	10-29-97	9,800	200	69	260	360	4,900	--		
VW-4	02-25-98	NR	7.08	0.00	NR	02-25-98	<50	2.5	<0.5	<0.5	0.7	<3	--		
VW-4	05-12-98	NR	9.17	0.00	NR	05-12-98	3,200	<20	22	29	52	2,100	--		
VW-4	07-28-98	NR	9.55	0.00	NR	07-28-98	<10,000	<100	<100	<100	<100	5,100	--		

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Petroleum Hydrocarbons and Their Constituents  
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**ARCO Service Station 6002  
6235 Seminary Avenue, Oakland, California**

Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	FP Thickness (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPHg ( $\mu\text{g/L}$ )	Benzene ( $\mu\text{g/L}$ )	Toluene ( $\mu\text{g/L}$ )	Ethyl-benzene ( $\mu\text{g/L}$ )	Total Xylenes ( $\mu\text{g/L}$ )	MTBE 8021B* ( $\mu\text{g/L}$ )	MTBE 8260 ( $\mu\text{g/L}$ )	Dissolved Oxygen (mg/L)	Purged/Not Purged (P/NP)
VW-4	10-27-98	NR	9.92	0.00	NR	10-27-98	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
VW-4	02-08-99	NR	7.50	0.00	NR	02-08-99	<2,500	<25	<25	28	<25	2,400	3,100[3]		
VW-4	06-01-99	NR	9.87	0.00	NR	06-01-99	2,100	2.5	1.1	2.5	15	3,300	--	2.0	NP
VW-4	08-25-99	NR	9.78	0.00	NR	08-25-99	1,300	4.4	4.9	1.7	2.9	4,600	--	0.36	NP
VW-4	10-29-99	NR	9.93	0.00	NR	10-29-99	1,400	<0.5	1.8	1.6	3.0	4,200	--	1.18	NP
VW-4	02-16-00	NR	7.45	0.00	NR	02-16-00	1,800	<0.5	2.9	15	10	3,400	--	1.01	NP
DUP 1	06-23-00	--	--	--	--	06-23-00	1,260	<2.00	<2.00	<2.00	2.73	2,720	--	--	--
VW-4	06-23-00	NR	9.74	0.00	NR	06-23-00	1,360	<2.00	2.26	<2.00	2.25	4,900	--	1.50	NP
VW-4	08-17-00	NR	9.95	0.00	NR	08-17-00	2,230	<10.0	<10.0	<10.0	<10.0	5,310	--	1.13	NP
VW-4	11-10-00	NR	9.22	0.00	NR	11-10-00	1,390	18.5	<5.00	<5.00	<5.00	8,840	--	1.25	NP
VW-4	02-12-01	NR	8.99	0.00	NR	02-12-01	1,400	9.42	<2.00	17.8	16.1	3,570	--	0.91	NP
VW-4	04-13-01	NR	7.80	0.00	NR	04-13-01	556	3.82	<1.25	<1.25	<1.25	2,450	--	--	NP

TPH: Total petroleum hydrocarbons by modified EPA method 8015

BTEX: Benzene, toluene, ethylbenzene, xylenes by EPA method 8021B. (EPA method 8020 prior to 10/29/99).

MTBE: Methyl tert-butyl ether

\*: EPA method 8020 prior to 10/29/99

TOC: Top of Casing

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

$\mu\text{g/L}$ : micrograms per liter

mg/L: milligrams per liter

ND: none detected

NR: not reported; data not available or not measurable

--: not analyzed or not applicable

<: less than laboratory detection limit stated to the right

[1]: [corrected elevation (Z')] = Z + (h \* 0.73) where: Z: measured elevation, h: floating product thickness, 0.73: density ratio of oil to water

[2]: analyzed by EPA method 8240

[3]: also analyzed for fuel oxygenates

\*\* : For previous historical groundwater elevation data please refer to Fourth Quarter 1995 Groundwater Monitoring Program Results, ARCO Service Station 6002, Oakland, California, (EMCON, February 23, 1996)

**Table 2**  
**Groundwater Flow Direction and Gradient**

**ARCO Service Station 6002**  
**6235 Seminary Avenue, Oakland, California**

<b>Date Measured</b>	<b>Average Flow Direction</b>	<b>Average Hydraulic Gradient</b>
03-15-95	West-Southwest	0.08
05-30-95	West-Southwest	0.08
09-01-95	West-Southwest	0.09
11-13-95	West-Southwest	0.08
02-23-96	West-Southwest	0.08
05-10-96	West-Southwest	0.08
08-09-96	Southwest	0.08
11-08-96	Southwest	0.055
03-21-97	West-Southwest	0.051
05-27-97	West-Southwest	0.069
08-05-97	West	0.076
10-29-97	West-Southwest	0.036
02-25-98	West-Southwest	0.052
05-12-98	West	0.07
07-28-98	West	0.07
10-27-98	West-Southwest	0.06
02-08-99	West-Southwest	0.07
06-01-99	West-Northwest	0.07
08-25-99	West-Southwest	0.07
10-29-99	West	0.07
02-16-00	Southwest	0.05
06-23-00	West	0.042
08-17-00	West	0.087
11-10-00	West-Southwest	0.080
02-12-01	West-Southwest	0.074
<b>04-13-01</b>	<b>West</b>	<b>0.085</b>

**APPENDIX A**

**SAMPLING AND ANALYSIS PROCEDURES**

## **APPENDIX A**

### **SAMPLING AND ANALYSIS PROCEDURES**

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The sampling and analysis procedures for water quality monitoring programs are contained in this appendix. The procedures provided for consistent and reproducible sampling methods, proper application of analytical methods, and accurate and precise analytical results. Finally, these procedures provided guidelines so that the overall objectives of the monitoring program were achieved.

The following documents have been used as guidelines for developing these procedures:

- Procedures Manual for Groundwater Monitoring at Solid Waste Disposal Facilities, Environmental Protection Agency (EPA)-530/SW-611, August 1977
- Resource Conservation and Recovery Act (RCRA) Groundwater Monitoring Technical Enforcement Guidance Document, Office of Solid Waste and Emergency Response (OSWER) 9950.1, September 1986
- Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, EPA SW-846, 3rd edition, November 1986
- Methods for Organic Chemical Analysis of Municipal and Industrial Waste Water, EPA-600/4-82-057, July 1982
- Methods for Organic Chemical Analysis of Water and Wastes, EPA-600/4-79-020, revised March 1983
- Leaking Underground Fuel Tank (LUFT) Field Manual, California State Water Resources Control Board, revised October 1989

#### **Sample Collection**

Sample collection procedures include equipment cleaning, water level and total well depth measurements, and well purging and sampling.

#### **Equipment Cleaning**

Before the sampling event was started, equipment that was used to sample groundwater was disassembled and cleaned with detergent water and then rinsed with tap water. During field sampling, equipment surfaces that were placed in the well or came into



contact with groundwater during field sampling were washed with detergent and double rinsed with tap water before the next well was purged or sampled.

## **Water Level, Floating Hydrocarbon, and Total Well Depth Measurements**

Before purging and sampling occurred, the depth to water, floating hydrocarbon thickness and total well depth were measured using an oil/water interface measuring system. The oil/water interface measuring system consists of a probe that emits a continuous audible tone when immersed in a nonconductive fluid, such as oil or gasoline and an intermittent tone when immersed in a conductive fluid, such as water. The floating hydrocarbon thickness and water level were measured by lowering the probe into the well. Liquid levels were recorded relative to the tone emitted at the groundwater surface. The sonic probe was decontaminated after each use. A bottom-filling, clear disposable bailer was used to verify floating hydrocarbon thickness measurements of less than 0.02 foot. Alternatively, an electric sounder and a bottom-filling Teflon bailer may have been used to record floating hydrocarbon thickness and depth to water.

The electric sounder is a transistorized instrument that uses a reel-mounted, two-conductor, coaxial cable that connects the control panel to the sensor. Cable markings are stamped at 1-foot intervals. The water level was measured by lowering the sensor into the monitoring well. A low-current circuit was completed when the sensor contacted the water, which served as an electrolyte. The current was amplified and fed into an indicator light and audible buzzer, signaling when water had been contacted. A sensitivity control compensated for highly saline or conductive water. The electric sounder was decontaminated after each use. The bailer was lowered to a point just below the liquid level, retrieved, and observed for floating hydrocarbon.

Liquid measurements were recorded to the nearest 0.01 foot on the depth to water/floating product survey form. The groundwater elevation at each monitoring well was calculated by subtracting the measured depth to water from the surveyed elevation of the top of the well casing. (Every attempt was made to measure depth to water for all wells on the same day.) Total well depth was then measured by lowering the sensor to the bottom of the well. Total well depth, used to calculate purge volumes and to determine whether the well screen was partially obstructed by silt, was recorded to the nearest 0.1 foot on the depth to water/floating product survey form.

## **Well Purging**

If the depth to groundwater was above the top of screens of the monitoring wells, then the wells were purged, otherwise non-purge groundwater samples were collected. Before sampling occurred, a polyvinyl chloride (PVC) bailer, centrifugal pump, low-flow submersible pump, or disposable bailer was used to purge standing water in the casing and gravel pack from the monitoring well. In most monitoring wells, the amount of water purged before sampling was greater than or equal to three casing volumes. Some monitoring wells were expected to be evacuated to dryness after removing fewer than three casing volumes. These low-yield monitoring wells were allowed to recharge for up to 24 hours. Samples were obtained as soon as the monitoring wells recharged to a level

sufficient for sample collection. If insufficient water recharged after 24 hours, the monitoring well was recorded as dry for the sampling event.

Groundwater purged from the monitoring wells was transported in a 240-gallon truck-mounted tank to Integrated Waste Management's Milpitas storage facility for disposal.

Field measurements of pH, specific conductance, and temperature were recorded in a waterproof field logbook. Field data sheets were reviewed for completeness by the sampling coordinator after the sampling event was completed.

The pH, specific conductance, and temperature meter were calibrated each day before field activities were begun. The calibration was checked once each day to verify meter performance. Field meter calibrations were recorded on the water sample field data sheet.

## **Well Sampling**

A disposable bailer was the only equipment acceptable for well sampling. When samples for volatile organic analysis were being collected, the flow of groundwater from the bailer was regulated to minimize turbulence and aeration. Glass bottles of at least 40-milliliters volume and fitted with Teflon-lined septa were used in sampling for volatile organics. These bottles were filled completely to prevent air from remaining in the bottle. A positive meniscus formed when the bottle was completely full. A convex Teflon septum was placed over the positive meniscus to eliminate air. After the bottle was capped, it was inverted and tapped to verify that it contained no air bubbles. The sample containers for other parameters were filled, filtered as required, and capped.

When required, dissolved concentrations of metals were determined using appropriate field filtration techniques. The sample was filtered by emptying the contents of the disposable bailer into a pressure transfer vessel. A disposable 0.45-micron acrylic copolymer filter was threaded onto the transfer vessel at the discharge point, and the vessel was sealed. Pressure was applied to the vessel with a hand pump and the filtrate directed into the appropriate containers. Each filter was used once and discarded.

## **Sample Preservation and Handling**

The following section specifies sample containers, preservation methods, and sample handling procedures.

### **Sample Containers and Preservation**

Sample containers vary with each type of analytical parameter. Container types and materials were selected to be nonreactive with the particular analytical parameter tested.

### **Sample Handling**

Sample containers were labeled immediately prior to sample collection. Samples were kept cool with cold packs or ice until received by the laboratory. At the time of

sampling, each sample was logged on an ARCO chain-of-custody record that accompanied the sample to the laboratory. Samples that required overnight storage prior to shipping to the laboratory were kept cool (4° C) in a refrigerator.

Samples were transferred from Cambria to an ARCO-approved laboratory by courier or taken directly to the laboratory by the environmental sampler. Sample shipments from Cambria to laboratories performing the selected analyses routinely occurred within two to three days of sample collection.

## Sample Documentation

The following procedures were used during sampling and analysis to provide chain-of-custody control during sample handling from collection through storage. Sample documentation included the use of the following:

- Water sample field data sheets to document sampling activities in the field
- Labels to identify individual samples
- Chain-of-custody record sheets for documenting possession and transfer of samples
- Laboratory analysis request sheets for documenting analyses to be performed

## Field Logbook

In the field, the sampler recorded the following information on the water sample field data sheet (see Figure A-2) for each sample collected:

- Project number
- Client's name
- Location
- Name of sampler
- Date and time
- Well accessibility and integrity
- Pertinent well data (e.g., casing diameter, depth to water, well depth)
- Calculated and actual purge volumes
- Purging equipment used
- Sampling equipment used
- Appearance of each sample (e.g., color, turbidity, sediment)
- Results of field analyses (temperature, pH, specific conductance)
- General comments

The water sample field data sheet was signed by the sampler and reviewed by the sampling coordinator.

## **Labels**

Sample labels contained the following information:

- Project number
- Sample number (i.e., well designation)
- Sample depth
- Sampler's initials
- Date and time of collection
- Type of preservation used (if any)

## **Sampling and Analysis Chain-of-Custody Record**

The ARCO chain-of-custody record initiated at the time of sampling contained, at a minimum, the sample designation (including the depth at which the sample was collected), sample type, analytical request, date of sampling, and the name of the sampler. The record sheet was signed, timed, and dated by the sampler when transferring the samples. The number of custodians in the chain of possession was minimized. A copy of the ARCO chain-of-custody record was returned to Cambria with the analytical results.

## **Groundwater Sampling and Analysis Request Form**

A groundwater sampling and analysis request form (see Figure A-3) was used to communicate to the environmental sampler the requirements of the monitoring event. At a minimum, the groundwater sampling and analysis request form included the following information:

- Date scheduled
- Site-specific instructions
- Specific analytical parameters
- Well number
- Well specifications (expected total depth, depth of water, and product thickness)

**APPENDIX B**

**CERTIFIED ANALYTICAL REPORTS  
AND CHAIN-OF-CUSTODY DOCUMENTATION**



# Sequoia Analytical

885 Jarvis Drive  
Morgan Hill, CA 95037  
(408) 776-9600  
FAX (408) 782-6308  
[www.sequoialabs.com](http://www.sequoialabs.com)

25 April, 2001

Ron Scheele  
Cambria - Emeryville  
6262 Hollis St.  
Emeryville, CA 94608

RE: Arco  
Sequoia Report: MKD0485

Enclosed are the results of analyses for samples received by the laboratory on 04/18/01 17:33. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jeff Smyly  
Project Manager

CA ELAP Certificate #1210





Cambria - Emeryville  
6262 Hollis St.  
Emeryville CA, 94608

Project: Arco  
Project Number: Arco #6002  
Project Manager: Ron Scheele

**Reported:**  
04/25/01 11:55

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
VW-1	MKD0485-01	Water	04/13/01 10:37	04/18/01 17:33
VW-4	MKD0485-02	Water	04/13/01 11:20	04/18/01 17:33
MW-4	MKD0485-03	Water	04/13/01 10:55	04/18/01 17:33
MW-5	MKD0485-04	Water	04/13/01 11:10	04/18/01 17:33
MW-7	MKD0485-05	Water	04/13/01 09:40	04/18/01 17:33
MW-8	MKD0485-06	Water	04/13/01 10:10	04/18/01 17:33
DUP	MKD0485-07	Water	04/13/01 00:00	04/18/01 17:33

Sequoia Analytical - Morgan Hill

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

  
Jeff Smyly, Project Manager

Page Page 1 of 9





Cambria - Emeryville 6262 Hollis St. Emeryville CA, 94608	Project: Arco Project Number: Arco #6002 Project Manager: Ron Scheele	<b>Reported:</b> 04/25/01 11:55
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## -Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT

### Sequoia Analytical - Morgan Hill

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>VW-1 (MKD0485-01) Water</b> Sampled: 04/13/01 10:37 Received: 04/18/01 17:33									
Purgeable Hydrocarbons	213	50.0	ug/l	1	1D20003	04/20/01	04/20/01	DHS LUFT	P-03
Benzene	ND	0.500	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	0.500	"	"	"	"	"	"	
Methyl tert-butyl ether	6.38	2.50	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		83.8 %	70-130	"	"	"	"	"	
<b>VW-4 (MKD0485-02) Water</b> Sampled: 04/13/01 11:20 Received: 04/18/01 17:33									
Purgeable Hydrocarbons	556	125	ug/l	2.5	1D23001	04/23/01	04/23/01	DHS LUFT	P-03
Benzene	3.82	1.25	"	"	"	"	"	"	
Toluene	ND	1.25	"	"	"	"	"	"	
Ethylbenzene	ND	1.25	"	"	"	"	"	"	
Xylenes (total)	ND	1.25	"	"	"	"	"	"	
Methyl tert-butyl ether	2450	50.0	"	20	"	"	04/19/01	"	A-01,M-03
<i>Surrogate: a,a,a-Trifluorotoluene</i>		97.9 %	70-130	"	"	"	04/23/01	"	
<b>MW-4 (MKD0485-03) Water</b> Sampled: 04/13/01 10:55 Received: 04/18/01 17:33									
Purgeable Hydrocarbons	ND	50.0	ug/l	1	1D23002	04/23/01	04/23/01	DHS LUFT	
Benzene	ND	0.500	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	0.500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.50	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		95.7 %	70-130	"	"	"	"	"	







Cambria - Emeryville  
6262 Hollis St.  
Emeryville CA, 94608

Project: Arco  
Project Number: Arco #6002  
Project Manager: Ron Scheele

**Reported:**  
04/25/01 11:55

**-Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT  
Sequoia Analytical - Morgan Hill**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>MW-5 (MKD0485-04) Water</b> <b>Sampled: 04/13/01 11:10</b> <b>Received: 04/18/01 17:33</b>									
Purgeable Hydrocarbons	9020	2000	ug/l	40	1D19003	04/19/01	04/19/01	DHS LUFT	P-01
Benzene	54.2	20.0	"	"	"	"	"	"	
Toluene	43.3	20.0	"	"	"	"	"	"	
Ethylbenzene	137	20.0	"	"	"	"	"	"	
Xylenes (total)	96.0	20.0	"	"	"	"	"	"	
Methyl tert-butyl ether	297	100	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		82.4 %	70-130		"	"	"	"	
<b>MW-7 (MKD0485-05) Water</b> <b>Sampled: 04/13/01 09:40</b> <b>Received: 04/18/01 17:33</b>									
Purgeable Hydrocarbons	ND	50.0	ug/l	1	1D19003	04/19/01	04/19/01	DHS LUFT	
Benzene	ND	0.500	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	0.500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.50	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		84.3 %	70-130		"	"	"	"	
<b>MW-8 (MKD0485-06) Water</b> <b>Sampled: 04/13/01 10:10</b> <b>Received: 04/18/01 17:33</b>									
Purgeable Hydrocarbons	ND	50.0	ug/l	1	1D23002	04/23/01	04/23/01	DHS LUFT	
Benzene	ND	0.500	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	0.500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.50	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		97.5 %	70-130		"	"	"	"	





Cambria - Emeryville  
6262 Hollis St.  
Emeryville CA, 94608

Project: Arco  
Project Number: Arco #6002  
Project Manager: Ron Scheele

**Reported:**  
04/25/01 11:55

**-Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT**

**Sequoia Analytical - Morgan Hill**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>DUP (MKD0485-07) Water Sampled: 04/13/01 00:00 Received: 04/18/01 17:33</b>									
Purgeable Hydrocarbons	ND	50.0	ug/l	1	1D19003	04/19/01	04/19/01	DHS LUFT	
Benzene	ND	0.500	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	0.500	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.50	"	"	"	"	"	"	
Surrogate: <i>a,a,a-Trifluorotoluene</i>		83.7 %		70-130	"	"	"	"	





Cambria - Emeryville  
6262 Hollis St.  
Emeryville CA, 94608

Project: Arco  
Project Number: Arco #6002  
Project Manager: Ron Scheele

Reported:  
04/25/01 11:55

## Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT - Quality Control Sequoia Analytical - Morgan Hill

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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### Batch 1D19003 - EPA 5030B [P/T]

#### Blank (1D19003-BLK1)

Prepared & Analyzed: 04/19/01

Purgeable Hydrocarbons	ND	50.0	ug/l							
Benzene	ND	0.500	"							
Toluene	ND	0.500	"							
Ethylbenzene	ND	0.500	"							
Xylenes (total)	ND	0.500	"							
Methyl tert-butyl ether	ND	2.50	"							
<i>Surrogate: a,a,a-Trifluorotoluene</i>	9.01		"	10.0		90.1	70-130			

#### LCS (1D19003-BS1)

Prepared & Analyzed: 04/19/01

Benzene	8.82	0.500	ug/l	10.0		88.2	70-130			
Toluene	8.29	0.500	"	10.0		82.9	70-130			
Ethylbenzene	8.42	0.500	"	10.0		84.2	70-130			
Xylenes (total)	25.2	0.500	"	30.0		84.0	70-130			
<i>Surrogate: a,a,a-Trifluorotoluene</i>	8.30		"	10.0		83.0	70-130			

#### Matrix Spike (1D19003-MS1)

Source: MKD0392-11

Prepared & Analyzed: 04/19/01

Benzene	8.67	0.500	ug/l	10.0	ND	86.7	60-140			
Toluene	7.88	0.500	"	10.0	ND	78.8	60-140			
Ethylbenzene	7.82	0.500	"	10.0	ND	78.2	60-140			
Xylenes (total)	24.4	0.500	"	30.0	ND	81.3	60-140			
<i>Surrogate: a,a,a-Trifluorotoluene</i>	7.95		"	10.0		79.5	70-130			

#### Matrix Spike Dup (1D19003-MSD1)

Source: MKD0392-11

Prepared & Analyzed: 04/19/01

Benzene	9.41	0.500	ug/l	10.0	ND	94.1	60-140	8.19	25	
Toluene	8.59	0.500	"	10.0	ND	85.9	60-140	8.62	25	
Ethylbenzene	8.46	0.500	"	10.0	ND	84.6	60-140	7.86	25	
Xylenes (total)	25.7	0.500	"	30.0	ND	85.7	60-140	5.19	25	
<i>Surrogate: a,a,a-Trifluorotoluene</i>	8.97		"	10.0		89.7	70-130			





Cambria - Emeryville  
6262 Hollis St.  
Emeryville CA, 94608

Project: Arco  
Project Number: Arco #6002  
Project Manager: Ron Scheele

Reported:  
04/25/01 11:55

## Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT - Quality Control Sequoia Analytical - Morgan Hill

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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### Batch 1D20003 - EPA 5030B [P/T]

#### Blank (1D20003-BLK1)

Prepared: 04/20/00 Analyzed: 04/20/01

Purgeable Hydrocarbons	ND	50.0	ug/l							
Benzene	ND	0.500	"							
Toluene	ND	0.500	"							
Ethylbenzene	ND	0.500	"							
Xylenes (total)	ND	0.500	"							
Methyl tert-butyl ether	ND	2.50	"							
Surrogate: a,a,a-Trifluorotoluene	8.41		"	10.0		84.1	70-130			

#### LCS (1D20003-BS1)

Prepared: 04/20/00 Analyzed: 04/20/01

Purgeable Hydrocarbons	224	50.0	ug/l	250		89.6	70-130			
Surrogate: a,a,a-Trifluorotoluene	12.5		"	10.0		125	70-130			

#### Matrix Spike (1D20003-MS1)

Source: MKD0527-01

Prepared: 04/20/00 Analyzed: 04/20/01

Purgeable Hydrocarbons	238	50.0	ug/l	250	ND	95.2	60-140			
Surrogate: a,a,a-Trifluorotoluene	11.7		"	10.0		117	70-130			

#### Matrix Spike Dup (1D20003-MSD1)

Source: MKD0527-01

Prepared: 04/20/00 Analyzed: 04/20/01

Purgeable Hydrocarbons	208	50.0	ug/l	250	ND	83.2	60-140	13.5	25	
Surrogate: a,a,a-Trifluorotoluene	11.1		"	10.0		111	70-130			

### Batch 1D23001 - EPA 5030B [P/T]

#### Blank (1D23001-BLK1)

Prepared & Analyzed: 04/23/01

Purgeable Hydrocarbons	ND	50.0	ug/l							
Benzene	ND	0.500	"							
Toluene	ND	0.500	"							
Ethylbenzene	ND	0.500	"							
Xylenes (total)	ND	0.500	"							
Methyl tert-butyl ether	ND	2.50	"							
Surrogate: a,a,a-Trifluorotoluene	10.1		"	10.0		101	70-130			





Cambria - Emeryville  
6262 Hollis St.  
Emeryville CA, 94608

Project: Arco  
Project Number: Arco #6002  
Project Manager: Ron Scheele

Reported:  
04/25/01 11:55

## Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT - Quality Control Sequoia Analytical - Morgan Hill

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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### Batch 1D23001 - EPA 5030B [P/T]

#### LCS (1D23001-BS1)

Prepared & Analyzed: 04/23/01

Benzene	10.7	0.500	ug/l	10.0		107	70-130			
Toluene	10.4	0.500	"	10.0		104	70-130			
Ethylbenzene	10.2	0.500	"	10.0		102	70-130			
Xylenes (total)	31.2	0.500	"	30.0		104	70-130			
Surrogate: <i>a,a,a</i> -Trifluorotoluene	10.5		"	10.0		105	70-130			

#### Matrix Spike (1D23001-MS1)

Source: MKD0545-04

Prepared & Analyzed: 04/23/01

Benzene	11.3	0.500	ug/l	10.0	ND	113	60-140			
Toluene	11.0	0.500	"	10.0	ND	110	60-140			
Ethylbenzene	10.6	0.500	"	10.0	ND	106	60-140			
Xylenes (total)	32.4	0.500	"	30.0	ND	108	60-140			
Surrogate: <i>a,a,a</i> -Trifluorotoluene	10.7		"	10.0		107	70-130			

#### Matrix Spike Dup (1D23001-MSD1)

Source: MKD0545-04

Prepared & Analyzed: 04/23/01

Benzene	11.0	0.500	ug/l	10.0	ND	110	60-140	2.69	25	
Toluene	10.6	0.500	"	10.0	ND	106	60-140	3.70	25	
Ethylbenzene	10.3	0.500	"	10.0	ND	103	60-140	2.87	25	
Xylenes (total)	31.3	0.500	"	30.0	ND	104	60-140	3.45	25	
Surrogate: <i>a,a,a</i> -Trifluorotoluene	10.6		"	10.0		106	70-130			

### Batch 1D23002 - EPA 5030B [P/T]

#### Blank (1D23002-BLK1)

Prepared & Analyzed: 04/23/01

Purgeable Hydrocarbons	ND	50.0	ug/l							
Benzene	ND	0.500	"							
Toluene	ND	0.500	"							
Ethylbenzene	ND	0.500	"							
Xylenes (total)	ND	0.500	"							
Methyl tert-butyl ether	ND	2.50	"							
Surrogate: <i>a,a,a</i> -Trifluorotoluene	9.64		"	10.0		96.4	70-130			





Cambria - Emeryville 6262 Hollis St. Emeryville CA, 94608	Project: Arco Project Number: Arco #6002 Project Manager: Ron Scheele	<b>Reported:</b> 04/25/01 11:55
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**Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT - Quality Control  
Sequoia Analytical - Morgan Hill**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 1D23002 - EPA 5030B [P/T]**

**LCS (1D23002-BS1)**

Prepared & Analyzed: 04/23/01

Purgeable Hydrocarbons	240	50.0	ug/l	250		96.0	70-130			
<i>Surrogate: a,a,a-Trifluorotoluene</i>	<i>10.6</i>		"	<i>10.0</i>		<i>106</i>	<i>70-130</i>			

**Matrix Spike (1D23002-MS1)**

Source: MKD0557-03

Prepared & Analyzed: 04/23/01

Purgeable Hydrocarbons	226	50.0	ug/l	250	ND	90.4	60-140			
<i>Surrogate: a,a,a-Trifluorotoluene</i>	<i>10.6</i>		"	<i>10.0</i>		<i>106</i>	<i>70-130</i>			

**Matrix Spike Dup (1D23002-MSD1)**

Source: MKD0557-03

Prepared & Analyzed: 04/23/01

Purgeable Hydrocarbons	237	50.0	ug/l	250	ND	94.8	60-140	4.75	25	
<i>Surrogate: a,a,a-Trifluorotoluene</i>	<i>11.2</i>		"	<i>10.0</i>		<i>112</i>	<i>70-130</i>			





Cambria - Emeryville  
6262 Hollis St.  
Emeryville CA, 94608

Project: Arco  
Project Number: Arco #6002  
Project Manager: Ron Scheele

**Reported:**  
04/25/01 11:55

### Notes and Definitions

A-01 MTBE was prepared on 4/19/01.  
M-03 Sample was analyzed at a second dilution.  
P-01 Chromatogram Pattern: Gasoline C6-C12  
P-03 Chromatogram Pattern: Unidentified Hydrocarbons C6-C12  
DET Analyte DETECTED  
ND Analyte NOT DETECTED at or above the reporting limit  
NR Not Reported  
dry Sample results reported on a dry weight basis  
RPD Relative Percent Difference



ARCO Facility no. **ARCO 6002** City (Facility) **OAKLAND** Project manager (Consultant) **Ron Scheele / Jason Olson**  
 ARCO engineer **Chuck Carmel** Telephone no. (ARCO) **925-946-1085** Telephone no. (Consultant) **510-450-1983** Fax no. (Consultant) **510-450-8295**  
 Consultant name **CAMBRIA ENV. TECH** Address (Consultant) **6262 HOLLIS ST, OAKLAND CA**

Laboratory name **SEQUOIA**  
Contract number

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPHs EPA 1602/8020/8015 /MTBE	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"/>	Semi Metals <input type="checkbox"/> VOA <input type="checkbox"/>	CAN. Metals EPA 6010/7000 TLC <input type="checkbox"/> STLC <input type="checkbox"/>	Lead Org./DHS Lead EPA 7420/7421 <input type="checkbox"/>	
			Soil	Water	Other	Ice	Acid															
VW-1		4		X		X	X	4-13-01	10:37		X											
VW-4		4		X		X	X	4-13-01	11:20		X											
MW-4		4		X		X	X	4-13-01	10:55		X											
MW-5		4		X		X	X	4-13-01	11:10		X											
MW-7		4		X		X	X	4-13-01	9:40		X											
MW-8		4		X		X	X	4-13-01	10:10		X											
DUP		4		X		X	X	4-13-01			X											

Method of shipment

Special detection Limit/reporting  
\* Lowest possible detection

Special QA/QC

Remarks  
TPH<sub>5</sub>, BTEX, MTBE  
**PKD0985**

Lab number **0-18-5**  
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 **4-13-01** Time **1100** Received by **'Secured Location'**  
 Relinquished by **[Signature]** Date **17 Apr 01** Time **1300** Received by **[Signature]** Date **4/17/01** Time **1305**  
 Relinquished by **[Signature]** Date **4/18/01** Time **1400** Received by laboratory \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_



**APPENDIX C**  
**FIELD DATA SHEETS**

WELL DEPTH MEASUREMENTS

Well ID	Time	Top of Screen	DTB	DTP	DTW	DOP	Casing Dia	Comments
MW-3	8:55	5'	24.4'		6.13		4"	
MW-4	8:50	4.5'	24'		8.17		4"	
MW-5	9:15	5'	24.4'		11.31		4"	
MW-6	9:00	17'	30'		10.52		2"	
MW-7	8:40	8.5'	13.3'		7.95		2"	
MW-8	8:45	5.5'	13.9'		5.19		2"	
VW-1	9:05	6'	14'		5.11		4"	
VW-4	9:10	6'	15'		7.80		4"	

Project Name: ARCO 6002

Project Number: 438-1609

Measured By: [Signature]

Date: 4-13-01

WELL SAMPLING FORM

Project Name: ARCO 6002	Cambria Mgr: Ron Scheele	Well ID: MW-4
Project Number: 438 - 1609	Date: 4-13-01	Well Yield:
Site Address: 6235 Seminary Ave, Oakland	Sampling Method:	Well Diameter: 4" pvc
	Disposable bailer	Technician(s): SG
Initial Depth to Water: 3.17	Total Well Depth:	Water Column Height:
Volume/ft:	1 Casing Volume:	3 Casing Volumes:
Purge/No Purge: NO PURGE		
Purging Device: Submersible Pump	Did Well Dewater?:	Total Gallons Purged:
Start Purge Time:	Stop Purge Time:	Total Time:

1 Casing Volume = Water column height x Volume/ ft.

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

Time	Casing Volume	Temp. C	pH	Cond. uS	Comments

NO PURGE

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-4	4-13-01	10:55	4 VOA	HCL	TPHg, BTEX, MTBE	8021B
DUP						

WELL SAMPLING FORM

Project Name: ARCO 6002	Cambria Mgr: Ron Scheele	Well ID: MW-5
Project Number: 438 - 1609	Date: 4-13-01	Well Yield:
Site Address: 6235 Seminary Ave, Oakland	Sampling Method:	Well Diameter: 4" pvc
	Disposable bailer	Technician(s): SG
Initial Depth to Water: 11.31	Total Well Depth:	Water Column Height:
Volume/ft:	1 Casing Volume:	3 Casing Volumes:
Purge/No Purge:		
Purging Device: Submersible Pump	Did Well Dewater?:	Total Gallons Purged:
Start Purge Time:	Stop Purge Time:	Total Time:

1 Casing Volume = Water column height x Volume/ ft.

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

Time	Casing Volume	Temp. C	pH	Cond. uS	Comments

no purge

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-5	4-13-01	11:10	4 VOA	HCL	TPHg, BTEX, MTBE	8021B

WELL SAMPLING FORM

Project Name: ARCO 6002	Cambria Mgr: Ron Scheele	Well ID: MW-7
Project Number: 438 - 1609	Date: 4-13-01	Well Yield:
Site Address: 6235 Seminary Ave, Oakland	Sampling Method:	Well Diameter: 2" pvc
	Disposable bailer	Technician(s): SG
Initial Depth to Water: 7.95	Total Well Depth: 13.30	Water Column Height: 5.35
Volume/ft: 0.16	1 Casing Volume: 0.85	3 Casing Volumes: 2.56
Purge/No Purge: <sup>purse</sup>		
Purging Device: <del>Submersible Pump</del> <sup>Disposable bailer</sup>	Did Well Dewater?: NO	Total Gallons Purged: 2.56
Start Purge Time: 9:30	Stop Purge Time: 9:34	Total Time: 4 mins

1 Casing Volume = Water column height x Volume/ft.

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

Time	Casing Volume	Temp. C	pH	Cond. uS	Comments
9:32	1	15.7	7.52	3999	
9:33	1.5	14.9	7.30	3999	
9:35	2.5	14.8	7.24	3947	

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-7	4-13-01	9:40	4 VOA	HCL	TPHg, BTEX, MTBE	8021B

WELL SAMPLING FORM

Project Name: ARCO 6002	Cambria Mgr: Ron Scheele	Well ID: MW-8
Project Number: 438 - 1609	Date: 4-13-01	Well Yield:
Site Address: 6235 Seminary Ave, Oakland	Sampling Method:	Well Diameter: 2" pvc
	Disposable bailer	Technician(s): SG
Initial Depth to Water: 5.19	Total Well Depth: 13.90	Water Column Height: 8.71
Volume/ft: 0.16	1 Casing Volume: 1.39	3 Casing Volumes: 4.18
Purge/No Purge: PURSE		
Purging Device: <del>Submersible Pump</del> disposable bailer	Did Well Dewater?: NO	Total Gallons Purged: 4.0
Start Purge Time: 10:00	Stop Purge Time: 10:04	Total Time: 4mins

1 Casing Volume = Water column height x Volume/ft.

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

Time	Casing Volume	Temp. C	pH	Cond. uS	Comments
10:02	1.5	14.9	7.12	3117	
10:03	3	14.9	7.18	3022	
10:05	4	14.8	7.25	3054	

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-8	4-13-01	10:10	4 VOA	HCL	TPHg, BTEX, MTBE	8021B

WELL SAMPLING FORM

Project Name: ARCO 6002	Cambria Mgr: Ron Scheele	Well ID: VW-1
Project Number: 438 - 1609	Date: 4-13-01	Well Yield:
Site Address: 6235 Seminary Ave, Oakland	Sampling Method:	Well Diameter: 4" pvc
	Disposable bailer	Technician(s):
Initial Depth to Water: 5.15	Total Well Depth: 14.00	Water Column Height: 8.89
Volume/ft: 0.65	1 Casing Volume: 5.77	3 Casing Volumes: 17.33
Purge/No Purge: purge		
Purging Device: 3" PVC bailer Submersible Pump	Did Well Dewater?: NO	Total Gallons Purged: 18
Start Purge Time: 10:25	Stop Purge Time: 10:33	Total Time: 8 mins

1 Casing Volume = Water column height x Volume/ft.

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

Time	Casing Volume	Temp. C	pH	Cond. uS	Comments
10:28	6	15.1	7.59	2813	
10:31	17	14.7	7.50	1291	
10:34	18	14.9	7.24	1217	

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
VW-1	4-13-01	10:37	4 VOA	HCL	TPHg, BTEX, MTBE	8021B

WELL SAMPLING FORM

Project Name: ARCO 6002	Cambria Mgr: Ron Scheele	Well ID: VW-4
Project Number: 438 - 1609	Date:	Well Yield:
Site Address: 6235 Seminary Ave, Oakland	Sampling Method:	Well Diameter: 4" pvc
	Disposable bailer	Technician(s): SG
Initial Depth to Water: 7.80	Total Well Depth:	Water Column Height:
Volume/ft:	1 Casing Volume:	3 Casing Volumes:
Purge/No Purge: no purge		
Purging Device: Submersible Pump	Did Well Dewater?:	Total Gallons Purged:
Start Purge Time:	Stop Purge Time:	Total Time:

1 Casing Volume = Water column height x Volume/ ft.

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

Time	Casing Volume	Temp. C	pH	Cond. uS	Comments

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
VW-4	4-13-01	11:20	4 VOA	HCL	TPHg, BTEX, MTBE	8021B