

C A M B R I A

April 25, 2001

Ms. Eva Chu  
Alameda County Health Care Services Agency  
1131 Harbor Bay Parkway, 2nd Floor  
Alameda, California 94502

Re: **Monitoring and Remediation Performance Report  
First Quarter 2001**  
ARCO Service Station No. 6041  
7249 Village Parkway  
Dublin, California  
Cambria Project # 438-1643

MAY 09 2001



Dear Ms. Chu:

On behalf of ARCO, Cambria Environmental Technology, Inc. (Cambria) is submitting the attached report which presents the results of the first quarter 2001 groundwater monitoring program at ARCO Service Station No. 6041, located at 7249 Village Parkway, Dublin, California. Operation and performance data for the mobile dual-phase vacuum extraction (DVE) program is also presented. The monitoring program complies with the ACHCSA requirements regarding underground tank investigations.

Please call if you have any questions.

Sincerely,

**Cambria Environmental Technology, Inc.**

*Ron Scheele*

Ron Scheele, RG  
Senior Project Manager

Attachment: Quarterly Groundwater Monitoring Report, First Quarter 2001

Oakland, CA  
San Ramon, CA  
Sonoma, CA

cc: Mr. Paul Supple, ARCO, PO Box 6549, Moraga, California 94570  
Ms. Karen Petryna, Equiva Services, LLC, PO Box 7869, Burbank, California 91510-7869

**Cambria  
Environmental  
Technology, Inc.**

1144 65th Street  
Suite B  
Oakland, CA 94608  
Tel (510) 420-0700  
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C A M B R I A

## Monitoring and Remediation Performance Report

First Quarter 2001

ARCO Service Station No. 6041  
7249 Village Parkway  
Dublin, California  
Cambria Project # 438-1643



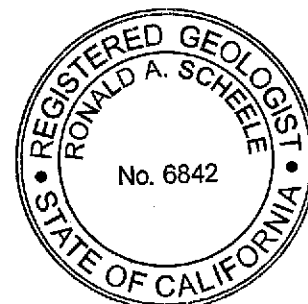
Prepared For:

Mr. Paul Supple  
ARCO

April 25, 2001

Prepared By:

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



Written by:

  
\_\_\_\_\_  
Jason D. Olson  
Senior Staff Environmental Scientist

  
\_\_\_\_\_  
Ron Scheele, RG  
Senior Project Manager

**ARCO QUARTERLY GROUNDWATER MONITORING REPORT**

Station No.: 6041      Address: 7249 Village Parkway, Dublin, California  
 ARCO Environmental Engineer/Phone No.: Paul Supple /(925) 299-8891  
 Consulting Co./Contact Person: Cambria Environmental Technology, Inc. / Ron Scheele, RG  
 Consultant Project No.: 438-1643  
 Primary Agency/Regulatory ID No.: ACHCSA

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

1. Submitted quarterly groundwater monitoring report for fourth quarter, 2000.
2. Performed quarterly groundwater monitoring and sampling on February 9, 2001.
3. Prepared remediation piping design for upcoming station remodel.
4. Performed monthly mobile dual phase vacuum extraction (DVE) remediation (January 30, February 26, and March 20, 2001).

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

1. Prepare and submit quarterly groundwater monitoring report for first quarter 2001.
2. Perform quarterly groundwater monitoring and sampling for second quarter 2001.
3. Perform final DVE remediation event in May 2001.

**MONITORING:**

Current Phase of Project:	<u>Interim Remediation</u>
Frequency of Groundwater Sampling	<u>Quarterly: MW-1, MW-3, VW-2, Shell MW-6, Shell MW-7</u> <u>Semi-annual: MW-2 (1<sup>st</sup>/3<sup>rd</sup>)</u>
Frequency of Groundwater Monitoring	<u>Quarterly</u>
Is Free Product (FP) Present On-site:	<u>No</u>
Bulk Soil Removed to Date :	<u>15 cubic yards of TPH impacted soil</u>
Water Wells or Surface Waters, within 2000 ft., impacted by site:	<u>None</u>
Current Remediation Techniques:	<u>DVE (8 hours monthly)</u>
Average Depth to Groundwater:	<u>8.92 feet</u>
Groundwater Flow Direction and Gradient	<u>0.003 ft/ft toward west-southwest</u>

### MOBILE DVE QUARTERLY OPERATION AND PERFORMANCE

Event Frequency:	Monthly (began on 11/22/00)
Event Duration This Quarter (average):	7.6 hours
Total Extraction Time – This Quarter:	22.75 hours
To Date:	37.75 hours
Extraction Wells:	TP-1, TP-2, MW-1, MW-3, VW-2 discontinued 12/13/00
Total TPHg removed this quarter:	< 3.32 pounds
Total TPHg removed to date:	< 5.96 pounds
Total Benzene removed this quarter:	< 0.143 pounds
Total Benzene removed to date:	< 0.235 pounds
Total MTBE removed this quarter:	3.68 pounds
Total MTBE removed to date:	4.21 pounds

### SOIL VAPOR EXTRACTION

TPHg Vapor Conc. End of Period (lab):	9,780 ppmv (MW-1 on 3/20/01)
Benzene Vapor Conc. End of Period (lab):	176 ppmv (MW-1 on 3/20/01)
MTBE Vapor Conc. End of Period (lab):	453 ppmv (MW-1 on 3/20/01)
System vapor flow rates:	4.3 to 17.9 cfm

### GROUNDWATER EXTRACTION

Groundwater extracted this quarter:	5,163 gallons
Total groundwater extracted:	5,829 gallons
System groundwater flow rates:	0.27 to 11.52 gallons per minute
Source of groundwater analytical data:	4 <sup>th</sup> Quarter 2000 / 1 <sup>st</sup> Quarter 2001
Max TPHg groundwater concentration (lab):	29,700 ug/L (MW-3)
Max Benzene groundwater concentration (lab):	2,590 ug/L (MW-3)
Max MTBE groundwater concentration (lab):	85,500 ug/L (MW-3)

### DISCUSSION:

Based on field measurements collect on February 9, 2001, groundwater beneath the site flows towards the west-southwest at a gradient of 0.003 ft/ft. This is consistent with the historic groundwater flow direction and gradient.

Hydrocarbon concentrations detected this quarter show a decrease in MTBE concentrations in MW-1 and MW-2, and an increase in TPHg, benzene, and MTBE concentrations in well MW-3 as compared with the previous sampling event. The maximum TPHg, benzene, and MTBE concentrations were detected in well MW-3 at 29,300, 2,590, and 85,500 micrograms per liter (µg/L), respectively.

Five mobile DVE events have been performed at the site since November 22, 2000. Cambria will perform the final approved DVE event in May 2001. Site DVE remediation effectiveness will be assessed after the completion of the third quarter groundwater sampling event. Please note that DVE data presented in Cambria's *Quarterly Groundwater Monitoring Report, Fourth Quarter 2000* dated February 23, 2001 was revised due to incorrect flow data.

## ATTACHMENTS:

- Figure 1 - Groundwater Elevation Contour and Analytical Summary Map
- Table 1 - Groundwater Monitoring Data
- Table 2 - Groundwater Flow Direction and Gradient
- Table 3 - Groundwater Extraction – Mass Removal Data
- Table 4 - Soil Vapor Extraction – Mass Removal Data
- Appendix A - Sampling and Analysis Procedures
- Appendix B - Certified Analytical Reports and Chain-of-Custody Documentation
- Appendix C - Field Data Sheets



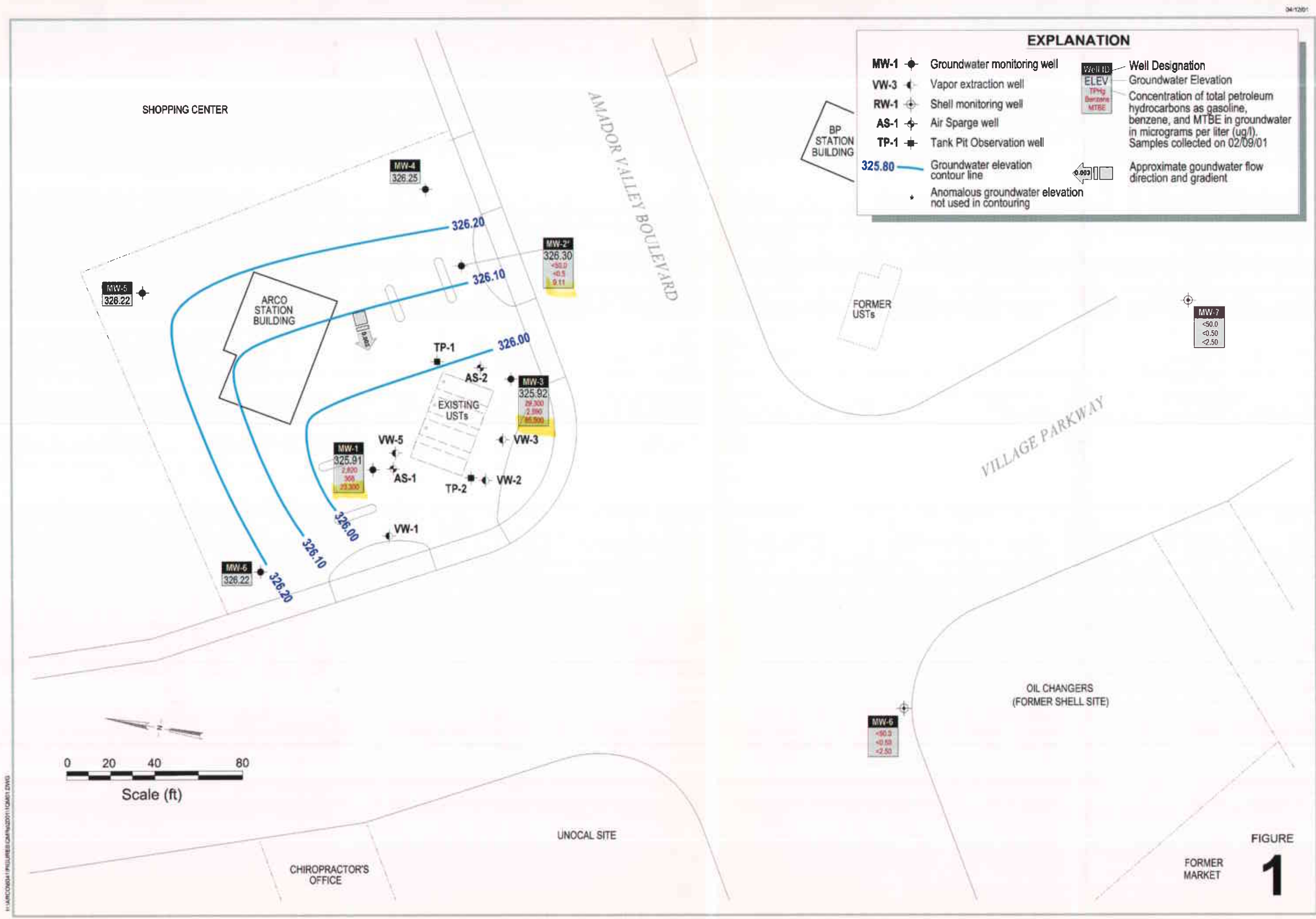


FIGURE 1

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

**ARCO Service Station 6041**  
**7249 Village Parkway, Dublin, California**

Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	FP Thickness (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPH Gasoline (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	02-15-95	336.56	8.53	0.00	328.03	02-15-95	820	15	<1	5.2	1.4	--	--		
MW-1	05-24-95	336.56	9.00	0.00	327.56	05-24-95	640	12	<1	7.3	<1	--	--		
MW-1	08-25-95	336.56	10.30	0.00	326.26	08-25-95	780	2	<1	2	2	2,500	--		
MW-1	11-28-95	336.56	11.01	0.00	325.55	11-28-95	570	2.2	<0.5	1.4	0.9	--	--		
MW-1	02-26-96	336.56	7.35	0.00	329.21	03-13-96	1,100	28	<7	13	7	3,400	--		
MW-1	05-23-96	336.56	8.73	0.00	327.83	05-23-96	560	8.5	<1	1.1	<1	3,900	--		
MW-1	08-23-96	336.56	10.25	0.00	326.31	08-23-96	860	<1	<1	<4	2	5,600	--		
MW-1	03-21-97	336.56	9.35	0.00	327.21	03-21-97	520	12	<0.5	2.7	1.5	6,200	--		
MW-1	08-20-97	336.56	10.75	0.00	325.81	08-20-97	<5,000	<50	<50	<50	<50	7,400	--		
MW-1	11-21-97	336.56	11.10	0.00	325.46	11-21-97	<5,000	<50	<50	<50	<50	8,500	--		
MW-1	02-12-98	336.56	7.05	0.00	329.51	02-12-98	210	<0.5	<0.5	<0.5	<0.5	8,900	--	1.71	P
MW-1	07-31-98	336.56	10.04	0.00	326.52	07-31-98	<20,000	<200	<200	<200	<200	18,000	--	2.43	P
MW-1	02-17-99	336.56	8.50	0.00	328.06	02-17-99	<20,000	<200	<200	<200	<200	16,000	--	1.0	
MW-1	08-24-99	336.56	10.40	0.00	326.16	08-24-99	190	<0.5	4.4	<0.5	1.1	15,000	--	NR	P
MW-1	03-01-00	336.56	8.85	0.00	327.71	03-01-00	310	20	0.5	7.6	4	80,000	--	1.57	P
MW-1	08-18-00	336.56	9.35	0.00	327.21	08-18-00	<10,000	<100	<100	<100	<100	48,400	63,700	1.50	P
MW-1	12-27-00	336.56	10.81	0.00	325.75	12-27-00	<10,000	309	<100	<100	289	44,400	--	0.51	P
MW-1	02-09-01	336.56	10.65	0.00	325.91	02-09-01	2,820	368	<25.0	116	176	23,300	--	0.58	P
DUP	02-09-01	NR	NR	NR	NR	02-09-01	3,490	432	9.56	146	235	31,800	--	NR	
MW-2	02-15-95	334.80	6.75	0.00	328.05	02-15-95	730	110	1.7	25	66	--	--		
MW-2	05-24-95	334.80	6.88	0.00	327.92	05-24-95	370	110	<1	17	1.9	--	--		
MW-2	08-25-95	334.80	7.91	0.00	326.89	08-25-95	150	6	<1	<1	<1	2,700	--		
MW-2	11-28-95	334.80	9.06	0.00	325.74	11-28-95	<50	<0.5	<0.5	<0.5	0.8	--	--		
MW-2	02-26-96	334.80	6.65	0.00	328.15	03-13-96	350	66	<0.5	11	1.7	<3	--		
MW-2	05-23-96	334.80	6.90	0.00	327.90	05-23-96	540	140	<2.5	13	<2.5	4,600	--		

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**Petroleum Hydrocarbons and Their Constituents**  
**1995 - Present\*\***

**ARCO Service Station 6041**  
**7249 Village Parkway, Dublin, California**

Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	FP Thickness (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPH Gasoline (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-2	08-23-96	334.80	8.45	0.00	326.35	08-23-96	180	0.8	2	0.7	2.6	4,000	--		
MW-2	03-21-97	334.80	7.28	0.00	327.52	03-21-97	410	90	<1	14	4	3,800	--		
MW-2	08-20-97	334.80	8.87	0.00	325.93	08-20-97	<5,000	<50	<50	<50	<50	3,100	--		
MW-2	11-21-97	334.80	9.28	0.00	325.52	11-21-97	<2,000	<20	<20	<20	<20	2,600	--		
MW-2	02-12-98	334.80	5.90	0.00	328.90	02-12-98	310	54	<0.5	6.2	1.1	3,800	--	3.76	P
MW-2	07-31-98	334.80	8.12	0.00	326.68	07-31-98	6,100	52	220	110	1100	7,700	--	2.96	P
MW-2	02-17-99	334.80	7.18	0.00	327.62	02-17-99	<5,000	<50	<50	<50	<50	4,200	--	1.0	P
MW-2	08-24-99	334.80	8.68	0.00	326.12	08-24-99	200	1.8	16	3.0	32	3,100	--	NR	P
MW-2	03-01-00	334.80	7.02	0.00	327.78	03-01-00	760	24	12	13	59	6,300	--	1.92	P
MW-2	08-18-00	334.80	7.75	0.00	327.05	08-18-00	<500	<5.00	<5.00	<5.00	<5.00	1,610	1,980	2.03	P
MW-2	12-27-00	334.80	8.85	0.00	325.95	Not Sampled: Well sampled during first and third quarters								NR	
MW-2	02-09-01	334.80	8.50	0.00	326.30	02-09-01	<50.0	<0.500	<0.500	<0.500	<0.500	9.11		0.53	P
MW-3	02-15-95	335.53	8.55	0.00	326.98	02-15-95	100	14	<0.5	6.3	<0.5	--	--		
MW-3	05-24-95	335.53	8.17	0.00	327.36	05-24-95	110	8	<0.5	2.7	<0.5	--	--		
MW-3	08-25-95	335.53	9.27	0.00	326.26	08-25-95	210	3.6	<0.5	2.9	0.6	20,000	--		
MW-3	11-28-95	335.53	9.91	0.00	325.62	11-28-95	81	1.5	<0.5	1.4	<0.5	--	15,000		
MW-3	02-26-96	335.53	8.42	0.00	327.11	03-13-96	16,000	1,600	1,200	300	2,000	9,500	--		
MW-3	05-23-96	335.53	7.70	0.00	327.83	05-23-96	6,500	690	<10	120	14	8,600	--		
MW-3	08-23-96	335.53	9.25	0.00	326.28	08-23-96	1,700	85	2	61	5.3	11,000	--		
MW-3	03-21-97	335.53	8.72	0.00	326.81	03-21-97	100	2	<1	1	<1	6,600	--		
MW-3	08-20-97	335.53	9.73	0.00	325.80	08-20-97	<5,000	<50	<50	<50	<50	7,700	--		
MW-3	11-21-97	335.53	10.10	0.00	325.43	11-21-97	<5,000	<50	<50	<50	<50	9,700	--		
MW-3	02-12-98	335.53	6.68	0.00	328.85	02-12-98	110	11	<0.5	<0.5	1.9	10,000	--	1.02	P
MW-3	07-31-98	335.53	7.98	0.00	327.55	07-31-98	<10,000	<100	<100	<100	<100	13,000	--	2.59	P
MW-3	02-17-99	335.53	8.40	0.00	327.13	02-17-99	<20,000	<200	<200	<200	<200	23,000	--	1.0	P



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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	TPH Gasoline (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	08-24-99	335.53	9.45	0.00	326.08	08-24-99	200	0.6	5.6	0.6	1.7	22,000	--	NR	P
MW-3	03-01-00	335.53	8.32	0.00	327.21	03-01-00	320	32	1.0	6.1	4	58,000	--	2.42	P
MW-3	08-18-00	335.53	8.35	0.00	327.18	08-18-00	<10,000	<100	<100	<100	<100	46,200	55,600	1.59	P
DUP	08-18-00	NR	NR	NR	NR	08-18-00	<10,000	<100	<100	<100	<100	45,500	51,700	NR	
MW-3	12-27-00	335.53	9.75	0.00	325.78	12-27-00	29,700	1,620	1,730	<250	6,230	62,600	--	1.59	P
MW-3	02-09-01	335.53	9.61	0.00	325.92	02-09-01	29,300	2,590	3,530	440	7,080	85,500	--	0.51	P
MW-4	02-15-95	334.22	7.85	0.00	326.37	02-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--		
MW-4	05-24-95	334.22	6.68	0.00	327.54	Not sampled: well sampled semi-annually, during the first and third quarters									
MW-4	08-25-95	334.22	6.93	0.00	327.29	08-25-95	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-4	11-28-95	334.22	8.21	0.00	326.01	Not sampled: well sampled semi-annually, during the first and third quarters									
MW-4	02-26-96	334.22	6.65	0.00	327.57	03-13-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-4	05-23-96	334.22	6.47	0.00	327.75	Not sampled: well sampled semi-annually, during the first and third quarters									
MW-4	08-23-96	334.22	7.66	0.00	326.56	Not sampled: well not part of sampling program									
MW-4	03-21-97	334.22	6.84	0.00	327.38	Not sampled: well not part of sampling program									
MW-4	08-20-97	334.22	8.32	0.00	325.90	Not sampled: well not part of sampling program									
MW-4	11-21-97	334.22	8.65	0.00	325.57	Not sampled: well not part of sampling program									
MW-4	02-12-98	334.22	6.35	0.00	327.87	Not sampled: well not part of sampling program									
MW-4	07-31-98	334.22	6.84	0.00	327.38	Not sampled: well not part of sampling program									
MW-4	02-17-99	334.22	7.50	0.00	326.72	Not sampled: well not part of sampling program									
MW-4	08-24-99	334.22	9.50	0.00	324.72	Not sampled: well not part of sampling program									
MW-4	03-01-00	334.22	6.93	0.00	327.29	Not sampled: well not part of sampling program									
MW-4	08-18-00	334.22	7.03	0.00	327.19	Not sampled: well not part of sampling program									
MW-4	12-27-00	334.22	8.10	0.00	326.12	Not sampled: well not part of sampling program									
MW-4	02-09-01	334.22	7.97	0.00	326.25	Not sampled: well not part of sampling program									

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**7249 Village Parkway, Dublin, California**

Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	FP Thickness (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPH Gasoline ( $\mu\text{g/L}$ )	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)
MW-5	02-15-95	335.87	7.80	0.00	328.07	02-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--		
MW-5	05-24-95	335.87	8.10	0.00	327.77	Not sampled: well sampled annually, during the first quarter									
MW-5	08-25-95	335.87	9.43	0.00	326.44	Not sampled: well sampled annually, during the first quarter									
MW-5	11-28-95	335.87	10.12	0.00	325.75	Not sampled: well sampled annually, during the first quarter									
MW-5	02-26-96	335.87	6.73	0.00	329.14	03-13-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-5	05-23-96	335.87	7.87	0.00	328.00	Not sampled: well sampled annually, during the first quarter									
MW-5	08-23-96	335.87	9.46	0.00	326.41	Not sampled: well not part of sampling program									
MW-5	03-21-97	335.87	8.23	0.00	327.64	Not sampled: well not part of sampling program									
MW-5	08-20-97	335.87	9.92	0.00	325.95	Not sampled: well not part of sampling program									
MW-5	11-21-97	335.87	10.18	0.00	325.69	Not sampled: well not part of sampling program									
MW-5	02-12-98	335.87	6.45	0.00	329.42	Not sampled: well not part of sampling program									
MW-5	07-31-98	335.87	8.98	0.00	326.89	Not sampled: well not part of sampling program									
MW-5	02-17-99	335.87	7.65	0.00	328.22	Not sampled: well not part of sampling program									
MW-5	08-24-99	335.87	8.10	0.00	327.77	Not sampled: well not part of sampling program									
MW-5	03-01-00	335.87	7.31	0.00	328.56	Not sampled: well not part of sampling program									
MW-5	08-18-00	335.87	8.65	0.00	327.22	Not sampled: well not part of sampling program									
MW-5	12-27-00	335.87	9.80	0.00	326.07	Not sampled: well not part of sampling program									
MW-5	02-09-01	335.87	9.65	0.00	326.22	Not sampled: well not part of sampling program									
MW-6	02-15-95	335.84	7.81	0.00	328.03	02-15-95	<50	<0.5	<0.5	<0.5	<0.5	--	--		
MW-6	05-24-95	335.84	8.35	0.00	327.49	Not sampled: well sampled annually, during the first quarter									
MW-6	08-25-95	335.84	9.71	0.00	326.13	Not sampled: well sampled annually, during the first quarter									
MW-6	11-28-95	335.84	10.28	0.00	325.56	Not sampled: well sampled annually, during the first quarter									
MW-6	02-26-96	335.84	6.60	0.00	329.24	03-13-96	<50	<0.5	<0.5	<0.5	<0.5	<3	--		
MW-6	05-23-96	335.84	8.05	0.00	327.79	Not sampled: well sampled annually, during the first quarter									
MW-6	08-23-96	335.84	9.58	0.00	326.26	Not sampled: well not part of sampling program									

**Table 1**  
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**1995 - Present\*\***

**ARCO Service Station 6041**  
**7249 Village Parkway, Dublin, California**

Well Number	Date Gauged	TOC	Depth	FP	Groundwater	Date Sampled	TPH			Ethyl-	Total	MTBE	MTBE	Dissolved	Purged/	
		Elevation	to Water	Thickness	Elevation		Gasoline	Benzene	Toluene	benzene	Xylenes	8021B*	8260	Oxygen	Not Purged	
		(ft-MSL)	(feet)	(feet)	(ft-MSL)		(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(mg/L)	(P/NP)	
MW-6	03-21-97	335.84	8.39	0.00	327.45	Not sampled: well not part of sampling program										
MW-6	08-20-97	335.84	9.98	0.00	325.86	Not sampled: well not part of sampling program										
MW-6	11-21-97	335.84	10.31	0.00	325.53	Not sampled: well not part of sampling program										
MW-6	02-12-98	335.84	3.15	0.00	332.69	Not sampled: well not part of sampling program										
MW-6	07-31-98	335.84	9.29	0.00	326.55	Not sampled: well not part of sampling program										
MW-6	02-17-99	335.84	7.72	0.00	328.12	Not sampled: well not part of sampling program										
MW-6	08-24-99	335.84	9.65	0.00	326.19	Not sampled: well not part of sampling program										
MW-6	03-01-00	335.84	7.35	0.00	328.49	Not sampled: well not part of sampling program										
MW-6	08-18-00	335.84	8.65	0.00	327.19	Not sampled: well not part of sampling program										
MW-6	12-27-00	335.84	9.83	0.00	326.01	Not sampled: well not part of sampling program										
MW-6	02-09-01	335.84	9.62	0.00	326.22	Not sampled: well not part of sampling program										
VW-2	03-21-97	NR	8.22	0.00	NR	03-21-97	150	8.9	<0.5	<0.5	0.6	270	--			
VW-2	08-20-97	NR	9.16	0.00	NR	08-20-97	Not sampled: well not part of sampling program									
VW-2	11-21-97	NR	8.27	0.00	NR	11-21-97	<200	3	<2	<2	<2	180	--			
VW-2	02-12-98	NR	6.65	0.00	NR	02-12-98	200	19	<0.5	0.6	<0.5	2,200	--			
VW-2	07-31-98	NR	7.01	0.00	NR	07-31-98	Not sampled: well not part of sampling program									
VW-2	02-17-99	NR	8.47	0.00	NR	02-17-99	Not sampled: well not part of sampling program									
VW-2	08-24-99	NR	8.20	0.00	NR	08-24-99	Not sampled: well not part of sampling program									
VW-2	03-01-00	NR	8.72	0.00	NR	03-01-00	Not sampled: well not part of sampling program									
VW-2	08-18-00	NR	8.40	0.00	NR	08-18-00	<250	<2.50	<2.50	<2.50	<2.50	537		1.59	NP	
VW-2	12-27-00	NR	8.95	0.00	NR	Not sampled: Well Dry										
VW-2	02-09-01	NR	8.87	0.00	NR	Not sampled: Well Dry										

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

**ARCO Service Station 6041**  
**7249 Village Parkway, Dublin, California**

Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	FP Thickness (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPH Gasoline ( $\mu\text{g/L}$ )	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)
Shell MW-6	12-27-00	NR	9.13	0.00	NR	12-27-00	74.7	<0.500	<0.500	<0.500	<0.500	<2.50		1.30	P
DUP	12-27-00	NR	NR	NR	NR	12-27-00	79.3	<0.500	<0.500	<0.500	<0.500	<2.50		NR	
Shell MW-6	02-09-01	NR	9.05	0.00	NR	02-09-01	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50		1.29	P
Shell MW-7	12-27-00	NR	6.45	0.00	NR	12-27-00	<50.0	<0.500	0.696	<0.500	0.795	<2.50		1.33	P
Shell MW-7	02-09-01	NR	6.39	0.00	NR	02-09-01	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50		1.13	P

Notes:

TOC: top of casing

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

TPH: total petroleum hydrocarbons, California DHS LUFT Method

BTEX: benzene, toluene, ethylbenzene, total xylenes by EPA method 8021B. (EPA method 8020 prior to 03/01/00).

MTBE: Methyl tert-butyl ether

EPA: United States Environmental Protection Agency

\*: EPA method 8020 prior to 03/01/00

$\mu\text{g/L}$ : 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

<: denotes concentration not present at or above laboratory detection limit stated to the right.

\*\* : For previous historical groundwater elevation and analytical data please refer to Fourth Quarter 1995 Groundwater Monitoring Program Results, ARCO Service Station 6041, Dublin, California, (EMCON, February 26, 1996).

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

**ARCO Service Station 6041**  
**7249 Village Parkway, Dublin, California**

<b>Date Measured</b>	<b>Average Flow Direction</b>	<b>Average Hydraulic Gradient</b>
02-15-95	NR	NR
05-24-95	East-Southeast	0.002
08-25-95	Northwest	0.006
11-28-95	North	0.006
02-26-96	East	0.012
05-23-96	Flat Gradient	Flat Gradient
08-23-96	Flat Gradient	Flat Gradient
03-21-97	South-Southeast	0.005
08-20-97	South-Southwest	0.001
11-21-97	South-Southwest	0.002
02-12-98	East	0.024
07-31-98	Northwest	0.01
02-17-99	Southeast	0.007
08-24-99	South-Southwest	0.013
03-01-00	South-Southeast	0.005
09-26-00	South-Southeast	0.002
12-27-00	West-Southwest	0.003
<b>02-09-01</b>	<b>West-Southwest</b>	<b>0.003</b>

**Table 3  
Groundwater Extraction  
Mass Removal Data**

**ARCO Service Station 6041  
7249 Village Parkway, Dublin, California**

Groundwater Extraction Data						Hydrocarbon Concentrations			TPHg Removal		Benzene Removal		MTBE Removal	
Event	Well	Groundwater Extraction Duration	Groundwater Extracted	Extraction Flow Rate	Groundwater Sample	TPHg	Benzene	MTBE	Mass Extracted Per Event	Mass Extracted To Date	Mass Extracted Per Event	Mass Extracted To Date	Mass Extracted Per Event	Mass Extracted To Date
Date	ID	(hours)	(gallons)	(gpm)	Date	(Concentrations in ug/L)			(lbs)	(lbs)	(lbs)	(lbs)	(lbs)	(lbs)
11/22/00	MW-1	3.08	235	1.27	09/26/00	<10,000	<100	63,700	<0.01961	<0.01961	<0.00020	<0.00020	0.1249	0.1249
12/13/00	MW-1	3.25	170	0.87	09/26/00	<10,000	<100	63,700	<0.01419	<0.03379	<0.00014	<0.00034	0.09036	0.2153
01/30/01	MW-1	1.50	50	0.56	12/27/00	<10,000	309	44,400	<0.00417	<0.03797	0.00013	<0.00047	0.01852	0.2338
03/20/01	MW-1	3.50	200	0.95	02/13/01	2,820	368	23,300	0.004706	<0.04267	0.00061	<0.00108	0.03888	0.2727
11/22/00	MW-3	2.00	71	0.59	09/26/00	<10,000	<100	55,600	<0.00592	<0.00592	<0.00006	<0.00006	0.03294	0.03294
12/13/00	MW-3	3.00	110	0.61	09/26/00	<10,000	<100	55,600	<0.00918	<0.01510	<0.00009	<0.00015	0.05103	0.08397
01/30/01	MW-3	6.25	100	0.27	12/27/00	29,700	1,620	62,600	0.02478	<0.03989	0.00135	<0.00150	0.05224	0.1362
02/26/01	MW-3	1.25	30	0.40	02/09/01	29,300	2,590	85,500	0.00733	<0.04722	0.00065	<0.00215	0.02140	0.1576
02/26/01	TP-1	2.75	1,900	11.52	2/9/2001*	29,300	2,590	85,500	0.4645	0.4645	0.04106	0.04106	1.356	1.356
02/26/01	TP-2	3.00	800	4.44	2/9/2001*	29,300	2,590	85,500	0.1956	0.1956	0.01729	0.01729	0.5708	0.5708
03/20/01	TP-2	4.50	2,083	7.71	2/9/2001*	29,300	2,590	85,500	0.5093	0.7049	0.04502	0.0623	1.4861	2.0569
11/22/00	VW-1	2.17	75	0.58	09/26/2000*	<10,000	<100.00	63,700	<0.00626	<0.00626	<0.00006	<0.00006	0.03987	0.03987
12/13/00	VW-2	1.50	5	0.06	09/26/00	<250	<2.50	554	<0.00001	<0.00001	0.00000	0.00000	0.00002	0.00002
Total Gallons Extracted:			5,829	Total Pounds Removed:			<1.266		<0.1067		3.883			

**Table 3**  
**Groundwater Extraction**  
**Mass Removal Data**

**ARCO Service Station 6041**  
**7249 Village Parkway, Dublin, California**

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**Notes:**

\* = Concentrations inferred from closest monitoring well

TPHg = Total petroleum hydrocarbons as gasoline

MTBE = Methyl tertiary butyl ether

ug/L = Micrograms per liter

lbs = Pounds

gpm = Gallons per minute

TPHg and benzene analyzed by EPA Method 8015/8020

MTBE analyzed by EPA Method 8020 or 8260 (if available)

Groundwater extracted by vacuum trucks provided by ACTI.

Concentrations based on the groundwater monitoring results from prior quarterly sampling event.

**Table 4  
Soil Vapor Extraction  
Mass Removal Data**

**ARCO Service Station 6041  
7249 Village Parkway, Dublin, California**

Soil Vapor Extraction Data				Hydrocarbon Concentrations			TPHg Removal			Benzene Removal			MTBE Removal		
Event	Well	Vapor Extraction Duration	System Flow Rate	TPHg	Benzene	MTBE	Mass Extraction Rate	Mass Extracted Per Event	Mass Extracted To Date	Mass Extraction Rate	Mass Extracted Per Event	Mass Extracted To Date	Mass Extraction Rate	Mass Extracted Per Event	Mass Extracted To Date
Date	ID	(hours)	(scfm)	(Concentrations in ppmv)			(lbs/hour)	(lbs)	(lbs)	(lbs/hour)	(lbs)	(lbs)	(lbs/hour)	(lbs)	(lbs)
11/22/00	MW-1	3.08	9.4	3,660	161	253	0.459	1.415	1.415	0.018	0.056	0.056	0.032	0.100	0.100
12/13/00	MW-1	3.25	7.7	2,979	<0.0310	<0.111	0.000	0.001	1.416	0.000	0.000	0.056	0.000	0.000	0.100
01/30/01	MW-1	1.50	9.7	9.6	0.11	0.58	0.001	0.002	1.418	0.000	0.000	0.056	0.000	0.000	0.100
03/20/01	MW-1	3.50	4.3	9,780	176	453	0.561	1.963	3.381	0.009	0.032	0.089	0.027	0.093	0.193
11/22/00	MW-3	2.00	8.1	3,462	119	333	0.375	0.750	0.750	0.012	0.023	0.023	0.037	0.074	0.074
12/13/00	MW-3	3.00	5.2	<2.838	<0.0310	<0.111	0.000	0.000	0.750	0.000	0.000	0.023	0.000	0.000	0.074
01/30/01	MW-3	6.25	5.6	280	12	71	0.021	0.131	0.881	0.001	0.005	0.028	0.005	0.034	0.108
02/26/01	MW-3	1.25	17.9	<2.84	<0.0314	1.08	0.000	0.000	0.881	0.000	0.000	0.028	0.000	0.000	0.108
02/26/01	TP-1	2.00	11.8	24.3	0.181	9.83	0.004	0.008	0.008	0.000	0.000	0.000	0.002	0.003	0.003
02/26/01	TP-2	3.00	17.1	5.79	<0.0314	9.16	0.001	0.004	0.004	0.000	0.000	0.000	0.002	0.006	0.006
11/22/00	VW-1	2.17	22.0	653	19.5	21.8	0.192	0.417	0.417	0.005	0.011	0.011	0.007	0.014	0.014
12/13/00	VW-2	1.50	23.0	<2.838	<0.0310	<0.111	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<b>Total Pounds Removed:</b>							<b>4.69</b>			<b>0.128</b>			<b>0.325</b>		



**Table 4  
Soil Vapor Extraction  
Mass Removal Data**

**ARCO Service Station 6041  
7249 Village Parkway, Dublin, California**

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**Abbreviations and Notes:**

TPHg = Total petroleum hydrocarbons as gasoline (C6-C12) by modified EPA Method 8015 in 1 liter tedlar bag samples

MTBE = Methyl tertiary butyl ether

cfm = Cubic feet per minute

ppmv = Parts per million by volume

lbs = Pounds

TPHG, Benzene, and MTBE analyzed by EPA Method 8015/8020 in 1 liter tedlar bag samples

TPHg / Benzene / MTBE Removal Rate = Based on Bay Area Air Quality Management District's Manual of Procedures for Soil Vapor Extraction dated July 17, 1991.

(Rate = Concentration (ppmv) x system flow rate (cfm) x (1lb-mole/386ft<sup>3</sup>) x molecular weight (86 lb/lb-mole for TPHg, 78 lb/lb-mole for benzene, 88 lb/lb-mole for MTBE)  
x 60 min/hour x 1/1,000,000)

## **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
- Chain-of-custody record sheets for documenting possession and transfer of samples
- Labels to identify individual 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**

404 N. Wiget Lane  
Walnut Creek, CA 94598  
(925) 988-9600  
FAX (925) 988-9673  
[www.sequoialabs.com](http://www.sequoialabs.com)

5 February, 2001

Jason Olson  
Cambria - Oakland  
1144 65th St. Suite C  
Oakland, CA 94608

RE: Arco  
Sequoia Report: W101682

Enclosed are the results of analyses for samples received by the laboratory on 30-Jan-01 13:35. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Charlie Westwater  
Project Manager

CA ELAP Certificate #1271





Cambria - Oakland  
1144 65th St. Suite C  
Oakland CA, 94608

Project: Arco  
Project Number: Arco # 6041  
Project Manager: Jason Olson

Reported:  
05-Feb-01 07:43

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	W101682-01	Air	30-Jan-01 09:30	30-Jan-01 13:35
MW-3	W101682-02	Air	30-Jan-01 12:30	30-Jan-01 13:35

Sequoia Analytical - Walnut Creek

*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.*

Charlie Westwater, Project Manager





Cambria - Oakland  
1144 65th St. Suite C  
Oakland CA, 94608

Project: Arco  
Project Number: Arco # 6041  
Project Manager: Jason Olson

Reported:  
05-Feb-01 07:43

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

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-1 (W101682-01) Air Sampled: 30-Jan-01 09:30 Received: 30-Jan-01 13:35									P-02
Purgeable Hydrocarbons	34	10	mg/m <sup>3</sup> Air	0.2	1B02015	31-Jan-01	31-Jan-01	DHS LUFT	
Benzene	0.35	0.10	"	"	"	"	"	"	
Toluene	0.18	0.10	"	"	"	"	"	"	
Ethylbenzene	0.78	0.10	"	"	"	"	"	"	
Xylenes (total)	0.93	0.10	"	"	"	"	"	"	
Methyl tert-butyl ether	2.1	0.50	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		81.3 %	70-130		"	"	"	"	
MW-3 (W101682-02) Air Sampled: 30-Jan-01 12:30 Received: 30-Jan-01 13:35									P-02
Purgeable Hydrocarbons	1000	250	mg/m <sup>3</sup> Air	5	1B02015	31-Jan-01	31-Jan-01	DHS LUFT	
Benzene	38	2.5	"	"	"	"	"	"	
Toluene	59	2.5	"	"	"	"	"	"	
Ethylbenzene	14	2.5	"	"	"	"	"	"	
Xylenes (total)	66	2.5	"	"	"	"	"	"	
Methyl tert-butyl ether	260	13	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		104 %	70-130		"	"	"	"	





Cambria - Oakland  
1144 65th St. Suite C  
Oakland CA, 94608

Project: Arco  
Project Number: Arco # 6041  
Project Manager: Jason Olson

Reported:  
05-Feb-01 07:43

## Total Purgeable Hydrocarbons (C6-C12) and BTEX in Air by DHS LUFT

### Sequoia Analytical - Walnut Creek

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-1 (W101682-01) Air Sampled: 30-Jan-01 09:30 Received: 30-Jan-01 13:35									
Purgeable Hydrocarbons	9.6	2.8	ppmv	1	1B02015	31-Jan-01	31-Jan-01	DHS LUFT	
Benzene	0.11	0.016	"	"	"	"	"	"	
Toluene	0.048	0.013	"	"	"	"	"	"	
Ethylbenzene	0.18	0.012	"	"	"	"	"	"	
Xylenes (total)	0.21	0.012	"	"	"	"	"	"	
Methyl tert-butyl ether	0.58	0.14	"	"	"	"	"	"	
MW-3 (W101682-02) Air Sampled: 30-Jan-01 12:30 Received: 30-Jan-01 13:35									
Purgeable Hydrocarbons	280	2.8	ppmv	1	1B02015	31-Jan-01	31-Jan-01	DHS LUFT	
Benzene	12	0.016	"	"	"	"	"	"	
Toluene	16	0.013	"	"	"	"	"	"	
Ethylbenzene	3.2	0.012	"	"	"	"	"	"	
Xylenes (total)	15	0.012	"	"	"	"	"	"	
Methyl tert-butyl ether	71	0.14	"	"	"	"	"	"	





Cambria - Oakland  
1144 65th St, Suite C  
Oakland CA, 94608

Project: Arco  
Project Number: Arco # 6041  
Project Manager: Jason Olson

Reported:  
05-Feb-01 07:43

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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### Batch 1B02015 - EPA 5030B [P/T]

#### Blank (1B02015-BLK1)

Prepared & Analyzed: 31-Jan-01

Purgeable Hydrocarbons	ND	10	mg/m <sup>3</sup> Air							
Benzene	ND	0.10	"							
Toluene	ND	0.10	"							
Ethylbenzene	ND	0.10	"							
Xylenes (total)	ND	0.10	"							
Methyl tert-butyl ether	ND	0.50	"							
Surrogate: <i>a,a,a</i> -Trifluorotoluene	5.38		"	6.00		89.7	70-130			

#### LCS (1B02015-BS1)

Prepared & Analyzed: 31-Jan-01

Q-01

Benzene	2.48	0.10	mg/m <sup>3</sup> Air	2.00		124	70-130			
Toluene	2.50	0.10	"	2.00		125	70-130			
Ethylbenzene	2.80	0.10	"	2.00		140	70-130			
Xylenes (total)	8.36	0.10	"	6.00		139	70-130			
Surrogate: <i>a,a,a</i> -Trifluorotoluene	5.08		"	6.00		84.7	70-130			

#### LCS Dup (1B02015-BSD1)

Prepared & Analyzed: 31-Jan-01

Q-01

Benzene	2.36	0.10	mg/m <sup>3</sup> Air	2.00		118	70-130	4.96	25	
Toluene	2.38	0.10	"	2.00		119	70-130	4.92	25	
Ethylbenzene	2.76	0.10	"	2.00		138	70-130	1.44	25	
Xylenes (total)	8.18	0.10	"	6.00		136	70-130	2.18	25	
Surrogate: <i>a,a,a</i> -Trifluorotoluene	5.02		"	6.00		83.7	70-130			





Cambria - Oakland  
1144 65th St. Suite C  
Oakland CA, 94608

Project: Arco  
Project Number: Arco # 6041  
Project Manager: Jason Olson

**Reported:**  
05-Feb-01 07:43

## Notes and Definitions

- P-02      Chromatogram Pattern: Gasoline C6-C12 + Unidentified Hydrocarbons <C6
- Q-01      The spike recovery for this QC sample is outside of established control limits. Review of associated batch QC indicates the recovery for this analyte does not represent an out-of-control condition for the batch.
- 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





# Sequoia Analytical

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

26 February, 2001

Jason Olson  
Cambria - Emeryville  
6262 Hollis St.  
Emeryville, CA 94608

RE: Arco  
Sequoia Report: MKB0502

Enclosed are the results of analyses for samples received by the laboratory on 02/14/01 19:35. 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 # 6041  
Project Manager: Jason Olson

**Reported:**  
02/26/01 17:37

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	MKB0502-01	Water	02/09/01 08:46	02/14/01 19:35
MW-2	MKB0502-02	Water	02/09/01 09:07	02/14/01 19:35
MW-3	MKB0502-03	Water	02/09/01 09:30	02/14/01 19:35
Shell MW-6	MKB0502-04	Water	02/09/01 07:41	02/14/01 19:35
Shell MW-7	MKB0502-05	Water	02/09/01 07:41	02/14/01 19:35
DUP	MKB0502-06	Water	02/09/01 00:00	02/14/01 19:35

Sequoia Analytical - Morgan Hill

Jeff Smyly, Project Manager

*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.*







Cambria - Emeryville  
6262 Hollis St.  
Emeryville CA, 94608

Project: Arco  
Project Number: Arco # 6041  
Project Manager: Jason Olson

**Reported:**  
02/26/01 17:37

## 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-1 (MKB0502-01) Water</b> Sampled: 02/09/01 08:46 Received: 02/14/01 19:35									
Purgeable Hydrocarbons	2820	2500	ug/l	50	1B21002	02/21/01	02/21/01	DHS LUFT	P-01
Benzene	368	25.0	"	"	"	"	"	"	
Toluene	ND	25.0	"	"	"	"	"	"	
Ethylbenzene	116	25.0	"	"	"	"	"	"	
Xylenes (total)	176	25.0	"	"	"	"	"	"	
Methyl tert-butyl ether	23300	250	"	100	"	"	02/22/01	"	M-03
Surrogate: a,a,a-Trifluorotoluene		100 %	70-130		"	"	02/21/01	"	
<b>MW-2 (MKB0502-02) Water</b> Sampled: 02/09/01 09:07 Received: 02/14/01 19:35									
Purgeable Hydrocarbons	ND	50.0	ug/l	1	1B21002	02/21/01	02/21/01	DHS LUFT	
Benzene	ND	0.500	"	"	"	"	"	"	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	0.500	"	"	"	"	"	"	
Methyl tert-butyl ether	9.11	2.50	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		107 %	70-130		"	"	"	"	
<b>MW-3 (MKB0502-03) Water</b> Sampled: 02/09/01 09:30 Received: 02/14/01 19:35									
Purgeable Hydrocarbons	29300	2500	ug/l	50	1B21002	02/21/01	02/21/01	DHS LUFT	P-01
Benzene	2590	25.0	"	"	"	"	"	"	
Toluene	3530	25.0	"	"	"	"	"	"	
Ethylbenzene	440	25.0	"	"	"	"	"	"	
Xylenes (total)	7080	25.0	"	"	"	"	"	"	
Methyl tert-butyl ether	85500	1250	"	500	"	"	02/22/01	"	M-03
Surrogate: a,a,a-Trifluorotoluene		97.8 %	70-130		"	"	02/21/01	"	





Cambria - Emeryville  
6262 Hollis St.  
Emeryville CA, 94608

Project: Arco  
Project Number: Arco # 6041  
Project Manager: Jason Olson

**Reported:**  
02/26/01 17:37

## 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>Shell MW-6 (MKB0502-04) Water</b> Sampled: 02/09/01 07:41 Received: 02/14/01 19:35									
Purgeable Hydrocarbons	ND	50.0	ug/l	1	1B22001	02/22/01	02/22/01	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: a,a,a-Trifluorotoluene		101 %	70-130		"	"	"	"	
<b>Shell MW-7 (MKB0502-05) Water</b> Sampled: 02/09/01 07:41 Received: 02/14/01 19:35									
Purgeable Hydrocarbons	ND	50.0	ug/l	1	1B21002	02/21/01	02/21/01	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: a,a,a-Trifluorotoluene		105 %	70-130		"	"	"	"	
<b>DUP (MKB0502-06) Water</b> Sampled: 02/09/01 00:00 Received: 02/14/01 19:35									
Purgeable Hydrocarbons	3490	500	ug/l	10	1B22001	02/22/01	02/22/01	DHS LUFT	P-01
Benzene	432	5.00	"	"	"	"	"	"	
Toluene	9.56	5.00	"	"	"	"	"	"	
Ethylbenzene	146	5.00	"	"	"	"	"	"	
Xylenes (total)	235	5.00	"	"	"	"	"	"	
Methyl tert-butyl ether	31800	250	"	100	"	"	02/22/01	"	M-03
Surrogate: a,a,a-Trifluorotoluene		92.1 %	70-130		"	"	02/22/01	"	





Cambria - Emeryville  
6262 Hollis St.  
Emeryville CA, 94608

Project: Arco  
Project Number: Arco # 6041  
Project Manager: Jason Olson

**Reported:**  
02/26/01 17:37

**MTBE Confirmation by EPA Method 8260A**

**Sequoia Analytical - Morgan Hill**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>MW-3 (MKB0502-03) Water    Sampled: 02/09/01 09:30    Received: 02/14/01 19:35</b>									
Methyl tert-butyl ether	87700	2000	ug/l	2000	1B26012	02/23/01	02/23/01	EPA 8260A	
Surrogate: 1,2-Dichloroethane-d4		87.5 %	70-130		"	"	"	"	





Cambria - Emeryville  
6262 Hollis St.  
Emeryville CA, 94608

Project: Arco  
Project Number: Arco # 6041  
Project Manager: Jason Olson

**Reported:**  
02/26/01 17:37

## 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 1B21002 - EPA 5030B [P/T]

#### Blank (1B21002-BLK1)

Prepared & Analyzed: 02/21/01

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	11.4		"	10.0		114	70-130			

#### LCS (1B21002-BS1)

Prepared & Analyzed: 02/21/01

Purgeable Hydrocarbons	221	50.0	ug/l	250		88.4	70-130			
Surrogate: a,a,a-Trifluorotoluene	10.6		"	10.0		106	70-130			

#### Matrix Spike (1B21002-MS1)

Source: MKB0502-02

Prepared & Analyzed: 02/21/01

Purgeable Hydrocarbons	201	50.0	ug/l	250	ND	80.4	60-140			
Surrogate: a,a,a-Trifluorotoluene	11.5		"	10.0		115	70-130			

#### Matrix Spike Dup (1B21002-MSD1)

Source: MKB0502-02

Prepared & Analyzed: 02/21/01

Purgeable Hydrocarbons	203	50.0	ug/l	250	ND	81.2	60-140	0.990	25	
Surrogate: a,a,a-Trifluorotoluene	11.8		"	10.0		118	70-130			

### Batch 1B22001 - EPA 5030B [P/T]

#### Blank (1B22001-BLK1)

Prepared & Analyzed: 02/22/01

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	10.4		"	10.0		104	70-130			



Cambria - Emeryville  
6262 Hollis St.  
Emeryville CA, 94608

Project: Arco  
Project Number: Arco # 6041  
Project Manager: Jason Olson

**Reported:**  
02/26/01 17:37

**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 Limits	RPD	RPD Limit	Notes
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**Batch 1B22001 - EPA 5030B [P/T]**

**LCS (1B22001-BS1)**

Prepared & Analyzed: 02/22/01

Purgeable Hydrocarbons	225	50.0	ug/l	250		90.0	70-130		
Surrogate: a,a,a-Trifluorotoluene	9.08		"	10.0		90.8	70-130		

**Matrix Spike (1B22001-MS1)**

Source: MKB0513-01

Prepared & Analyzed: 02/22/01

Purgeable Hydrocarbons	236	50.0	ug/l	250	ND	94.4	60-140		
Surrogate: a,a,a-Trifluorotoluene	10.0		"	10.0		100	70-130		

**Matrix Spike Dup (1B22001-MSD1)**

Source: MKB0513-01

Prepared & Analyzed: 02/22/01

Purgeable Hydrocarbons	229	50.0	ug/l	250	ND	91.6	60-140	3.01	25
Surrogate: a,a,a-Trifluorotoluene	9.38		"	10.0		93.8	70-130		



Cambria - Emeryville  
6262 Hollis St.  
Emeryville CA, 94608

Project: Arco  
Project Number: Arco # 6041  
Project Manager: Jason Olson

**Reported:**  
02/26/01 17:37

## MTBE Confirmation by EPA Method 8260A - Quality Control Sequoia Analytical - Morgan Hill

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 1B26012 - EPA 3510B</b>									
<b>Blank (1B26012-BLK1)</b>				Prepared & Analyzed: 02/23/01					
Methyl tert-butyl ether	ND	1.00	ug/l						
Surrogate: 1,2-Dichloroethane-d4	8.41		"	10.0		84.1	70-130		
<b>LCS (1B26012-BS1)</b>				Prepared & Analyzed: 02/23/01					
Methyl tert-butyl ether	11.9	1.00	ug/l	10.0		119	70-130		
Surrogate: 1,2-Dichloroethane-d4	9.48		"	10.0		94.8	70-130		
<b>Matrix Spike (1B26012-MS1)</b>				Source: MKB0496-03 Prepared & Analyzed: 02/23/01					
Methyl tert-butyl ether	56.3	1.00	ug/l	10.0	45.4	109	70-130		
Surrogate: 1,2-Dichloroethane-d4	8.96		"	10.0		89.6	70-130		
<b>Matrix Spike Dup (1B26012-MSD1)</b>				Source: MKB0496-03 Prepared & Analyzed: 02/23/01					
Methyl tert-butyl ether	54.9	1.00	ug/l	10.0	45.4	95.0	70-130	2.52	25
Surrogate: 1,2-Dichloroethane-d4	8.72		"	10.0		87.2	70-130		



Cambria - Emeryville  
6262 Hollis St.  
Emeryville CA, 94608

Project: Arco  
Project Number: Arco # 6041  
Project Manager: Jason Olson

**Reported:**  
02/26/01 17:37

## Notes and Definitions

M-03 Sample was analyzed at a second dilution.  
P-01 Chromatogram Pattern: Gasoline 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



[illegible]

• White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant





Sequoia  
Analytical

1455 McDowell Blvd. North, Ste. D  
Petaluma, CA 94954  
(707) 792-1865  
FAX (707) 792-0342  
[www.sequoialabs.com](http://www.sequoialabs.com)

March 01 , 2001

Jason Olson  
Cambria Environmental - Emeryville  
6262 Hollis Street  
Emeryville, CA 94608  
RE: ARCO / P102646

Enclosed are the results of analyses for samples received by the laboratory on 02/27/01. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Angelee Cari  
Client Services Representative

CA ELAP Certificate Number 2374





Cambria Environmental - Emeryville  
6262 Hollis Street  
Emeryville CA, 94608

Project: ARCO  
Project Number: 6041  
Project Manager: Jason Olson

**Reported:**  
03/01/01 16:25

## ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
TP-1	P102646-01	Air	02/26/01 09:30	02/27/01 15:25
TP-2	P102646-02	Air	02/26/01 11:30	02/27/01 15:25
MW-3	P102646-03	Air	02/26/01 14:00	02/27/01 15:25





Cambria Environmental - Emeryville  
6262 Hollis Street  
Emeryville CA, 94608

Project: ARCO  
Project Number: 6041  
Project Manager: Jason Olson

Reported:  
03/01/01 16:25

## Total Petroleum Hydrocarbons as Gasoline and BTEX by EPA 8015M/8020M Sequoia Analytical - Petaluma

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TP-1 (P102646-01) Air Sampled: 02/26/01 09:30 Received: 02/27/01 15:25									
Gasoline (ppmv, MW 86.2)	24.3	2.84	ppmv	0.2	1020723	02/28/01	02/28/01	EPA 8015M/8020M	
Benzene (ppmv)	0.181	0.0314	"	"	"	"	"	"	
Toluene (ppmv)	0.502	0.0266	"	"	"	"	"	"	
Ethylbenzene (ppmv)	0.313	0.0230	"	"	"	"	"	"	
Xylenes (total) (ppmv)	1.28	0.0230	"	"	"	"	"	"	
Methyl tert-butyl ether (ppmv)	9.83	0.111	"	"	"	"	"	"	
Gasoline	85.7	10.0	ug/l	"	"	"	"	"	
Benzene	0.579	0.100	"	"	"	"	"	"	
Toluene	1.89	0.100	"	"	"	"	"	"	
Ethylbenzene	1.36	0.100	"	"	"	"	"	"	
Xylenes (total)	5.56	0.100	"	"	"	"	"	"	
Methyl tert-butyl ether	35.4	0.500	"	"	"	"	"	"	
Surrogate: <i>a,a,a</i> -Trifluorotoluene		99.7 %	65-135		"	"	"	"	
Surrogate: <i>4</i> -Bromofluorobenzene		104 %	65-135		"	"	"	"	
TP-2 (P102646-02) Air Sampled: 02/26/01 11:30 Received: 02/27/01 15:25									
Gasoline (ppmv, MW 86.2)	5.79	2.84	ppmv	0.2	1020723	02/28/01	02/28/01	EPA 8015M/8020M	
Benzene (ppmv)	ND	0.0314	"	"	"	"	"	"	
Toluene (ppmv)	ND	0.0266	"	"	"	"	"	"	
Ethylbenzene (ppmv)	0.105	0.0230	"	"	"	"	"	"	
Xylenes (total) (ppmv)	0.134	0.0230	"	"	"	"	"	"	
Methyl tert-butyl ether (ppmv)	9.16	0.111	"	"	"	"	"	"	
Gasoline	20.4	10.0	ug/l	"	"	"	"	"	
Benzene	ND	0.100	"	"	"	"	"	"	
Toluene	ND	0.100	"	"	"	"	"	"	
Ethylbenzene	0.454	0.100	"	"	"	"	"	"	
Xylenes (total)	0.579	0.100	"	"	"	"	"	"	
Methyl tert-butyl ether	33.0	0.500	"	"	"	"	"	"	
Surrogate: <i>a,a,a</i> -Trifluorotoluene		98.0 %	65-135		"	"	"	"	
Surrogate: <i>4</i> -Bromofluorobenzene		103 %	65-135		"	"	"	"	



Cambria Environmental - Emeryville  
6262 Hollis Street  
Emeryville CA, 94608

Project: ARCO  
Project Number: 6041  
Project Manager: Jason Olson

Reported:  
03/01/01 16:25

**Total Petroleum Hydrocarbons as Gasoline and BTEX by EPA 8015M/8020M**  
**Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-3 (P102646-03) Air Sampled: 02/26/01 14:00 Received: 02/27/01 15:25									
Gasoline (ppmv, MW 86.2)	ND	2.84	ppmv	0.2	1020723	02/28/01	02/28/01	EPA 8015M/8020M	
Benzene (ppmv)	ND	0.0314	"	"	"	"	"	"	
Toluene (ppmv)	0.0588	0.0266	"	"	"	"	"	"	
Ethylbenzene (ppmv)	ND	0.0230	"	"	"	"	"	"	
Xylenes (total) (ppmv)	0.131	0.0230	"	"	"	"	"	"	
Methyl tert-butyl ether (ppmv)	1.08	0.111	"	"	"	"	"	"	
Gasoline	ND	10.0	ug/l	"	"	"	"	"	
Benzene	ND	0.100	"	"	"	"	"	"	
Toluene	0.221	0.100	"	"	"	"	"	"	
Ethylbenzene	ND	0.100	"	"	"	"	"	"	
Xylenes (total)	0.567	0.100	"	"	"	"	"	"	
Methyl tert-butyl ether	3.87	0.500	"	"	"	"	"	"	
Surrogate: <i>a,a,a</i> -Trifluorotoluene		98.0 %	65-135		"	"	"	"	
Surrogate: <i>4</i> -Bromofluorobenzene		102 %	65-135		"	"	"	"	





Cambria Environmental - Emeryville  
6262 Hollis Street  
Emeryville CA, 94608

Project: ARCO  
Project Number: 6041  
Project Manager: Jason Olson

Reported:  
03/01/01 16:25

## Total Petroleum Hydrocarbons as Gasoline and BTEX by EPA 8015M/8020M - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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### Batch 1020723 - EPA 5030, waters

#### Blank (1020723-BLK1)

Prepared & Analyzed: 02/28/01

Gasoline	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	296		"	300		98.7	65-135			
Surrogate: 4-Bromofluorobenzene	294		"	300		98.0	65-135			

#### LCS (1020723-BS1)

Prepared & Analyzed: 02/28/01

Gasoline	2230	50.0	ug/l	2750		81.1	65-135			
Benzene	34.3	0.500	"	32.0		107	65-135			
Toluene	182	0.500	"	193		94.3	65-135			
Ethylbenzene	40.0	0.500	"	46.0		87.0	65-135			
Xylenes (total)	201	0.500	"	231		87.0	65-135			
Methyl tert-butyl ether	61.9	2.50	"	52.0		119	65-135			
Surrogate: a,a,a-Trifluorotoluene	333		"	300		111	65-135			
Surrogate: 4-Bromofluorobenzene	308		"	300		103	65-135			

#### Matrix Spike (1020723-MS1)

Source: P102629-02

Prepared & Analyzed: 02/28/01

Gasoline	2310	50.0	ug/l	2750	ND	84.0	65-135			
Benzene	32.1	0.500	"	32.0	ND	100	65-135			
Toluene	171	0.500	"	193	ND	88.6	65-135			
Ethylbenzene	38.5	0.500	"	46.0	ND	83.7	65-135			
Xylenes (total)	191	0.500	"	231	ND	82.7	65-135			
Methyl tert-butyl ether	59.2	2.50	"	52.0	ND	113	65-135			
Surrogate: a,a,a-Trifluorotoluene	309		"	300		103	65-135			
Surrogate: 4-Bromofluorobenzene	314		"	300		105	65-135			





Cambria Environmental - Emeryville  
6262 Hollis Street  
Emeryville CA, 94608

Project: ARCO  
Project Number: 6041  
Project Manager: Jason Olson

Reported:  
03/01/01 16:25

**Total Petroleum Hydrocarbons as Gasoline and BTEX by EPA 8015M/8020M - Quality Control**  
**Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 1020723 - EPA 5030, waters**

**Matrix Spike Dup (1020723-MSD1)**

**Source: P102629-02**

**Prepared & Analyzed: 02/28/01**

Gasoline	2310	50.0	ug/l	2750	ND	84.0	65-135	0	20	
Benzene	34.1	0.500	"	32.0	ND	107	65-135	6.04	20	
Toluene	189	0.500	"	193	ND	97.9	65-135	10.0	20	
Ethylbenzene	40.5	0.500	"	46.0	ND	88.0	65-135	5.06	20	
Xylenes (total)	207	0.500	"	231	ND	89.6	65-135	8.04	20	
Methyl tert-butyl ether	64.1	2.50	"	52.0	ND	122	65-135	7.95	20	
Surrogate: <i>a,a,a</i> -Trifluorotoluene	335		"	300		112	65-135			
Surrogate: <i>4</i> -Bromofluorobenzene	314		"	300		105	65-135			





Cambria Environmental - Emeryville  
6262 Hollis Street  
Emeryville CA, 94608

Project: ARCO  
Project Number: 6041  
Project Manager: Jason Olson

**Reported:**  
03/01/01 16:25

## Notes and Definitions

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









Sequoia  
Analytical

1455 McDowell Blvd. North, Ste. D  
Petaluma, CA 94954  
(707) 792-1865  
FAX (707) 792-0342  
[www.sequoialabs.com](http://www.sequoialabs.com)

March 23 , 2001

Ron Scheele  
Cambria Environmental - Oakland  
1144 65th St., Suite C  
Oakland, CA 94608  
RE: ARCO / P103468

Enclosed are the results of analyses for samples received by the laboratory on 03/21/01. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Angelee Cari  
Client Services Representative

CA ELAP Certificate Number 2374





Cambria Environmental - Oakland  
1144 65th St., Suite C  
Oakland CA, 94608

Project: ARCO  
Project Number: 6041-Dublin  
Project Manager: Ron Scheele

**Reported:**  
03/23/01 16:52

## ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	P103468-01	Air	03/20/01 09:15	03/21/01 15:49





Cambria Environmental - Oakland  
1144 65th St., Suite C  
Oakland CA, 94608

Project: ARCO  
Project Number: 6041-Dublin  
Project Manager: Ron Scheele

Reported:  
03/23/01 16:52

**Total Petroleum Hydrocarbons as Gasoline and BTEX by EPA 8015M/8020M**  
**Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-1 (P103468-01) Air Sampled: 03/20/01 09:15 Received: 03/21/01 15:49									
Gasoline	9780	1420	ppmv	100	1030490	03/22/01	03/22/01	EPA 8015M/8020M	
Benzene	176	15.7	"	"	"	"	"	"	QR-04
Toluene	15.8	13.3	"	"	"	"	"	"	
Ethylbenzene	50.7	11.5	"	"	"	"	"	"	
Xylenes (total)	51.2	11.5	"	"	"	"	"	"	
Methyl tert-butyl ether	453	55.6	"	"	"	"	"	"	
Surrogate: <i>a,a,a</i> -Trifluorotoluene		110 %		65-135	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %		65-135	"	"	"	"	





Cambria Environmental - Oakland  
1144 65th St., Suite C  
Oakland CA, 94608

Project: ARCO  
Project Number: 6041-Dublin  
Project Manager: Ron Scheele

Reported:  
03/23/01 16:52

## Total Petroleum Hydrocarbons as Gasoline and BTEX by EPA 8015M/8020M - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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### Batch 1030490 - EPA 5030, waters

#### Blank (1030490-BLK1)

Prepared & Analyzed: 03/21/01

Gasoline	ND	14.2	ppmv							
Benzene	ND	0.157	"							
Toluene	ND	0.133	"							
Ethylbenzene	ND	0.115	"							
Xylenes (total)	ND	0.115	"							
Methyl tert-butyl ether	ND	0.556	"							
Surrogate: <i>a,a,a</i> -Trifluorotoluene	55.3		"	50.3		110	65-135			
Surrogate: 4-Bromofluorobenzene	39.2		"	41.9		93.6	65-135			

#### Blank (1030490-BLK2)

Prepared & Analyzed: 03/22/01

Gasoline	ND	14.2	ppmv							
Benzene	ND	0.157	"							
Toluene	ND	0.133	"							
Ethylbenzene	ND	0.115	"							
Xylenes (total)	ND	0.115	"							
Methyl tert-butyl ether	ND	0.556	"							
Surrogate: <i>a,a,a</i> -Trifluorotoluene	54.4		"	50.3		108	65-135			
Surrogate: 4-Bromofluorobenzene	42.0		"	41.9		100	65-135			

#### LCS (1030490-BS1)

Prepared & Analyzed: 03/21/01

Gasoline	733	14.2	ppmv	780		94.0	65-135			
Benzene	13.2	0.157	"	10.0		132	65-135			
Toluene	55.9	0.133	"	51.3		109	65-135			
Ethylbenzene	11.8	0.115	"	10.6		111	65-135			
Xylenes (total)	59.5	0.115	"	53.3		112	65-135			
Methyl tert-butyl ether	16.2	0.556	"	14.5		112	65-135			
Surrogate: <i>a,a,a</i> -Trifluorotoluene	62.9		"	50.3		125	65-135			
Surrogate: 4-Bromofluorobenzene	42.7		"	41.9		102	65-135			





Cambria Environmental - Oakland  
1144 65th St., Suite C  
Oakland CA, 94608

Project: ARCO  
Project Number: 6041-Dublin  
Project Manager: Ron Scheele

Reported:  
03/23/01 16:52

## Total Petroleum Hydrocarbons as Gasoline and BTEX by EPA 8015M/8020M - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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### Batch 1030490 - EPA 5030, waters

#### LCS (1030490-BS2)

Prepared & Analyzed: 03/22/01

Gasoline	640	14.2	ppmv	780		82.1	65-135			
Benzene	10.5	0.157	"	10.0		105	65-135			
Toluene	49.4	0.133	"	51.3		96.3	65-135			
Ethylbenzene	10.5	0.115	"	10.6		99.1	65-135			
Xylenes (total)	54.0	0.115	"	53.3		101	65-135			
Methyl tert-butyl ether	16.1	0.556	"	14.5		111	65-135			
Surrogate: a,a,a-Trifluorotoluene	59.5		"	50.3		118	65-135			
Surrogate: 4-Bromofluorobenzene	44.3		"	41.9		106	65-135			

#### Matrix Spike (1030490-MS1)

Source: P103440-01

Prepared & Analyzed: 03/21/01

Gasoline	937	14.2	ppmv	780	174	97.8	65-135			
Benzene	25.1	0.157	"	10.0	14.2	109	65-135			
Toluene	53.3	0.133	"	51.3	2.53	99.0	65-135			
Ethylbenzene	11.7	0.115	"	10.6	ND	110	65-135			
Xylenes (total)	73.7	0.115	"	53.3	19.6	102	65-135			
Methyl tert-butyl ether	21.4	0.556	"	14.5	2.79	128	65-135			
Surrogate: a,a,a-Trifluorotoluene	57.8		"	50.3		115	65-135			
Surrogate: 4-Bromofluorobenzene	42.4		"	41.9		101	65-135			

#### Matrix Spike (1030490-MS2)

Source: P103478-03

Prepared & Analyzed: 03/22/01

Gasoline	611	14.2	ppmv	780	ND	78.3	65-135			
Benzene	9.94	0.157	"	10.0	ND	99.4	65-135			
Toluene	47.5	0.133	"	51.3	ND	92.6	65-135			
Ethylbenzene	10.4	0.115	"	10.6	ND	98.1	65-135			
Xylenes (total)	52.6	0.115	"	53.3	ND	98.7	65-135			
Methyl tert-butyl ether	18.1	0.556	"	14.5	ND	125	65-135			
Surrogate: a,a,a-Trifluorotoluene	57.3		"	50.3		114	65-135			
Surrogate: 4-Bromofluorobenzene	43.4		"	41.9		104	65-135			





Cambria Environmental - Oakland  
1144 65th St., Suite C  
Oakland CA, 94608

Project: ARCO  
Project Number: 6041-Dublin  
Project Manager: Ron Scheele

Reported:  
03/23/01 16:52

## Total Petroleum Hydrocarbons as Gasoline and BTEX by EPA 8015M/8020M - Quality Control Sequoia Analytical - Petaluma

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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### Batch 1030490 - EPA 5030, waters

Matrix Spike Dup (1030490-MSD1)		Source: P103440-01		Prepared & Analyzed: 03/21/01						
Gasoline	799	14.2	ppmv	780	174	80.1	65-135	15.9	20	
Benzene	24.9	0.157	"	10.0	14.2	107	65-135	0.800	20	
Toluene	52.2	0.133	"	51.3	2.53	96.8	65-135	2.09	20	
Ethylbenzene	10.9	0.115	"	10.6	ND	103	65-135	7.08	20	
Xylenes (total)	74.6	0.115	"	53.3	19.6	103	65-135	1.21	20	
Methyl tert-butyl ether	19.7	0.556	"	14.5	2.79	117	65-135	8.27	20	
Surrogate: <i>a,a,a</i> -Trifluorotoluene	61.1		"	50.3		121	65-135			
Surrogate: 4-Bromofluorobenzene	40.9		"	41.9		97.6	65-135			

Matrix Spike Dup (1030490-MSD2)		Source: P103478-03		Prepared & Analyzed: 03/22/01						
Gasoline	628	14.2	ppmv	780	ND	80.5	65-135	2.74	20	
Benzene	9.95	0.157	"	10.0	ND	99.5	65-135	0.101	20	
Toluene	47.8	0.133	"	51.3	ND	93.2	65-135	0.630	20	
Ethylbenzene	10.4	0.115	"	10.6	ND	98.1	65-135	0	20	
Xylenes (total)	53.7	0.115	"	53.3	ND	101	65-135	2.07	20	
Methyl tert-butyl ether	18.1	0.556	"	14.5	ND	125	65-135	0	20	
Surrogate: <i>a,a,a</i> -Trifluorotoluene	56.6		"	50.3		113	65-135			
Surrogate: 4-Bromofluorobenzene	44.6		"	41.9		106	65-135			





Cambria Environmental - Oakland  
1144 65th St., Suite C  
Oakland CA, 94608

Project: ARCO  
Project Number: 6041-Dublin  
Project Manager: Ron Scheele

Reported:  
03/23/01 16:52

## Notes and Definitions

QR-04 Results between the primary and confirmation columns varied by greater than 40% RPD.

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







**APPENDIX C**

**FIELD DATA SHEETS**

## WELL DEPTH MEASUREMENTS

Well ID	Time	Top of Screen	DTB	DTP	DTW	DOP	Casing Dia	Comments
MW-1	7:00	12'	17.5'		10.65		4"	
MW-2	6:57	10'	14.1'		8.50		4"	
MW-3	6:58	11'	14.7'		9.61		4"	
MW-4	6:55				7.97		4"	
MW-5	6:50				9.65		4"	
MW-6	6:53				9.62		4"	
VW-2	7:02	4'	9.0'		8.87		4"	
SHELL MW-6	6:40		22.70		9.05		4"	Wells Located at neighboring shell station
SHELL MW-7	6:45		16.30		6.39		4"	

Project Name: ARCO 6041\_\_\_\_\_

Project Number: 436-1610\_\_\_\_\_

CAMBRIA

Measured By:

S. Hall

Date:

2-9-01

Project Name: <b>ARCO 6041</b>	Cambria Mgr: <b>Darryk Ataide</b>	Well ID: <b>MW-1</b>
Project Number: <b>436 - 1610</b>	Date: <b>2-9-01</b>	Well Yield:
Site Address: <b>7249 Village Pkwy, Dublin</b>	Sampling Method:	Well Diameter: <b>4 pvc</b>
	<b>Disposable bailer</b>	Technician(s): <b>SC</b>
Initial Depth to Water: <b>10.65</b>	Total Well Depth: <b>17.50</b>	Water Column Height: <b>6.85</b>
Volume/ft: <b>0.65</b>	1 Casing Volume: <b>4.45</b>	3 Casing Volumes: <b>13.35</b>
Purge/No Purge: <b>purge</b>		
Purging Device: <b>Submersible Pump</b>	Did Well Dewater?: <b>no</b>	Total Gallons Purged: <b>13</b>
Start Purge Time: <b>8:30</b>	Stop Purge Time: <b>8:40</b>	Total Time: <b>10 mins</b>

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

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

[illegible]

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-1	2-9-01	8:46	4 VOA	HCL	TPHg, BTEX, MTBE	8020
DU1						

## WELL SAMPLING FORM

Project Name: ARCO 6041	Cambria Mgr: Darryk Ataide	Well ID: MW-2
Project Number: 436 - 1610	Date: 2-9-01	Well Yield:
Site Address: 7249 Village Pkwy, Dublin	Sampling Method:  Disposable bailer	Well Diameter: 4" pvc
		Technician(s): SG
Initial Depth to Water: 8.50	Total Well Depth: 14.10	Water Column Height: 5.60
Volume/ft: 0.65	1 Casing Volume: 3.64	3 Casing Volumes: 10.92
Purge/No Purge: purge		
Purging Device: Submersible Pump	Did Well Dewater?: NO	Total Gallons Purged: 11
Start Purge Time: 8:55	Stop Purge Time: 9:01	Total Time: 6 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
8:57	3	13.7	7.51	1315	
8:59	6	13.5	7.85	1217	
9:02	11	13.9	7.60	1242	
					DO = 0.53 mg/L

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-2	2-9-01	9:07	4 VOA	HCL	TPHg, BTEX, MTBE	8020

Project Name: ARCO 6041	Cambria Mgr: Darryk Ataide	Well ID: MK-3
Project Number: 436 - 1610	Date: 2-9-01	Well Yield:
Site Address: 7249 Village Pkwy, Dublin	Sampling Method:	Well Diameter: 4" pvc
	Disposable bailer	Technician(s): SS
Initial Depth to Water: 4.61	Total Well Depth: 14.70	Water Column Height: 5.09
Volume/ft: 0.65	1 Casing Volume: 3.30	3 Casing Volumes: 9.92
Purge/No Purge: parse		
Purging Device: Submersible Pump	Did Well Dewater?: NO	Total Gallons Purged: 10
Start Purge Time: 9:18	Stop Purge Time: 9:24	Total Time: 6 mins

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

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

Time	Casing Volume	Temp. C	pH	Cond. uS	Comments
9:20	3	13.0	7.08	1115	
9:22	6	13.5	7.21	972	
9:25	10	13.9	7.15	984	
					DO =
					0.51mg/l

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-3	2-9-01	9:30	4 VOA	HCL	TPHg, BTEX, MTBE	8020

## WELL SAMPLING FORM

Project Name: ARCO 6041	Cambria Mgr: Darryk Ataide	Well ID: Shell MW-6
Project Number: 436 - 1610	Date: 2-9-01	Well Yield:
Site Address: 7249 Village Pkwy, Dublin	Sampling Method:  Disposable bailer	Well Diameter: 4" pvc
		Technician(s): SG
Initial Depth to Water: 9.05	Total Well Depth: 22.70	Water Column Height: 13.65
Volume/ft: 0.65	1 Casing Volume: 8.87	3 Casing Volumes: 26.61
Purge/No Purge: purge		
Purging Device: Submersible Pump	Did Well Dewater?: NO	Total Gallons Purged: 26
Start Purge Time: 7:20	Stop Purge Time: 7:35	Total Time: 15mins

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
7:25	8	14.6	7.31	2115	
7:30	16	14.9	7.59	1822	
7:36	26	15.3	7.63	1751	
					DO =
					1.29 mg/L

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
Shell MW-6	2-8-01	7:41	4 VOA	HCL	TPHg, BTEX, MTBE	8020

Project Name: ARCO 6041	Cambria Mgr: Darryk Ataide	Well ID: Shell MW-7
Project Number: 436 - 1610	Date: 2-9-01	Well Yield:
Site Address: 7249 Village Pkwy, Dublin	Sampling Method:	Well Diameter: 4" pvc
	Disposable bailer	Technician(s): SC
Initial Depth to Water: 6.39	Total Well Depth: 16.30	Water Column Height: 9.91
Volume/ft: 0.65	1 Casing Volume: 6.44	3 Casing Volumes: 19.32
Purge/No Purge: none		
Purging Device: Submersible Pump	Did Well Dewater?: no	Total Gallons Purged: 29
Start Purge Time: 7:55	Stop Purge Time: 8:10	Total Time: 15 mins

$$1 \text{ Casing Volume} = \text{Water column height} \times \text{Volume/ft.}$$

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

Time	Casing Volume	Temp. C	pH	Cond. uS	Comments
7:59	6	15.4	7.50	1312	
8:05	12	15.1	7.59	1384	
8:11	19	14.8	7.51	1319	
					DO =
					1.13 mg/l

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
Shell MW-7	02-09-01	3:21	4 VOA	HCL	TPHg, BTEX, MTBE	8020



## WELL SAMPLING FORM

Project Name: <b>ARCO 6041</b>	Cambria Mgr: <b>Darryk Ataide</b>	Well ID: <b>VW-2</b>
Project Number: <b>436 - 1610</b>	Date: <b>2-9-01</b>	Well Yield:
Site Address: <b>7249 Village Pkwy, Dublin</b>	Sampling Method:	Well Diameter: <b>" pvc</b>
	<b>Disposable bailer</b>	Technician(s): <b>SG</b>
Initial Depth to Water: <b>8.87</b>	Total Well Depth: <b>9.00</b>	Water Column Height:
Volume/ft:	1 Casing Volume:	3 Casing Volumes:
Purge/No Purge:		
Purging Device: <b>Submersible Pump</b>	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

*In sufficient water  
no sample*

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
<b>VW-2</b>	<b>2-9-01</b>		<b>4 VOA</b>	<b>HCL</b>	<b>TPHg, BTEX, MTBE</b>	<b>8020</b>