

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

NOV 02 2001

Re: **Quarterly Groundwater Monitoring Report
Third Quarter 2001**
ARCO Service Station No. 6041
7249 Village Parkway
Dublin, California
Cambria Project # 438-1643



Dear Ms. chu:

On behalf of ARCO, Cambria Environmental Technology, Inc. (Cambria) is submitting the attached report which presents the results of the third quarter 2001 groundwater monitoring program at ARCO Service Station No. 6041, located at 7249 Village Parkway, Dublin, California. 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, RG
Senior Project Manager

Attachment: Quarterly Groundwater Monitoring Report, Third Quarter 2001

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

Oakland, CA
San Ramon, CA
Sonoma, CA

**Cambria
Environmental
Technology, Inc.**

1144 65th Street
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Oakland, CA 94608
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C A M B R I A

Quarterly Groundwater Monitoring Report

Third Quarter 2001

NOV 02 2001

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



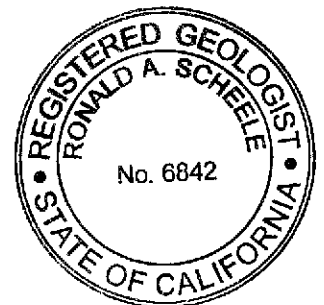
Prepared For:

Mr. Paul Supple
ARCO

October 26, 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.: 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 (THIRD - 2001):

1. Submitted quarterly groundwater monitoring report for second quarter, 2001.
2. Performed quarterly groundwater monitoring and sampling on July 17, 2001.
3. Performed soil sampling during station upgrade and over-excavation activities in July and August 2001.
4. Installed two tank backfill wells.

WORK PROPOSED FOR NEXT QUARTER (FOURTH - 2001):

1. Prepare and submit quarterly groundwater monitoring report for third quarter 2001.
2. Perform quarterly groundwater monitoring and sampling for fourth quarter 2001.
3. Prepare and submit *Underground Storage Tank, Piping Removal, and Well Abandonment Report*.
4. Install remediation piping during station upgrade activities.

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 (1st/3rd Quarters)</u>
Frequency of Groundwater Monitoring	<u>Quarterly</u>
Is Free Product (FP) Present On-site:	<u>No</u>
Bulk Soil Removed to Date :	<u>3,208 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>Performed temporary groundwater extraction and soil over-excavation</u>
Average Depth to Groundwater:	<u>9.32 feet</u>
Groundwater Flow Direction and Gradient	<u>0.003 ft/ft toward south-southwest</u>



DISCUSSION:

Based on field measurements collected on July 17, 2001, groundwater beneath the site flows towards the south-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 are consistent with the previous sampling event with the exception of wells MW-2 and MW-3, which showed increases in MTBE. The maximum TPHg, benzene, and MTBE concentrations were detected in well MW-3 at 21,000, 1,500, and 82,000 micrograms per liter ($\mu\text{g/L}$), respectively.



Station upgrade activities conducted during the third quarter included underground storage tank and product piping removal, over-excavation of TPH-impacted soil, and the installation of new underground storage tanks, piping, and dispensers. Underground storage tank and product piping sampling occurred on July 27, 2001.

Six mobile DVE events have been performed at the site since November 22, 2000. The final DVE event was performed in the second quarter 2001, and ~~site~~ DVE remediation effectiveness will be assessed after the completion of the fourth quarter groundwater sampling event and station upgrade activities.

- said it would occur after 3rd qtr event in last rpt

ATTACHMENTS:

- Figure 1 - Groundwater Elevation Contour and Analytical Summary Map
- Table 1 - Historical Groundwater Elevation and Analytical Data
- 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

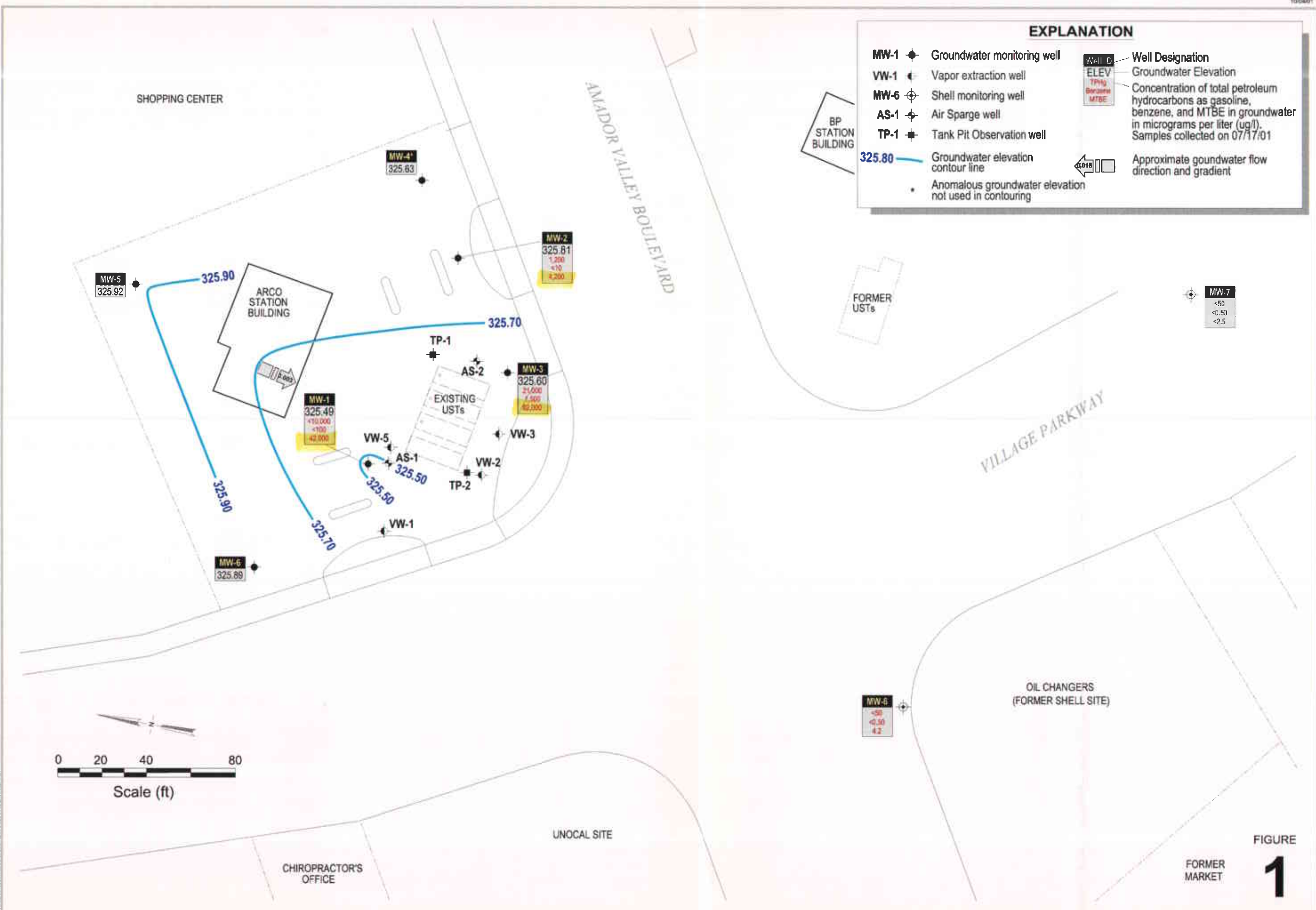


FIGURE
1

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			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)
							Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)						
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	--	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	--		
MW-1	04-17-01	336.56	11.09	0.00	325.47	04-17-01	2,900	66.0	<10.0	33.2	25.1	46,500	--	0.63 P	
DUP	04-17-01	NR	NR	NR	NR	04-17-01	2,600	70.1	<20.0	32.7	30.6	45,400	--		
MW-1	07-17-01	336.56	11.07	0.00	325.49	07-17-01	<10,000	<100	<100	130	520	42,000	--	0.69 P	
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	--		
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	--		

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Well Number	Date Gauged	TOC	Depth to Water (feet)	FP Thickness (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPH			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)					Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)						
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	--	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									
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-2	04-17-01	334.80	9.12	0.00	325.68	Not Sampled: Well sampled during first and third quarters									
MW-2	07-17-01	334.80	8.99	0.00	325.81	07-17-01	1,200	<10	<10	<10	<10	4,200	--	0.69 P	
DUP	07-17-01	NR	NR	NR	NR	07-17-01	3,500	<10	<10	<10	<10	3,500	--		
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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		Elevation (ft-MSL)			Elevation (ft-MSL)		Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)						
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	--		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		
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-3	04-17-01	335.53	9.94	0.00	325.59	04-17-01	16,400	1,680	<25.0	310	2,290	48,700	--	0.41	P
MW-3	07-17-01	335.53	9.93	0.00	325.60	07-17-01	21,000	1,500	<100	1,100	690	82,000	--	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									
MW-4	04-17-01	334.22	8.90	0.00	325.32	Not sampled: well not part of sampling program									
MW-4	07-17-01	334.22	8.59	0.00	325.63	Not sampled: well not part of sampling program									

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7249 Village Parkway, Dublin, California

Well Number	Date Gauged	TOC	Depth	FP	Groundwater	Date Sampled	TPH			Ethyl-	Total	MTBE	MTBE	Dissolved	Purged/
		Elevation (ft-MSL)	to Water (feet)	Thickness (feet)	Elevation (ft-MSL)		Gasoline ($\mu\text{g/L}$)	Benzene ($\mu\text{g/L}$)	Toluene ($\mu\text{g/L}$)	benzene ($\mu\text{g/L}$)	Xylenes ($\mu\text{g/L}$)	8021B* ($\mu\text{g/L}$)	8260 ($\mu\text{g/L}$)	Oxygen (mg/L)	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-5	04-17-01	335.87	9.92	0.00	325.95	Not sampled: well not part of sampling program									
MW-5	07-17-01	335.87	9.95	0.00	325.92	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									
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									

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	Depth	FP	Groundwater	Date Sampled	TPH				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)	to Water (feet)	Thickness (feet)	Elevation (ft-MSL)		Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)							
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										
MW-6	04-17-01	335.84	10.03	0.00	325.81	Not sampled: well not part of sampling program										
MW-6	07-17-01	335.84	9.95	0.00	325.89	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										
VW-2	04-17-01	NR	9.00	0.00	NR	Not sampled: Well Dry										
VW-2	07-17-01	NR	8.97	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	Depth	FP	Groundwater	Date Sampled	TPH			Ethyl-	Total	MTBE	MTBE	Dissolved	Purged/
		Elevation (ft-MSL)	to Water (feet)	Thickness (feet)	Elevation (ft-MSL)		Gasoline ($\mu\text{g/L}$)	Benzene ($\mu\text{g/L}$)	Toluene ($\mu\text{g/L}$)	benzene ($\mu\text{g/L}$)	Xylenes ($\mu\text{g/L}$)	8021B* ($\mu\text{g/L}$)	8260 ($\mu\text{g/L}$)	Oxygen (mg/L)	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	--		
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-6	04-17-01	NR	10.17	0.00	NR	04-17-01	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	0.95	P
Shell MW-6	07-17-01	NR	9.50	0.00	NR	07-17-01	<50	<0.50	<0.50	<0.50	<0.50	4.2	--	1.03	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
Shell MW-7	04-17-01	NR	7.22	0.00	NR	04-17-01	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	--	1.12	P
Shell MW-7	07-17-01	NR	6.93	0.00	NR	07-17-01	<50	<0.50	<0.50	<0.50	<0.50	<2.5	--	1.05	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

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).

DUP: duplicate

Table 2
Groundwater Flow Direction and Gradient

ARCO Service Station 6041
7249 Village Parkway, Dublin, California

Date Measured	Average Flow Direction	Average Hydraulic Gradient
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
02-09-01	West-Southwest	0.003
04-17-01	South-Southwest	0.015
07-17-01	South-Southwest	0.003

APPENDIX A

SAMPLING AND ANALYSIS PROCEDURES

APPENDIX A

SAMPLING AND ANALYSIS PROCEDURES

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**

July 25 , 2001

Ron Scheele
Cambria Environmental - Emeryville
6262 Hollis Street
Emeryville, CA 94608
RE: ARCO / P107360

Enclosed are the results of analyses for samples received by the laboratory on 07/19/01. 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/Dublin
Project Manager: Ron Scheele

Reported:
07/25/01 16:40

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	P107360-01	Water	07/17/01 07:15	07/19/01 15:00
MW-2	P107360-02	Water	07/17/01 06:00	07/19/01 15:00
MW-3	P107360-03	Water	07/17/01 06:35	07/19/01 15:00
Shell MW-6	P107360-04	Water	07/17/01 16:40	07/19/01 15:00
Shell MW-7	P107360-05	Water	07/17/01 17:30	07/19/01 15:00
DUP	P107360-06	Water	07/17/01 00:00	07/19/01 15:00

Cambria Environmental - Emeryville
 6262 Hollis Street
 Emeryville CA, 94608

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

Reported:
 07/25/01 16:40

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 (P107360-01) Water Sampled: 07/17/01 07:15 Received: 07/19/01 15:00									
Gasoline (C6-C12)	ND	10000	ug/l	200	1070580	07/24/01	07/24/01	EPA 8015M/8020M	
Benzene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
Ethylbenzene	130	100	"	"	"	"	"	"	
Xylenes (total)	520	100	"	"	"	"	"	"	
Methyl tert-butyl ether	42000	500	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		103 %		65-135	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.0 %		65-135	"	"	"	"	
MW-2 (P107360-02) Water Sampled: 07/17/01 06:00 Received: 07/19/01 15:00									
Gasoline (C6-C12)	1200	1000	ug/l	20	1070580	07/24/01	07/24/01	EPA 8015M/8020M	
Benzene	ND	10	"	"	"	"	"	"	
Toluene	ND	10	"	"	"	"	"	"	
Ethylbenzene	ND	10	"	"	"	"	"	"	
Xylenes (total)	ND	10	"	"	"	"	"	"	
Methyl tert-butyl ether	4200	50	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		102 %		65-135	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.0 %		65-135	"	"	"	"	
MW-3 (P107360-03) Water Sampled: 07/17/01 06:35 Received: 07/19/01 15:00									
Gasoline (C6-C12)	21000	10000	ug/l	200	1070580	07/24/01	07/24/01	EPA 8015M/8020M	
Benzene	1500	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
Ethylbenzene	1100	100	"	"	"	"	"	"	
Xylenes (total)	690	100	"	"	"	"	"	"	
Methyl tert-butyl ether	82000	500	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		102 %		65-135	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.0 %		65-135	"	"	"	"	

Sequoia Analytical - Petaluma

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 Environmental - Emeryville
 6262 Hollis Street
 Emeryville CA, 94608

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

Reported:
 07/25/01 16:40

**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
Shell MW-6 (P107360-04) Water Sampled: 07/17/01 16:40 Received: 07/19/01 15:00									
Gasoline (C6-C12)	ND	50	ug/l	1	1070580	07/24/01	07/24/01	EPA 8015M/8020M	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	4.2	2.5	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		101 %		65-135	"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		94.3 %		65-135	"	"	"	"	
Shell MW-7 (P107360-05) Water Sampled: 07/17/01 17:30 Received: 07/19/01 15:00									
Gasoline (C6-C12)	ND	50	ug/l	1	1070580	07/24/01	07/24/01	EPA 8015M/8020M	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		100 %		65-135	"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		93.0 %		65-135	"	"	"	"	
DUP (P107360-06) Water Sampled: 07/17/01 00:00 Received: 07/19/01 15:00									
Gasoline (C6-C12)	3500	1000	ug/l	20	1070580	07/24/01	07/24/01	EPA 8015M/8020M	
Benzene	ND	10	"	"	"	"	"	"	
Toluene	ND	10	"	"	"	"	"	"	
Ethylbenzene	ND	10	"	"	"	"	"	"	
Xylenes (total)	ND	10	"	"	"	"	"	"	
Methyl tert-butyl ether	3500	50	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		107 %		65-135	"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		98.3 %		65-135	"	"	"	"	

Sequoia Analytical - Petaluma

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 Environmental - Emeryville
 6262 Hollis Street
 Emeryville CA, 94608

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

Reported:
 07/25/01 16:40

**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 1070580 - EPA 5030, waters

Blank (1070580-BLK1)

Prepared & Analyzed: 07/24/01

Gasoline (C6-C12)	ND	50	ug/l							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Methyl tert-butyl ether	ND	2.5	"							
<i>Surrogate: a,a,a-Trifluorotoluene</i>	305		"	300		102	65-135			
<i>Surrogate: 4-Bromofluorobenzene</i>	284		"	300		94.7	65-135			

LCS (1070580-BS1)

Prepared & Analyzed: 07/24/01

Gasoline (C6-C12)	2350	50	ug/l	2750		85.5	65-135			
Benzene	37.6	0.50	"	33.0		114	65-135			
Toluene	199	0.50	"	198		101	65-135			
Ethylbenzene	41.6	0.50	"	46.0		90.4	65-135			
Xylenes (total)	215	0.50	"	230		93.5	65-135			
Methyl tert-butyl ether	64.7	2.5	"	52.5		123	65-135			
<i>Surrogate: a,a,a-Trifluorotoluene</i>	342		"	300		114	65-135			
<i>Surrogate: 4-Bromofluorobenzene</i>	303		"	300		101	65-135			

Matrix Spike (1070580-MS1)

Source: P107359-04

Prepared & Analyzed: 07/24/01

Gasoline (C6-C12)	3160	50	ug/l	2750	410	100	65-135			
Benzene	44.3	0.50	"	33.0	ND	134	65-135			
Toluene	232	0.50	"	198	ND	117	65-135			
Ethylbenzene	47.4	0.50	"	46.0	ND	103	65-135			
Xylenes (total)	226	0.50	"	230	ND	98.3	65-135			
Methyl tert-butyl ether	67.4	2.5	"	52.5	ND	128	65-135			
<i>Surrogate: a,a,a-Trifluorotoluene</i>	357		"	300		119	65-135			
<i>Surrogate: 4-Bromofluorobenzene</i>	303		"	300		101	65-135			

Sequoia Analytical - Petaluma

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 Environmental - Emeryville 6262 Hollis Street Emeryville CA, 94608	Project: ARCO Project Number: 6041/Dublin Project Manager: Ron Scheele	Reported: 07/25/01 16:40
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**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 1070580 - EPA 5030, waters

Matrix Spike Dup (1070580-MSD1)	Source: P107359-04			Prepared & Analyzed: 07/24/01						
Gasoline (C6-C12)	3100	50	ug/l	2750	410	97.8	65-135	1.92	20	
Benzene	42.5	0.50	"	33.0	ND	129	65-135	4.15	20	
Toluene	226	0.50	"	198	ND	114	65-135	2.62	20	
Ethylbenzene	45.9	0.50	"	46.0	ND	99.8	65-135	3.22	20	
Xylenes (total)	223	0.50	"	230	ND	97.0	65-135	1.34	20	
Methyl tert-butyl ether	66.4	2.5	"	52.5	ND	126	65-135	1.49	20	
<i>Surrogate: a,a,a-Trifluorotoluene</i>	351		"	300		117	65-135			
<i>Surrogate: 4-Bromofluorobenzene</i>	309		"	300		103	65-135			

Cambria Environmental - Emeryville
6262 Hollis Street
Emeryville CA, 94608

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

Reported:
07/25/01 16:40

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

ARCO Products Company

Division of Atlantic Richfield Company

Chain of Custody

RAT#8

Task Order No.

WARH 2718700

ARCO Facility no.

6041

City (Facility)

Dublin

Project manager (Consultant)

Jason Olson / Ron Scheele

Laboratory name

Sequoia

ARCO engineer

Paul Supple

Telephone no. (ARCO)

925-299-8241

Telephone no. (Consultant)

510-450-8291

Fax no. (Consultant)

510-450-8295

Contract number

Consultant name

Cambridge Env

Address (Consultant)

6262 Hollis St. Emeryville, Ca

Method of shipment

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX 802/EPA 8020	BTEX/TPH/TPH-EPA 1631/20/20/15	TPH Modified 8015 Gas Diesel	Oil and Grease 413.1 413.2	TPH EPA 418.1/SMR01E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCUP Semi Metals: VOA VOAD	CAMELAS EPA 601/0700 TLOC 311/312/313	Lead On-Site Lead EPA 7420/7421	
			Soil	Water	Other	Ice	Acid														
MW-1		4		X		X	X	7-17-01	7:15		X										
MW 2		4		X		X	X	7-17-01	6:00		X										
MW 3		4		X		X	X	7-17-01	6:35		X										
shell MW 6		4		X		X	X	7-17-01	4:40		X										
shell MW 7		4		X		X	X	7-17-01	5:30		X										
OUP		4		X		X	X	7-17-01			X										

Special detection Limit/reporting

Lowest possible b/o

Special QA/QC

Remarks

COOLER CUSTODY SEALS INTACT

NOT INTACT

COOLER TEMPERATURE 3.0 °C

Lab number

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

S. Hill

Date

7-17-01

Time

17:05

Received by

see note place

Relinquished by

D. Lopez

Date

7-19-01

Time

14:10

Received by

Atorrenzo at lab 1500

Relinquished by

Received by

Date

Time

APPENDIX C

FIELD DATA SHEETS

WELL DEPTH MEASUREMENTS

Well ID	Time	Product Depth	Water Depth	Product Thickness	Well Depth	Comments
MW-1	4:47		11.07		17.5	
MW-2	4:48		8.99		14.1	
MW-3	4:44		9.93		14.7	
MW-4	4:40		8.59			
MW-5	4:32		9.95			
MW-6	4:35		9.95			
Shell MW-6	4:25		9.50		22.70	
Shell MW-7	4:20		6.93		16.30	
VW-2	4:30		8.97		9.0	

Project Name: Arco 6041Project Number: 438-1643Measured By: J. HillDate: 07-17-01

WELL SAMPLING FORM

Project Name: ARCO 6041	Cambria Mgr: Darryk Ataide	Well ID: MW-1
Project Number: 436 - 1610	Date: 7-17-01	Well Yield:
Site Address: 7249 Village Pkwy, Dublin	Sampling Method: Disposable bailer	Well Diameter: 4" pvc
		Technician(s): SA
Initial Depth to Water: 11.07	Total Well Depth: 17.50	Water Column Height: 6.43
Volume/ft: 0.65	1 Casing Volume: 4.17	3 Casing Volumes: 12.5
Purge/No Purge: purge		
Purging Device: Submersible Pump	Did Well Dewater?: NO	Total Gallons Purged: 12
Start Purge Time: 6:55	Stop Purge Time: 7:09	Total Time: 14 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
7:00	4	16.8	7.59	1529	
7:05	8	16.9	7.54	1720	
7:10	12	16.9	7.20	1782	
					00 = 0.69ms/L

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-1	7-17-01	7:15	4 VOA	HCL	TPHg, BTEX, MTBE	8020

WELL SAMPLING FORM

Project Name: ARCO 6041	Cambria Mgr: Darryk Ataide	Well ID: MW-2
Project Number: 436 - 1610	Date: 7-17-01	Well Yield:
Site Address: 7249 Village Pkwy, Dublin	Sampling Method:	Well Diameter: 4" PVC
	Disposable bailer	Technician(s): SC
Initial Depth to Water: 8.99	Total Well Depth: 14.10	Water Column Height: 5.11
Volume/ft: 0.65	1 Casing Volume: 3.32	3 Casing Volumes: 9.96
Purge/No Purge: Purge		
Purging Device: Submersible Pump	Did Well Dewater?: NO	Total Gallons Purged: 10
Start Purge Time: 5:40	Stop Purge Time: 5:54	Total Time: 14 min

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
5:45	4	16.5	7.31	1370	
5:50	8	16.7	7.20	1815	
5:55	10	16.3	7.35	1872	
					DO = .69 mg/L

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-2	7-17-01	6:00	4 VOA	HCL	TPHg, BTEX, MTBE	8020
DMP						

WELL SAMPLING FORM

Project Name: ARCO 6041	Cambria Mgr: Darryk Ataide	Well ID: MW-3
Project Number: 436 - 1610	Date: 7-17-01	Well Yield:
Site Address: 7249 Village Pkwy, Dublin	Sampling Method:	Well Diameter: 4" pvc
	Disposable bailer	Technician(s): SC
Initial Depth to Water: 9.93	Total Well Depth: 14.70	Water Column Height: 4.77
Volume/ft: 0.65	1 Casing Volume: 3.10	3 Casing Volumes: 9.30
Purge/No Purge: purge		
Purging Device: Submersible Pump	Did Well Dewater?: no	Total Gallons Purged: 9
Start Purge Time: 6:15	Stop Purge Time: 6:29	Total Time: 14 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
6:20	3	16.8	7.25	1720	
6:25	6	16.5	7.62	1785	
6:30	9	16.3	7.65	1769	
					DO = 0.51 mg/L

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-3	7-17-01	6:35	4 VOA	HCL	TPHg, BTEX, MTBE	8020

WELL SAMPLING FORM

Project Name: ARCO 6041	Cambria Mgr: Darryk Ataide	Well ID: <i>VW-2</i>
Project Number: 436 - 1610	Date: <i>7-17-01</i>	Well Yield:
Site Address: <i>7249 Village Pkwy, Dublin</i>	Sampling Method:	Well Diameter: <i>4" pvc</i>
	<i>Disposable bailer</i>	Technician(s): <i>SA</i>
Initial Depth to Water: <i>8.97</i>	Total Well Depth: <i>9.00</i>	Water Column Height: <i>0.03</i>
Volume/ft:	1 Casing Volume:	3 Casing Volumes:
Purge/No Purge:		
Purging Device: <i>Submersible Pump</i>	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

*Insufficient water
for a sample
no sample taken*

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
			<i>4 VOA</i>	<i>HCL</i>	<i>TPHg, BTEX, MTBE</i>	<i>8020</i>

WELL SAMPLING FORM

Project Name: ARCO 6041	Cambria Mgr: Darryk Ataide	Well ID: <i>shell MW-6</i>
Project Number: 436 - 1610	Date: <i>7-17-01</i>	Well Yield:
Site Address: <i>7249 Village Pkwy, Dublin</i>	Sampling Method:	Well Diameter: <i>4" pvc</i>
	Disposable bailer	Technician(s): <i>59</i>
Initial Depth to Water: <i>9.50</i>	Total Well Depth: <i>22.70</i>	Water Column Height: <i>13.2</i>
Volume/ft: <i>0.65</i>	1 Casing Volume: <i>8.58</i>	3 Casing Volumes: <i>25.74</i>
Purge/No Purge: <i>purge</i>		
Purging Device: <i>Submersible Pump</i>	Did Well Dewater?: <i>no</i>	Total Gallons Purged: <i>26</i>
Start Purge Time: <i>4:00</i>	Stop Purge Time: <i>4:29</i>	Total Time: <i>29 mins</i>

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
<i>4:10</i>	<i>9</i>	<i>16.5</i>	<i>7.39</i>	<i>3999</i>	
<i>4:20</i>	<i>18</i>	<i>16.9</i>	<i>7.53</i>	<i>3999</i>	
<i>4:30</i>	<i>26</i>	<i>16.7</i>	<i>7.55</i>	<i>3999</i>	
					<i>DO = 1.03mg/L</i>

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
<i>Shell MW-6</i>	<i>7-17-01</i>	<i>4:40</i>	<i>4 VOA</i>	<i>HCL</i>	<i>TPHg, BTEX, MTBE</i>	<i>8020</i>

WELL SAMPLING FORM

Project Name: ARCO 6041	Cambria Mgr: Darryk Ataide	Well ID: Shell MW-7
Project Number: 436 - 1610	Date: 7-17-01	Well Yield:
Site Address: 7249 Village Pkwy, Dublin	Sampling Method:	Well Diameter: 4" pvc
	Disposable bailer	Technician(s): SG
Initial Depth to Water: 6.93	Total Well Depth: 16.30	Water Column Height: 9.37
Volume/ft: 0.65	1 Casing Volume: 6.09	3 Casing Volumes: 18.27
Purge/No Purge: purge		
Purging Device: Submersible Pump	Did Well Dewater?: NO	Total Gallons Purged: 18
Start Purge Time: 4:55	Stop Purge Time: 5:19	Total Time: 24 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
5:00	6	16.5	7.29	1927	
5:10	12	16.5	7.50	1950	
5:20	18	16.5	7.58	2017	
					DD = 1.05 mg/L

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
Shell MW-7	7-17-01	5:30	4 VOA	HCL	TPHg, BTEX, MTBE	8020