

C A M B R I A

October 10, 2000

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

*Why wasn't VW-2 purged before
sampling?*

Re: **Third Quarter 2000 Monitoring Report**
ARCO Service Station No. 6041
7249 Village Parkway
Dublin, California
Cambria Project # 436-1610



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 2000 groundwater monitoring program at ARCO Service Station No. 6041, located at 7249 Village Parkway, Dublin, California. The monitoring program complies with the Alameda County Health Care Services Agency (ACHCSA) requirements regarding underground tank investigations.

Please call if you have any questions.

Sincerely,

Cambria Environmental Technology, Inc.

Darryk Ataide, REA
Senior Project Manager

684 3339 cell pgr.

Attachment: Semi-Annual Groundwater Monitoring Report, Third Quarter 2000

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

Oakland, CA
San Ramon, CA
Sonoma, CA
Portland, OR

**Cambria
Environmental
Technology, Inc.**

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Oakland, CA 94608
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PROTECTION

C A M B R I A

Quarterly Groundwater Monitoring Report

Third Quarter 2000

ARCO Service Station No. 6041
7249 Village Parkway
Dublin, California
Cambria Project # 436-1610



Prepared For:

Mr. Paul Supple
ARCO


October 10, 2000

Prepared By:


Cambria Environmental Technology, Inc.
1144 65th Street, Suite B
Oakland, California 94608



Written by:



Jason D. Olson
Staff Environmental Scientist



Ron Scheele, RG
Senior Project Manager

ARCO SEMI-ANNUAL 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./Darryk Ataide, REA
 Consultant Project No.: 436-1610
 Primary Agency/Regulatory ID No.: ACHCSA

WORK PERFORMED THIS QUARTER (THIRD - 2000):



1. Submitted responses to ACHCSA letter dated July 13, 2000.
2. Performed semi-annual groundwater monitoring and sampling on August 20, 2000.
3. Prepared work plan (dated August 25, 2000) in response to ACHCSA letter dated July 13, 2000.

WORK PROPOSED FOR NEXT QUARTER (FOURTH - 2000):

1. Prepare and submit semi-annual groundwater monitoring report for third quarter 2000.
2. Obtain access to wells MW-6 and MW-7 at former Shell branded service station at 7194 Amador Valley, Dublin, CA. Sample wells per Cambria work plan dated August 25, 2000.
3. Implement mobile dual phase extraction (DVE) remediation per Cambria work plan dated August 25, 2000.

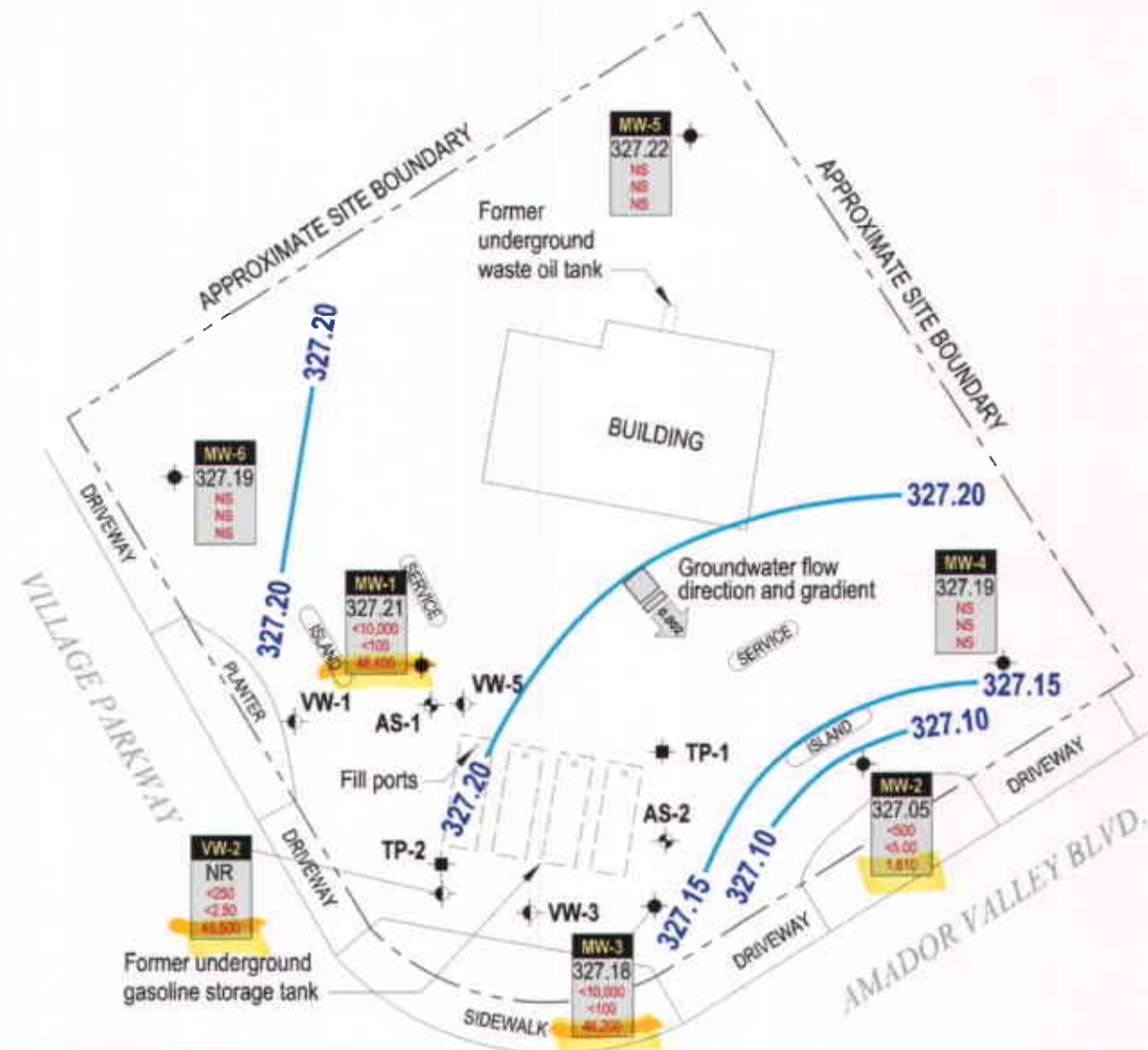
MONITORING:

Current Phase of Project:	<u>Monitoring</u>
Frequency of Groundwater Sampling	<u>Semi-annual (1st/3rd quarter): MW-1, MW-2, MW-3, VW-2</u>
Frequency of Groundwater Monitoring	<u>Semi-annual</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>None</u>
Average Depth to Groundwater:	<u>8.31 feet</u>
Groundwater Flow Direction and Gradient	<u>0.002 ft/ft toward south-southeast</u>

ATTACHMENTS:

- Figure 1 - Groundwater Elevation Contour and Analytical Summary Map
- Table 1 - Groundwater Monitoring 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





EXPLANATION

- MW-1 ● Groundwater monitoring well
- TP-1 ■ Tank pit observation well
- VW-1 ● Vapor extraction well
- AS-1 ● Air sparge well
- NR Groundwater elevation unavailable; top of casing not surveyed

327.15 — Groundwater elevation contour in feet above mean sea level

Well ID	Well Designation
ELEV	Groundwater Elevation
TP, VW, AS	Hydrocarbon concentrations in groundwater

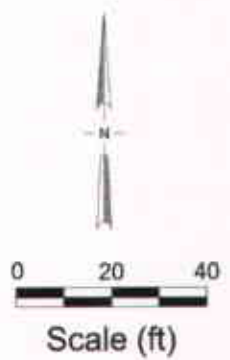


FIGURE
2

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ARCO Service Station 6041
7249 Village Parkway
Dublin, California



C A M B R I A

Groundwater Elevation Contour Map
August 18, 2000

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 to Water (feet)	FP Thickness (feet)	Groundwater		TPH			Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE 8021B* (µg/L)	MTBE 8240 (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
		Elevation (ft-MSL)			Elevation (ft-MSL)	Date Sampled	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	--	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	09-26-00	336.56	9.35	0.00	327.21	08-18-00	<10,000	<100	<100	<100	<100	48,400	--	1.50	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	--		
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	--		

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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 (µg/L)	Benzene (µg/L)	Toluene (µg/L)	benzene (µg/L)	Xylenes (µg/L)	8021B* (µg/L)	8240 (µg/L)	Oxygen (mg/L)	Not Purged (P/NP)		
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	09-26-00	334.80	7.75	0.00	327.05	08-18-00	<500	<5.00	<5.00	<5.00	<5.00	1,610	--	2.03	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		
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	09-26-00	335.53	8.35	0.00	327.18	08-18-00	<10,000	<100	<100	<100	<100	46,200	--	1.59	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	05-24-95	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	--				

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7249 Village Parkway, Dublin, California

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 8240 (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
		Elevation (ft-MSL)					Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)						
MW-4	11-28-95	334.22	8.21	0.00	326.01	11-28-95	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	05-23-96	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	08-23-96	Not sampled: well not part of sampling program								
MW-4	03-21-97	334.22	6.84	0.00	327.38	03-21-97	Not sampled: well not part of sampling program								
MW-4	08-20-97	334.22	8.32	0.00	325.90	08-20-97	Not sampled: well not part of sampling program								
MW-4	11-21-97	334.22	8.65	0.00	325.57	11-21-97	Not sampled: well not part of sampling program								
MW-4	02-12-98	334.22	6.35	0.00	327.87	02-12-98	Not sampled: well not part of sampling program								
MW-4	07-31-98	334.22	6.84	0.00	327.38	07-31-98	Not sampled: well not part of sampling program								
MW-4	02-17-99	334.22	7.50	0.00	326.72	02-17-99	Not sampled: well not part of sampling program								
MW-4	08-24-99	334.22	9.50	0.00	324.72	08-24-99	Not sampled: well not part of sampling program								
MW-4	03-01-00	334.22	6.93	0.00	327.29	03-01-00	Not sampled: well not part of sampling program								
MW-4	09-26-00	334.22	7.03	0.00	327.19	08-18-00	Not sampled: well not part of sampling program								
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	05-24-95	Not sampled: well sampled annually, during the first quarter								
MW-5	08-25-95	335.87	9.43	0.00	326.44	08-25-95	Not sampled: well sampled annually, during the first quarter								
MW-5	11-28-95	335.87	10.12	0.00	325.75	11-28-95	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	<3	--			
MW-5	05-23-96	335.87	7.87	0.00	328.00	05-23-96	Not sampled: well sampled annually, during the first quarter								
MW-5	08-23-96	335.87	9.46	0.00	326.41	08-23-96	Not sampled: well not part of sampling program								
MW-5	03-21-97	335.87	8.23	0.00	327.64	03-21-97	Not sampled: well not part of sampling program								
MW-5	08-20-97	335.87	9.92	0.00	325.95	08-20-97	Not sampled: well not part of sampling program								
MW-5	11-21-97	335.87	10.18	0.00	325.69	11-21-97	Not sampled: well not part of sampling program								
MW-5	02-12-98	335.87	6.45	0.00	329.42	02-12-98	Not sampled: well not part of sampling program								
MW-5	07-31-98	335.87	8.98	0.00	326.89	07-31-98	Not sampled: well not part of sampling program								
MW-5	02-17-99	335.87	7.65	0.00	328.22	02-17-99	Not sampled: well not part of sampling program								

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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 (µg/L)	Benzene (µg/L)	Toluene (µg/L)	benzene (µg/L)	Xylenes (µg/L)	8021B* (µg/L)	8240 (µg/L)	Oxygen (mg/L)	Not Purged (P/NP)
MW-5	08-24-99	335.87	8.10	0.00	327.77	08-24-99	Not sampled: well not part of sampling program								
MW-5	03-01-00	335.87	7.31	0.00	328.56	03-01-00	Not sampled: well not part of sampling program								
MW-5	09-26-00	335.87	8.65	0.00	327.22	08-18-00	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	05-24-95	Not sampled: well sampled annually, during the first quarter								
MW-6	08-25-95	335.84	9.71	0.00	326.13	08-25-95	Not sampled: well sampled annually, during the first quarter								
MW-6	11-28-95	335.84	10.28	0.00	325.56	11-28-95	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	05-23-96	Not sampled: well sampled annually, during the first quarter								
MW-6	08-23-96	335.84	9.58	0.00	326.26	08-23-96	Not sampled: well not part of sampling program								
MW-6	03-21-97	335.84	8.39	0.00	327.45	03-21-97	Not sampled: well not part of sampling program								
MW-6	08-20-97	335.84	9.98	0.00	325.86	08-20-97	Not sampled: well not part of sampling program								
MW-6	11-21-97	335.84	10.31	0.00	325.53	11-21-97	Not sampled: well not part of sampling program								
MW-6	02-12-98	335.84	3.15	0.00	332.69	02-12-98	Not sampled: well not part of sampling program								
MW-6	07-31-98	335.84	9.29	0.00	326.55	07-31-98	Not sampled: well not part of sampling program								
MW-6	02-17-99	335.84	7.72	0.00	328.12	02-17-99	Not sampled: well not part of sampling program								
MW-6	08-24-99	335.84	9.65	0.00	326.19	08-24-99	Not sampled: well not part of sampling program								
MW-6	03-01-00	335.84	7.35	0.00	328.49	03-01-00	Not sampled: well not part of sampling program								
MW-6	09-26-00	335.84	8.65	0.00	327.19	08-18-00	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								

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Well Number	Date Gauged	TOC	Depth	FP	Groundwater	Date Sampled	TPH				Ethyl- benzene	Total Xylenes	MTBE 8021B*	MTBE 8240	Dissolved Oxygen	Purged/ Not Purged (P/NP)
		Elevation (ft-MSL)	to Water (feet)	Thickness (feet)	Elevation (ft-MSL)		Gasoline ($\mu\text{g/L}$)	Benzene ($\mu\text{g/L}$)	Toluene ($\mu\text{g/L}$)	($\mu\text{g/L}$)						
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	09-26-00	NR	8.40	0.00	NR	08-18-00	<250	<2.50	<2.50	<2.50	<2.50	45,500		1.59	NP	

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7249 Village Parkway, Dublin, California

Well Number	Date Gauged	TOC	Depth	FP	Groundwater		TPH			Ethyl-	Total	MTBE	MTBE	Dissolved	Purged/
		Elevation (ft-MSL)	to Water (feet)	Thickness (feet)	Elevation (ft-MSL)	Date Sampled	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* ($\mu\text{g/L}$)	8240 ($\mu\text{g/L}$)	Oxygen (mg/L)	Not Purged (P/NP)

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

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

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 24 hours 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
- Sampler's initials
- Sample number (i.e., well designation)
- Date and time of collection
- Sample depth
- 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
- Well number
- Site-specific instructions
- Well specifications (expected total depth, depth of water, and product thickness)
- Specific analytical parameters

APPENDIX B
CERTIFIED ANALYTICAL REPORTS,
AND CHAIN-OF-CUSTODY DOCUMENTATION



Sequoia
Analytical

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

06 September 2000

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

RE: ARCO

Enclosed are the results of analyses for samples received by the laboratory on 21-Aug-00 15:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Richard Stover
Project Manager





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

Project: ARCO
Project Number: 6041-Dublin
Project Manager: Darryk Ataide

Reported:
06-Sep-00 15:19

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	P008472-01	Water	20-Aug-00 00:00	21-Aug-00 15:30
MW-2	P008472-02	Water	20-Aug-00 00:00	21-Aug-00 15:30
MW-3	P008472-03	Water	20-Aug-00 00:00	21-Aug-00 15:30
VW-2	P008472-04	Water	20-Aug-00 00:00	21-Aug-00 15:30
DUP	P008472-05	Water	20-Aug-00 00:00	21-Aug-00 15:30

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.

Richard Stover, Project Manager





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

Project: ARCO
Project Number: 6041-Dublin
Project Manager: Darryk Ataide

Reported:
06-Sep-00 15:19

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 (P008472-01) Water Sampled: 20-Aug-00 00:00 Received: 21-Aug-00 15:30									
Gasoline	ND	10000	ug/l	200	0080556	24-Aug-00	24-Aug-00	EPA 8015M/8020M	
Benzene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Xylenes (total)	ND	100	"	"	"	"	"	"	
Methyl tert-butyl ether	48400	500	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		<i>109 %</i>	<i>65-135</i>		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>93.7 %</i>	<i>65-135</i>		"	"	"	"	
MW-2 (P008472-02) Water Sampled: 20-Aug-00 00:00 Received: 21-Aug-00 15:30									
Gasoline	ND	500	ug/l	10	0080556	24-Aug-00	24-Aug-00	EPA 8015M/8020M	
Benzene	ND	5.00	"	"	"	"	"	"	
Toluene	ND	5.00	"	"	"	"	"	"	
Ethylbenzene	ND	5.00	"	"	"	"	"	"	
Xylenes (total)	ND	5.00	"	"	"	"	"	"	
Methyl tert-butyl ether	1610	25.0	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		<i>109 %</i>	<i>65-135</i>		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>90.0 %</i>	<i>65-135</i>		"	"	"	"	
MW-3 (P008472-03) Water Sampled: 20-Aug-00 00:00 Received: 21-Aug-00 15:30									
Gasoline	ND	10000	ug/l	200	0080556	24-Aug-00	24-Aug-00	EPA 8015M/8020M	
Benzene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Xylenes (total)	ND	100	"	"	"	"	"	"	
Methyl tert-butyl ether	46200	500	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		<i>108 %</i>	<i>65-135</i>		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		<i>87.7 %</i>	<i>65-135</i>		"	"	"	"	

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.

RA

Richard Stover, Project Manager





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

Project: ARCO
Project Number: 6041-Dublin
Project Manager: Darryk Ataide

Reported:
06-Sep-00 15:19

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
VW-2 (P008472-04) Water Sampled: 20-Aug-00 00:00 Received: 21-Aug-00 15:30									
Gasoline	ND	250	ug/l	5	0080556	24-Aug-00	24-Aug-00	EPA 8015M/8020M	
Benzene	ND	2.50	"	"	"	"	"	"	
Toluene	ND	2.50	"	"	"	"	"	"	
Ethylbenzene	ND	2.50	"	"	"	"	"	"	
Xylenes (total)	ND	2.50	"	"	"	"	"	"	
Methyl tert-butyl ether	537	12.5	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		104 %		65-135	"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		89.7 %		65-135	"	"	"	"	
DUP (P008472-05) Water Sampled: 20-Aug-00 00:00 Received: 21-Aug-00 15:30									
Gasoline	ND	10000	ug/l	200	0080556	24-Aug-00	24-Aug-00	EPA 8015M/8020M	
Benzene	ND	100	"	"	"	"	"	"	
Toluene	ND	100	"	"	"	"	"	"	
Ethylbenzene	ND	100	"	"	"	"	"	"	
Xylenes (total)	ND	100	"	"	"	"	"	"	
Methyl tert-butyl ether	45500	500	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		110 %		65-135	"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		89.3 %		65-135	"	"	"	"	

RS





Cambria Environmental - Oakland 1144 65th St., Suite C Oakland CA, 94608	Project: ARCO Project Number: 6041-Dublin Project Manager: Darryk Ataide	Reported: 06-Sep-00 15:19
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**Volatile Organic Compounds by EPA Method 8260B
Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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MW-1 (P008472-01) Water **Sampled: 20-Aug-00 00:00** **Received: 21-Aug-00 15:30**

Benzene	ND	1000	ug/l	2000	0080701	30-Aug-00	31-Aug-00	EPA 8260B	
Ethanol	ND	200000	"	"	"	"	"	"	
Ethylbenzene	ND	1000	"	"	"	"	"	"	
Methyl tert-butyl ether	63700	1000	"	"	"	"	"	"	
Toluene	ND	1000	"	"	"	"	"	"	
Xylenes (total)	ND	1000	"	"	"	"	"	"	
<i>Surrogate: Dibromofluoromethane</i>		108 %	88-118		"	"	"	"	
<i>Surrogate: 1,2-Dichloroethane-d4</i>		110 %	81-130		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		109 %	84-115		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		101 %	78-124		"	"	"	"	

MW-2 (P008472-02) Water **Sampled: 20-Aug-00 00:00** **Received: 21-Aug-00 15:30**

Benzene	ND	25.0	ug/l	50	0080573	24-Aug-00	24-Aug-00	EPA 8260B	
Ethanol	ND	5000	"	"	"	"	"	"	
Ethylbenzene	ND	25.0	"	"	"	"	"	"	
Methyl tert-butyl ether	1980	25.0	"	"	"	"	"	"	
Toluene	ND	25.0	"	"	"	"	"	"	
Xylenes (total)	ND	25.0	"	"	"	"	"	"	
<i>Surrogate: Dibromofluoromethane</i>		101 %	86-118		"	"	"	"	
<i>Surrogate: 1,2-Dichloroethane-d4</i>		102 %	80-120		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		107 %	88-110		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		105 %	86-115		"	"	"	"	

MW-3 (P008472-03) Water **Sampled: 20-Aug-00 00:00** **Received: 21-Aug-00 15:30**

Benzene	ND	1000	ug/l	2000	0080701	30-Aug-00	31-Aug-00	EPA 8260B	
Ethanol	ND	200000	"	"	"	"	"	"	
Ethylbenzene	ND	1000	"	"	"	"	"	"	
Methyl tert-butyl ether	55600	1000	"	"	"	"	"	"	
Toluene	ND	1000	"	"	"	"	"	"	
Xylenes (total)	ND	1000	"	"	"	"	"	"	
<i>Surrogate: Dibromofluoromethane</i>		106 %	88-118		"	"	"	"	
<i>Surrogate: 1,2-Dichloroethane-d4</i>		108 %	81-130		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		108 %	84-115		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		106 %	78-124		"	"	"	"	

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.

RU

Richard Stover, Project Manager





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

Project: ARCO
Project Number: 6041-Dublin
Project Manager: Darryk Ataide

Reported:
06-Sep-00 15:19

**Volatile Organic Compounds by EPA Method 8260B
Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
VW-2 (P008472-04) Water									PH
Sampled: 20-Aug-00 00:00 Received: 21-Aug-00 15:30									
Benzene	ND	12.5	ug/l	25	0080701	30-Aug-00	30-Aug-00	EPA 8260B	
Ethanol	ND	2500	"	"	"	"	"	"	
Ethylbenzene	ND	12.5	"	"	"	"	"	"	
Methyl tert-butyl ether	554	12.5	"	"	"	"	"	"	
Toluene	ND	12.5	"	"	"	"	"	"	
Xylenes (total)	ND	12.5	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		105 %	88-118		"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		106 %	81-130		"	"	"	"	
Surrogate: Toluene-d8		110 %	84-115		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	78-124		"	"	"	"	
DUP (P008472-05) Water									
Sampled: 20-Aug-00 00:00 Received: 21-Aug-00 15:30									
Benzene	ND	1000	ug/l	2000	0080701	31-Aug-00	31-Aug-00	EPA 8260B	
Ethanol	ND	200000	"	"	"	"	"	"	
Ethylbenzene	ND	1000	"	"	"	"	"	"	
Methyl tert-butyl ether	51700	1000	"	"	"	"	"	"	
Toluene	ND	1000	"	"	"	"	"	"	
Xylenes (total)	ND	1000	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		103 %	88-118		"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		96.8 %	81-130		"	"	"	"	
Surrogate: Toluene-d8		107 %	84-115		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	78-124		"	"	"	"	

RU





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

Project: ARCO
Project Number: 6041-Dublin
Project Manager: Darryk Ataide

Reported:
06-Sep-00 15:19

**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 0080556 - EPA 5030 waters

Blank (0080556-BLK1)

Prepared & Analyzed: 24-Aug-00

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: <i>a,a,a</i> -Trifluorotoluene	335		"	300		112	65-135			
Surrogate: 4-Bromofluorobenzene	276		"	300		92.0	65-135			

LCS (0080556-BS1)

Prepared & Analyzed: 24-Aug-00

Gasoline	972	50.0	ug/l	1000		97.2	65-135			
Surrogate: 4-Bromofluorobenzene	281		"	300		93.7	65-135			

Matrix Spike (0080556-MS1)

Source: P008502-02

Prepared & Analyzed: 24-Aug-00

Gasoline	846	50.0	ug/l	1000	ND	84.6	65-135			
Surrogate: 4-Bromofluorobenzene	272		"	300		90.7	65-135			

Matrix Spike Dup (0080556-MSD1)

Source: P008502-02

Prepared & Analyzed: 24-Aug-00

Gasoline	911	50.0	ug/l	1000	ND	91.1	65-135	7.40	20	
Surrogate: 4-Bromofluorobenzene	283		"	300		94.3	65-135			

RU





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

Project: ARCO
Project Number: 6041-Dublin
Project Manager: Darryk Ataide

Reported:
06-Sep-00 15:19

**Volatile Organic Compounds by EPA Method 8260B - 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 0080573 - EPA 5030 waters

Blank (0080573-BLK1)

Prepared & Analyzed: 24-Aug-00

Tert-amyl methyl ether	ND	1.00	ug/l							
Benzene	ND	0.500	"							
Tert-butyl alcohol	ND	20.0	"							
Di-isopropyl ether	ND	1.00	"							
1,2-Dibromoethane (EDB)	ND	0.500	"							
1,2-Dichloroethane	ND	0.500	"							
Ethanol	ND	100	"							
Ethylbenzene	ND	0.500	"							
Ethyl tert-butyl ether	ND	1.00	"							
Methyl tert-butyl ether	ND	0.500	"							
Toluene	ND	0.500	"							
Xylenes (total)	ND	0.500	"							
<i>Surrogate: Dibromofluoromethane</i>	5.08		"	5.00		102	86-118			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.97		"	5.00		99.4	80-120			
<i>Surrogate: Toluene-d8</i>	5.28		"	5.00		106	88-110			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.39		"	5.00		108	86-115			

Blank (0080573-BLK2)

Prepared & Analyzed: 25-Aug-00

Tert-amyl methyl ether	ND	1.00	ug/l							
Benzene	ND	0.500	"							
Tert-butyl alcohol	ND	20.0	"							
Di-isopropyl ether	ND	1.00	"							
1,2-Dibromoethane (EDB)	ND	0.500	"							
1,2-Dichloroethane	ND	0.500	"							
Ethanol	ND	100	"							
Ethylbenzene	ND	0.500	"							
Ethyl tert-butyl ether	ND	1.00	"							
Methyl tert-butyl ether	ND	0.500	"							
Toluene	ND	0.500	"							
Xylenes (total)	ND	0.500	"							
<i>Surrogate: Dibromofluoromethane</i>	5.13		"	5.00		103	86-118			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.90		"	5.00		98.0	80-120			
<i>Surrogate: Toluene-d8</i>	5.28		"	5.00		106	88-110			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.07		"	5.00		101	86-115			

Sequoia Analytical - Petaluma

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Richard Stover

Richard Stover, Project Manager





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

Project: ARCO
Project Number: 6041-Dublin
Project Manager: Darryk Ataide

Reported:
06-Sep-00 15:19

**Volatile Organic Compounds by EPA Method 8260B - 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 0080573 - EPA 5030 waters

LCS (0080573-BS1)

Prepared & Analyzed: 24-Aug-00

Benzene	4.59	0.500	ug/l	5.00		91.8	79.7-114			
Methyl tert-butyl ether	5.03	0.500	"	5.00		101	72.7-119			
Toluene	4.49	0.500	"	5.00		89.8	79.8-113			
Surrogate: Dibromofluoromethane	5.11		"	5.00		102	86-118			
Surrogate: 1,2-Dichloroethane-d4	5.18		"	5.00		104	80-120			
Surrogate: Toluene-d8	5.24		"	5.00		105	88-110			
Surrogate: 4-Bromofluorobenzene	4.99		"	5.00		99.8	86-115			

LCS (0080573-BS2)

Prepared & Analyzed: 25-Aug-00

Benzene	5.13	0.500	ug/l	5.00		103	79.7-114			
Methyl tert-butyl ether	4.94	0.500	"	5.00		98.8	72.7-119			
Toluene	5.04	0.500	"	5.00		101	79.8-113			
Surrogate: Dibromofluoromethane	5.02		"	5.00		100	86-118			
Surrogate: 1,2-Dichloroethane-d4	4.87		"	5.00		97.4	80-120			
Surrogate: Toluene-d8	5.26		"	5.00		105	88-110			
Surrogate: 4-Bromofluorobenzene	4.80		"	5.00		96.0	86-115			

Matrix Spike (0080573-MS1)

Source: P008472-02

Prepared & Analyzed: 25-Aug-00

Benzene	260	25.0	ug/l	250	ND	103	79.7-114			
Methyl tert-butyl ether	2060	25.0	"	250	1980	32.0	72.7-119			QM-4X
Toluene	256	25.0	"	250	ND	102	79.8-113			
Surrogate: Dibromofluoromethane	5.07		"	5.00		101	86-118			
Surrogate: 1,2-Dichloroethane-d4	4.81		"	5.00		96.2	80-120			
Surrogate: Toluene-d8	5.22		"	5.00		104	88-110			
Surrogate: 4-Bromofluorobenzene	4.77		"	5.00		95.4	86-115			

Matrix Spike Dup (0080573-MSD1)

Source: P008472-02

Prepared & Analyzed: 25-Aug-00

Benzene	253	25.0	ug/l	250	ND	99.8	79.7-114	2.73	20	
Methyl tert-butyl ether	2060	25.0	"	250	1980	32.0	72.7-119	0	20	QM-4X
Toluene	248	25.0	"	250	ND	99.2	79.8-113	3.17	20	
Surrogate: Dibromofluoromethane	5.10		"	5.00		102	86-118			
Surrogate: 1,2-Dichloroethane-d4	4.88		"	5.00		97.6	80-120			
Surrogate: Toluene-d8	5.28		"	5.00		106	88-110			
Surrogate: 4-Bromofluorobenzene	4.79		"	5.00		95.8	86-115			

Sequoia Analytical - Petaluma

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RU

Richard Stover, Project Manager





Cambria Environmental - Oakland 1144 65th St., Suite C Oakland CA, 94608	Project: ARCO Project Number: 6041-Dublin Project Manager: Darryk Ataide	Reported: 06-Sep-00 15:19
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**Volatile Organic Compounds by EPA Method 8260B - 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 0080701 - EPA 5030 waters

Blank (0080701-BLK1)				Prepared & Analyzed: 30-Aug-00						
Tert-amyl methyl ether	ND	1.00	ug/l							
Benzene	ND	0.500	"							
Tert-butyl alcohol	ND	20.0	"							
Di-isopropyl ether	ND	1.00	"							
1,2-Dibromoethane (EDB)	ND	0.500	"							
1,2-Dichloroethane	ND	0.500	"							
Ethanol	ND	100	"							
Ethylbenzene	ND	0.500	"							
Ethyl tert-butyl ether	ND	1.00	"							
Methyl tert-butyl ether	ND	0.500	"							
Toluene	ND	0.500	"							
Xylenes (total)	ND	0.500	"							
<i>Surrogate: Dibromofluoromethane</i>	5.15		"	5.00		103	88-118			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	5.12		"	5.00		102	81-130			
<i>Surrogate: Toluene-d8</i>	5.29		"	5.00		106	84-115			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.15		"	5.00		103	78-124			

Blank (0080701-BLK2)				Prepared & Analyzed: 31-Aug-00						
Tert-amyl methyl ether	ND	1.00	ug/l							
Benzene	ND	0.500	"							
Tert-butyl alcohol	ND	20.0	"							
Di-isopropyl ether	ND	1.00	"							
1,2-Dibromoethane (EDB)	ND	0.500	"							
1,2-Dichloroethane	ND	0.500	"							
Ethanol	ND	100	"							
Ethylbenzene	ND	0.500	"							
Ethyl tert-butyl ether	ND	1.00	"							
Methyl tert-butyl ether	ND	0.500	"							
Toluene	ND	0.500	"							
Xylenes (total)	ND	0.500	"							
<i>Surrogate: Dibromofluoromethane</i>	5.19		"	5.00		104	88-118			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.84		"	5.00		96.8	81-130			
<i>Surrogate: Toluene-d8</i>	5.43		"	5.00		109	84-115			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.05		"	5.00		101	78-124			

Sequoia Analytical - Petaluma

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RU

Richard Stover, Project Manager





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

Project: ARCO
Project Number: 6041-Dublin
Project Manager: Darryk Ataide

Reported:
06-Sep-00 15:19

**Volatile Organic Compounds by EPA Method 8260B - 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 0080701 - EPA 5030 waters

LCS (0080701-BS1)

Prepared & Analyzed: 30-Aug-00

Benzene	5.53	0.500	ug/l	5.00		111	79.7-114			
Methyl tert-butyl ether	5.37	0.500	"	5.00		107	72.7-119			
Toluene	5.46	0.500	"	5.00		109	79.8-113			
Surrogate: Dibromofluoromethane	5.15		"	5.00		103	88-118			
Surrogate: 1,2-Dichloroethane-d4	5.32		"	5.00		106	81-130			
Surrogate: Toluene-d8	5.38		"	5.00		108	84-115			
Surrogate: 4-Bromofluorobenzene	4.99		"	5.00		99.8	78-124			

LCS (0080701-BS2)

Prepared & Analyzed: 31-Aug-00

Benzene	5.15	0.500	ug/l	5.00		103	79.7-114			
Methyl tert-butyl ether	5.23	0.500	"	5.00		105	72.7-119			
Toluene	5.16	0.500	"	5.00		103	79.8-113			
Surrogate: Dibromofluoromethane	5.26		"	5.00		105	88-118			
Surrogate: 1,2-Dichloroethane-d4	5.01		"	5.00		100	81-130			
Surrogate: Toluene-d8	5.37		"	5.00		107	84-115			
Surrogate: 4-Bromofluorobenzene	4.82		"	5.00		96.4	78-124			

Matrix Spike (0080701-MS1)

Source: P008472-04

Prepared & Analyzed: 30-Aug-00

Benzene	121	12.5	ug/l	125	ND	96.8	79.7-114			
Methyl tert-butyl ether	803	12.5	"	125	554	199	72.7-119			QM-4X
Toluene	120	12.5	"	125	ND	96.0	79.8-113			
Surrogate: Dibromofluoromethane	5.26		"	5.00		105	88-118			
Surrogate: 1,2-Dichloroethane-d4	5.50		"	5.00		110	81-130			
Surrogate: Toluene-d8	5.40		"	5.00		108	84-115			
Surrogate: 4-Bromofluorobenzene	4.85		"	5.00		97.0	78-124			

Matrix Spike Dup (0080701-MSD1)

Source: P008472-04

Prepared & Analyzed: 30-Aug-00

Benzene	112	12.5	ug/l	125	ND	89.6	79.7-114	7.73	20	
Methyl tert-butyl ether	789	12.5	"	125	554	188	72.7-119	1.76	20	QM-4X
Toluene	112	12.5	"	125	ND	89.6	79.8-113	6.90	20	
Surrogate: Dibromofluoromethane	5.37		"	5.00		107	88-118			
Surrogate: 1,2-Dichloroethane-d4	5.55		"	5.00		111	81-130			
Surrogate: Toluene-d8	5.35		"	5.00		107	84-115			
Surrogate: 4-Bromofluorobenzene	4.87		"	5.00		97.4	78-124			

Sequoia Analytical - Petaluma

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RW

Richard Stover, Project Manager





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

Project: ARCO
Project Number: 6041-Dublin
Project Manager: Darryk Ataide

Reported:
06-Sep-00 15:19

Notes and Definitions

- PH Insufficient preservative to reduce the sample pH to less than 2. Sample was analyzed within 14 days of sampling, but beyond the 7 days recommended for Benzene, Toluene, and Ethylbenzene.
- QM-4X The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference



ARCO Facility no. **6041** City (Facility) **Dublin** Project manager (Consultant) **Darryk Ataide**
 ARCO engineer **Paul Supple** Telephone no. (ARCO) **925-299-8391** Telephone no. (Consultant) **510-420-3339** Fax no. (Consultant) **510-420-9170**
 Consultant name **Cambric** Address (Consultant) **1144 65th St #3 Oakland, CA 94608**

Laboratory name **Seq**
Contract number

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH/MTBE EPA M602/8020/8015	TPH Modified 8015 Gas <input type="checkbox"/> Diesel <input type="checkbox"/>	Oil and Grease 413.1 <input type="checkbox"/> 413.2 <input type="checkbox"/>	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 824/8240	EPA 625/8270	TCLP Metals: <input type="checkbox"/> VOA <input type="checkbox"/> VOA <input type="checkbox"/>	CAM METALS EPA 601/7000 TLC <input type="checkbox"/> STLC <input type="checkbox"/>	Lead Org./DHS <input type="checkbox"/> Lead EPA 7420/7421 <input type="checkbox"/>	BTEX/TPH MTBE b1 8260	
			Soil	Water	Other	Ice	Acid															
MW-1		6		W			HCl	08-20-00	8:47		X											X
MW-2		4		↓			↓		8:18		X											X
MW-3		6		↓			↓		9:12		X											X
VW-2		6		↓			↓		9:35		X											X
DUP		6		↓			↓				X											X

Method of shipment

Special detection Limit/reporting **Lowest Possible**

Special QA/QC

Remarks
TPH 6/8/14
8240 0 XY 7 + BTEX
my comments and report BTEX, MTBE
ETHANOL only

COOLER CUSTODY SEALS INTACT
NOT INTACT
COOLER TEMPERATURE **3** °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: Relinquished by sampler **J. Hill** Date Time Received by **[Signature]** 8-21-00 1330
 Relinquished by Date Time Received by
 Relinquished by Date Time Received by

APPENDIX C
FIELD DATA SHEETS

WELL DEPTH MEASUREMENTS

Well ID	Time	Top of Screen	DTB	DTP	DTW	DOP	Casing Dia	Comments
MW-1	1:37	12'	17.5'		9.35		4"	
MW-2	1:34	10'	14.1'		7.75		4"	
MW-3	1:40	11'	14.7'		8.35		4"	
MW-4	1:28		14.44		7.03		4"	
MW-5	1:25		17.40		8.65		4"	
MW-6	1:31		15.75		8.65		4"	
VW-2	1:43	4'	9.0'		8.40		4"	

Project Name: ARCO 6041

Project Number: 436-1610

Measured By: 

Date: 09.26.00

WELL DEPTH MEASUREMENTS

Well ID	Time	Top of Screen	DTB	DTP	DTW	DOP	Casing Dia	Comments
2 MW-1	14:03	12'	17.5'		9.31		4"	
1 MW-2	14:00	10'	14.1'		7.65		4"	
3 MW-3	14:05	11'	14.7'		8.25		4"	
4 VW-2	14:07	4'	9.0'		8.55		4"	

Project Name: ARCO 6041

Project Number: 436-1610

Measured By: [Signature]

Date: 08-18-00

WELL SAMPLING FORM

Project Name: ARCO 6041	Cambria Mgr: Darryk Ataide	Well ID: VW-2
Project Number: 436 - 1610	Date: 08-20-00	Well Yield:
Site Address: 7249 Village Pkwy, Dublin	Sampling Method:	Well Diameter: "pvc 4"
	Disposable bailer	Technician(s): SG
Initial Depth to Water: 8.55	Total Well Depth: 90	Water Column Height: /
Volume/ft: /	1 Casing Volume: /	3 Casing Volumes: /
Purge/No-Purge: /		
Purging Device: Submersible Pump	Did Well Dewater?:	Total Gallons Purged:
Start Purge Time:	Stop Purge Time:	Total Time:

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

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

Time	Casing Volume	Temp. C	pH	Cond. uS	Comments
<div style="font-size: 2em; opacity: 0.5;">NO PURGE</div>					<div style="font-size: 1.2em; font-family: cursive;">water reacted with HCl</div>
					DO = 1.59 mg/L

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
VW-2	08-20-00	9:35	6 VOA	HCL	TPHg, BTEX, MTBE	8020 8260

WELL SAMPLING FORM

Project Name: ARCO 6041	Cambria Mgr: Darryk Ataide	Well ID: <i>MW-1</i>
Project Number: 436 - 1610	Date: <i>08-20-00</i>	Well Yield:
Site Address: 7249 Village Pkwy, Dublin	Sampling Method:	Well Diameter: "pvc 4."
	Disposable bailer	Technician(s): <i>SC</i>
Initial Depth to Water: <i>9.31</i>	Total Well Depth: <i>17.5</i>	Water Column Height: <i>8.19</i>
Volume/ft: <i>0.65</i>	1 Casing Volume: <i>5.3</i>	3 Casing Volumes: <i>15.9</i>
<input checked="" type="radio"/> Purge/No Purge:		
Purging Device: Submersible Pump	Did Well Dewater?: <i>no</i>	Total Gallons Purged: <i>16</i>
Start Purge Time: <i>8:35</i>	Stop Purge Time: <i>8:42</i>	Total Time: <i>7min</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>8:40</i>	<i>5</i>	<i>17.7</i>	<i>7.2</i>	<i>7</i>	<i>DO = 1.5 mg/L</i>
<i>8:41</i>	<i>10</i>	<i>19.5</i>	<i>7.2</i>	<i>9</i>	
<i>8:42</i>	<i>16</i>	<i>19.7</i>	<i>7.2</i>	<i>9</i>	

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
<i>MW-1</i>	<i>08-20-00</i>	<i>8:47</i>	<i>VOA</i>	<i>HCL</i>	<i>TPHg, BTEX, MTBE</i>	<i>8020 8260</i>

WELL SAMPLING FORM

Project Name: ARCO 6041	Cambria Mgr: Darryk Ataide	Well ID: <u>MW-2</u>
Project Number: 436 - 1610	Date: <u>08-20-00</u>	Well Yield:
Site Address: 7249 Village Pkwy, Dublin	Sampling Method:	Well Diameter: <u>"pvc 4"</u>
	Disposable bailer	Technician(s): <u>S.G.</u>
Initial Depth to Water: <u>7.65</u>	Total Well Depth: <u>14.1</u>	Water Column Height: <u>6.45</u>
Volume/ft: <u>0.65</u>	1 Casing Volume: <u>4.19</u>	3 Casing Volumes: <u>12.57</u>
<u>Purge</u> /No Purge:		
Purging Device: Submersible Pump	Did Well Dewater?: <u>no</u>	Total Gallons Purged: <u>12</u>
Start Purge Time: <u>8:07</u>	Stop Purge Time: <u>8:12</u>	Total Time: <u>5</u>

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
<u>8:11</u>	<u>4</u>	<u>19.3</u>	<u>7.9</u>	<u>6</u>	
<u>8:12</u>	<u>8</u>	<u>20.9</u>	<u>7.1</u>	<u>6</u>	<u>DO = 2.03 mg/l</u>
<u>8:13</u>	<u>12</u>	<u>20.1</u>	<u>7.1</u>	<u>6</u>	

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
<u>MW-2</u>	<u>08-20-00</u>	<u>8:18</u>	<u>4 VOA</u>	<u>HCL</u>	<u>TPHg, BTEX, MTBE</u>	<u>8020</u>

WELL SAMPLING FORM

Project Name: ARCO 6041	Cambria Mgr: Darryk Ataide	Well ID: MW-3
Project Number: 436 - 1610	Date: 08-20-00	Well Yield:
Site Address: 7249 Village Pkwy, Dublin	Sampling Method:	Well Diameter: "pvc 4"
	Disposable bailer	Technician(s): SG
Initial Depth to Water: 8.25	Total Well Depth: 14.7	Water Column Height: 6.45
Volume/ft: 0.65	1 Casing Volume: 4.19	3 Casing Volumes: 12.57
<u>Purge</u> /No Purge:		
Purging Device: Submersible Pump	Did Well Dewater?: NO	Total Gallons Purged: 12
Start Purge Time: 9:00	Stop Purge Time: 9:06	Total Time: 6

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

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

Time	Casing Volume	Temp. C	pH	Cond. uS	Comments
9:05	4	22.2	7.3	7	
9:06	3	20.1	7.1	6	
9:07	12	20.7	7.1	6	DO = 1.55 mg/l

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-3	08-20-00	9:12	6 AVOA	HCL	TPHg, BTEX, MTBE	8020-2260
DUP						→