9/18/00
Per D Ataide, VW 1 through VW 3, shall be sampled in 9/2000 - done
Not all VEW could be opened. If they go out to sample those not done, they are to include GW sampling of RW-1.

CAMBRIA

August 4, 2000

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

Re: **Second Quarter 2000 Monitoring Report**
ARCO Service Station No. 6113
785 East Stanley Boulevard
Livermore, California
Cambria Project #436-1611

Dear Ms. Chu:

On behalf of ARCO, Cambria Environmental Technology, Inc. (Cambria) is submitting the attached report which presents the results of the second quarter 2000 groundwater monitoring program at ARCO Service Station No. 6113, located at 785 East Stanley Boulevard, Livermore, 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.

D. Ataide

684-3339 pg

Darryk Ataide, REA
Senior Project Manager

x139

Attachment: Quarterly Groundwater Monitoring Report, Second Quarter 2000

cc: Ms. Danielle Stefani, City of Livermore Fire Department
Mr. Paul Supple, ARCO

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

Cambria Environmental Technology, Inc.

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

CAMBRIA

Quarterly Groundwater Monitoring Report

Second Quarter 2000

Arco Service Station 6113
785 East Stanley Boulevard
Livermore, California
Cambria Project #436-1611

Prepared For:

Mr. Paul Supple
ARCO

August 4, 2000

Prepared By:
Cambria Environmental Technology, Inc.
1144 65th St., Suite B
Oakland, California 94608

Written by:

Jason D. Olson
Staff Environmental Scientist

Ron Scheele, RG
Senior Project Manager

CAMBRIA

Date: August 4, 2000
Quarter: 2nd Quarter, 2000

ARCO QUARTERLY STATUS REPORT

Station No.: 6113 Address:	785 East Stanley Boulevard, Livermore, California
ARCO Environmental Engineer:	Paul Supple
Consulting Co./Contact Person:	Cambria Environmental Technology Inc./Darryk Ataide, REA
Consultant Project No.:	436-1611
Primary Agency/Regulatory ID No.:	ACHCSA

WORK PERFORMED THIS QUARTER (SECOND - 2000):

1. Perform semi-annual groundwater monitoring and sampling for second quarter 2000.

WORK PROPOSED FOR NEXT QUARTER (THIRD - 2000):

1. Prepare and submit semi-annual groundwater monitoring report for second quarter 2000.
2. Per Eva Chu verbal request, Cambria will sample vapor wells (VW-1, VW-3, VW-4) and compare results to nearby monitoring wells.
3. Evaluate site for closure based on third quarter 2000 sampling results

MONITORING:

Current Phase of Project:	Semi-Annual Groundwater Monitoring
Frequency of Sampling:	Annual (4th Quarter): MW-1, MW-2, MW-3, MW-8, MW-9, MW-10 Semi-Annual (2nd/4th Quarter): MW-4 through MW-7, MW-11, MW-12 Onetime event (3rd Quarter): VW-1, VW-3, VW-4
Frequency of Monitoring:	Semi-Annual (groundwater)
Is Free Product (FP) Present On-site:	No
Bulk Soil Removed This Quarter :	None
Bulk Soil Removed to Date :	288 cubic yards of TPH impacted soil
Water Wells or Surface Waters, within 2000 ft., impacted by site:	None
Current Remediation Techniques:	NA
Average Depth to Groundwater	16.91 feet
Groundwater Flow Direction and Gradient (Average)	0.014 ft/ft toward North Northeast

ATTACHMENTS:

- Table 1 – Summary of Historical Groundwater Elevation and Analytical Data
- Figure 1 – Groundwater Elevation Contour and Analytical Map – Second Quarter 2000
- Appendix A – Field and Laboratory Procedures
- Appendix B – Certified Analytical Report, Chain-of-Custody Documentation
- Appendix C – Field Data Sheets

Oakland, CA
Sonoma, CA
Portland, OR
Seattle, WA

Cambria Environmental Technology, Inc.

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

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Well Number	Date Gauged	Top of Casing Elevation (ft-MSL)	Depth to Water (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPH Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-1	03-23-95	457.04	14.12	442.92	03-23-95	Not sampled: well sampled annually, during the fourth quarter							
MW-1	05-31-95	457.04	14.45	442.59	05-31-95	Not sampled: well sampled annually, during the fourth quarter							
MW-1	08-31-95	457.04	17.12	439.92	08-31-95	Not sampled: well sampled annually, during the fourth quarter							
MW-1	11-28-95	457.04	16.34	440.70	11-28-95	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-1	02-22-96	457.04	13.23	443.81	02-22-96	Not sampled: well sampled annually, during the fourth quarter							
MW-1	05-23-96	457.04	14.02	443.02	05-23-96	Not sampled: well sampled annually, during the fourth quarter							
MW-1	08-08-96	457.04	16.13	440.91	08-08-96	Not sampled: well sampled annually, during the fourth quarter							
MW-1	11-07-96	457.04	17.28	439.76	11-08-96	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-1	03-27-97	457.04	14.91	442.13	03-28-97	Not sampled: well sampled annually, during the fourth quarter							
MW-1	05-19-97	457.04	16.47	440.57	05-19-97	Not sampled: well sampled annually, during the fourth quarter							
MW-1	05-18-98	457.04	14.69	442.35	05-18-98	Not sampled: well sampled annually, during the fourth quarter							
MW-1	11-02-98	457.04	25.94	431.10	11-02-98	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-1	06-04-99	457.04	17.38	439.66	06-04-99	Not sampled: well sampled annually, during the fourth quarter							
MW-1	11-11-99	457.04	18.63	438.41	11-11-99	<50	<0.5	<0.5	<0.5	<1	<3	1.03	P
MW-1	**06-20-00**	**457.04**	**17.09**	**439.95**	**06-20-00**	**Not sampled: well sampled annually, during the fourth quarter**						**3.1**	
MW-2	03-23-95	457.74	14.15	443.59	03-23-95	Not sampled: well sampled annually, during the fourth quarter							
MW-2	05-31-95	457.74	14.67	443.07	05-31-95	Not sampled: well sampled annually, during the fourth quarter							
MW-2	08-31-95	457.74	17.24	440.50	08-31-95	Not sampled: well sampled annually, during the fourth quarter							
MW-2	11-28-95	457.74	16.40	441.34	11-29-95	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-2	02-22-96	457.74	13.55	444.19	02-22-96	Not sampled: well sampled annually, during the fourth quarter							
MW-2	05-23-96	457.74	14.29	443.45	05-23-96	Not sampled: well sampled annually, during the fourth quarter							
MW-2	08-08-96	457.74	16.19	441.55	08-08-96	Not sampled: well sampled annually, during the fourth quarter							
MW-2	11-07-96	457.74	17.50	440.24	11-07-96	65	0.6	7.4	2.1	12	5		
MW-2	03-27-97	457.74	15.32	442.42	03-28-97	Not sampled: well sampled annually, during the fourth quarter							
MW-2	05-19-97	457.74	16.62	441.12	05-19-97	Not sampled: well sampled annually, during the fourth quarter							
MW-2	05-18-98	457.74	15.12	442.62	05-18-98	Not sampled: well sampled annually, during the fourth quarter							

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Well Number	Date Gauged	Top of Casing Elevation (ft-MSL)	Depth to Water (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPH Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-2	11-02-98	457.74	26.66	431.08	11-02-98	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-2	06-04-99	457.74	17.74	440.00	06-04-99	Not sampled: well sampled annually, during the fourth quarter							
MW-2	11-11-99	457.74	18.75	438.99	11-11-99	<50	<0.5	<0.5	<0.5	<1	<3	0.82	P
MW-2	**06-20-00**	**457.74**	**17.21**	**440.53**	**06-20-00**	**Not sampled: well sampled annually, during the fourth quarter**						**2.6**	
MW-3	03-23-95	456.97	14.13	442.84	03-23-95	Not sampled: well sampled annually, during the fourth quarter							
MW-3	05-31-95	456.97	14.46	442.51	05-31-95	Not sampled: well sampled annually, during the fourth quarter							
MW-3	08-31-95	456.97	17.06	439.91	08-31-95	Not sampled: well sampled annually, during the fourth quarter							
MW-3	11-28-95	456.97	16.27	440.70	11-28-95	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-3	02-22-96	456.97	13.14	443.83	02-22-96	Not sampled: well sampled annually, during the fourth quarter							
MW-3	05-23-96	456.97	13.95	443.02	05-23-96	Not sampled: well sampled annually, during the fourth quarter							
MW-3	08-08-96	456.97	16.03	440.94	08-08-96	Not sampled: well sampled annually, during the fourth quarter							
MW-3	11-07-96	456.97	17.26	439.71	11-07-96	<50	<0.5	0.9	<0.5	1.5	<3		
MW-3	03-27-97	456.97	14.85	442.12	03-28-97	Not sampled: well sampled annually, during the fourth quarter							
MW-3	05-19-97	456.97	16.40	440.57	05-19-97	Not sampled: well sampled annually, during the fourth quarter							
MW-3	05-18-98	456.97	14.66	442.31	05-18-98	Not sampled: well sampled annually, during the fourth quarter							
MW-3	11-02-98	456.97	25.85	431.12	11-02-98	<1,000	<10	<10	<10	<10	1,700		
MW-3	06-04-99	456.97	17.35	439.62	06-04-99	Not sampled: well sampled annually, during the fourth quarter							
MW-3	11-11-99	456.97	18.58	438.39	11-11-99	<50	<0.5	<0.5	<0.5	<1	<3	0.79	P
MW-3	**06-20-00**	**456.97**	**17.03**	**439.94**	**06-20-00**	**Not sampled: well sampled annually, during the fourth quarter**						**2.8**	
MW-4	03-23-95	456.55	15.39	441.16	03-23-95	210	2.1	0.6	0.8	2.1	- -		
MW-4	05-31-95	456.55	15.32	441.23	05-31-95	190	1.6	<0.5	0.7	0.9	- -		
MW-4	08-31-95	456.55	17.86	438.69	08-31-95	160	1.2	0.7	<0.5	<2	<3		
MW-4	11-28-95	456.55	17.18	439.37	11-29-95	150	0.7	<0.5	0.7	1.4	<3		
MW-4	02-22-96	456.55	14.80	441.75	02-22-96	100	<0.5	<0.5	<0.6	0.8	<3		
MW-4	05-23-96	456.55	14.43	442.12	05-23-96	86	<0.5	<0.5	<0.5	<0.7	<3		

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MW-4	08-08-96	456.55	16.80	439.75	08-08-96	98	<0.5	<0.5	<0.5	1.3	<3		
MW-4	11-07-96	456.55	17.90	438.65	11-13-96	140	<0.5	<0.5	<0.9	1.3	<3		
MW-4	03-27-97	456.55	15.22	441.33	03-28-97	<50	1.1	<0.5	<0.5	1.6	<3		
MW-4	05-19-97	456.55	16.98	439.57	05-19-97	62	<0.5	<0.5	<0.5	0.6	<3		
MW-4	05-18-98	456.55	14.99	441.56	05-18-98	<50	<0.5	<0.5	<0.5	<0.5	64		
MW-4	11-02-98	456.55	25.29	431.26	11-02-98	74	<0.5	<0.5	<0.5	<0.5	96		
MW-4	06-04-99	456.55	17.95	438.60	06-04-99	100	<0.5	<0.5	<0.5	<0.5	38	NM	P
MW-4	11-11-99	456.55	19.25	437.30	11-11-99	88	<0.5	<0.5	<0.5	<1	10	0.77	P
DUP 1	**06-20-00**	**NA**	**NA**	**NA**	**06-20-00**	**<50.0**	**<0.500**	**<0.500**	**<0.500**	**<0.500**	**62.3**	**NA**	
MW-4	**06-20-00**	**456.55**	**17.79**	**438.76**	**06-20-00**	**<50.0**	**<0.500**	**<0.500**	**<0.500**	**<0.500**	**82.4**	**1.3**	**P**
MW-5	03-23-95	455.84	13.97	441.87	03-23-95	68	4.2	3.4	2.3	12	- -		
MW-5	05-31-95	455.84	Not surveyed		05-31-95	Not sampled: well was inaccessible							
MW-5	08-31-95	455.84	Not surveyed		08-31-95	Not sampled: well was inaccessible							
MW-5	11-28-95	455.84	16.46	439.38	11-29-95	960	41	24	38	210	<5		
MW-5	02-22-96	455.84	13.34	442.50	02-22-96	Not sampled: well sampled semi-annually, during the second and fourth quarters							
MW-5	05-23-96	455.84	14.36	441.48	05-23-96	7,100	440	180	270	1,700	<50		
MW-5	08-08-96	455.84	16.38	439.46	08-08-96	Not sampled: well sampled semi-annually, during the second and fourth quarters							
MW-5	11-07-96	455.84	17.26	438.58	11-13-96	5,600	230	86	210	1,100	<80		
MW-5	03-27-97	455.84	15.95	439.89	03-28-97	Not sampled: well sampled semi-annually, during the second and fourth quarters							
MW-5	05-19-97	455.84	16.64	439.20	05-20-97	7,600	480	140	400	1,200	<40		
MW-5	05-18-98	455.84	14.75	441.09	05-18-98	990	46	13	45	180	4		
MW-5	11-02-98	455.84	27.83	428.01	11-02-98	14,000	690	140	550	2,200	100		
MW-5	06-04-99	455.84	17.47	438.37	06-04-99	8,300	690	370	90	440	1,400	NM	P
MW-5	11-11-99	455.84	18.80	437.04	11-11-99	18,000	900	190	1,100	3,200	72	0.86	P
MW-5	**06-20-00**	**455.84**	**17.14**	**438.70**	**06-20-00**	**10,200**	**618**	**122**	**832**	**2,020**	**<50.0**	**1.6**	**P**

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MW-6	03-23-95	454.93	13.38	441.55	03-23-95	<50	1.5	<0.5	<0.5	0.9	- -		
MW-6	05-31-95	454.93	13.96	440.97	05-31-95	<50	<0.5	<0.5	<0.5	<0.5	- -		
MW-6	08-31-95	454.93	16.71	438.22	08-31-95	150	9	1.8	4	12	<3		
MW-6	11-28-95	454.93	15.65	439.28	11-29-95	<50	0.6	<0.5	<0.5	0.8	<3		
MW-6	02-22-96	454.93	12.53	442.40	02-22-96	<50	1.9	<0.5	0.8	2.1	<3		
MW-6	05-23-96	454.93	13.24	441.69	05-23-96	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-6	08-08-96	454.93	16.65	438.28	08-08-96	<50	0.5	<0.5	<0.5	0.5	<3		
MW-6	11-07-96	454.93	16.65	438.28	11-08-96	110	5.3	1.3	3.1	6.6	<3		
MW-6	03-27-97	454.93	14.25	440.68	03-28-97	<50	2.3	<0.5	0.9	3.5	4		
MW-6	05-19-97	454.93	15.87	439.06	05-20-97	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-6	05-18-98	454.93	14.00	440.93	05-18-98	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-6	11-02-98	454.93	24.95	429.98	11-02-98	<50	1.2	<0.5	<0.5	<0.5	3		
MW-6	06-04-99	454.93	16.68	438.25	06-04-99	310	41	3.8	11	19	33	NM	P
MW-6	11-11-99	454.93	16.12	438.81	11-11-99	<50	0.5	<0.5	<0.5	<1	<3	0.92	P
MW-6	**06-20-00**	**454.93**	**16.63**	**438.30**	**06-20-00**	**<50.0**	**<0.500**	**<0.500**	**<0.500**	**<0.500**	**17.3**	**1.9**	**P**
MW-7	03-23-95	454.92	13.29	441.63	03-23-95	<50	<0.5	<0.5	<0.5	<0.5	- -		
MW-7	05-31-95	454.92	13.72	441.20	05-31-95	<50	<0.5	<0.5	<0.5	<0.5	- -		
MW-7	08-31-95	454.92	16.53	438.39	08-31-95	<50	<0.5	<0.5	<0.5	1.2	<3		
MW-7	11-28-95	454.92	15.50	439.42	11-29-95	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-7	02-22-96	454.92	12.30	442.62	02-22-96	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-7	05-23-96	454.92	13.02	441.90	05-23-96	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-7	08-08-96	454.92	Not surveyed		08-08-96	Not sampled: unable to locate well							
MW-7	11-07-96	454.92	16.50	438.42	11-08-96	<50	<0.5	<0.5	<0.5	0.8	<3		
MW-7	03-27-97	454.92	14.22	440.70	03-28-97	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-7	05-19-97	454.92	15.74	439.18	05-20-97	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-7	05-18-98	454.92	13.82	441.10	05-18-98	<50	<0.5	<0.5	<0.5	<0.5	<3		

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Well Number	Date Gauged	Top of Casing Elevation (ft-MSL)	Depth to Water (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPH Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-7	11-02-98	454.92	24.80	430.12	11-02-98	<50	<0.5	<0.5	<0.5	<0.5	4		
MW-7	06-04-99	454.92	16.55	438.37	06-04-99	<50	<0.5	<0.5	<0.5	<0.5	<3	NM	P
MW-7	11-11-99	454.92	18.02	436.90	11-11-99	<50	<0.5	<0.5	<0.5	<1	<3	1.03	P
MW-7	**06-20-00**	**454.92**	**16.50**	**438.42**	**06-20-00**	**<50.0**	**<0.500**	**<0.500**	**<0.500**	**<0.500**	**<2.50**	**1.3**	**P**
MW-8	03-23-95	456.97	11.55	445.42	03-23-95	Not sampled: well sampled annually, during the fourth quarter							
MW-8	05-31-95	456.97	12.37	444.60	05-31-95	Not sampled: well sampled annually, during the fourth quarter							
MW-8	08-31-95	456.97	15.68	441.29	08-31-95	Not sampled: well sampled annually, during the fourth quarter							
MW-8	11-28-95	456.97	14.15	442.82	11-28-95	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-8	02-22-96	456.97	10.97	446.00	02-22-96	Not sampled: well sampled annually, during the fourth quarter							
MW-8	05-23-96	456.97	11.90	445.07	05-23-96	Not sampled: well sampled annually, during the fourth quarter							
MW-8	08-08-96	456.97	13.85	443.12	08-08-96	Not sampled: well sampled annually, during the fourth quarter							
MW-8	11-07-96	456.97	15.08	441.89	11-08-96	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-8	03-27-97	456.97	12.96	444.01	03-28-97	Not sampled: well sampled annually, during the fourth quarter							
MW-8	05-19-97	456.97	14.35	442.62	05-19-97	Not sampled: well sampled annually, during the fourth quarter							
MW-8	05-18-98	456.97	12.97	444.00	05-18-98	Not sampled: well sampled annually, during the fourth quarter							
MW-8	11-02-98	456.97	26.01	430.96	11-02-98	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-8	06-04-99	456.97	15.53	441.44	06-04-99	Not sampled: well sampled annually, during the fourth quarter							
MW-8	11-11-99	456.97	16.67	440.30	11-11-99	<50	<0.5	<0.5	<0.5	<1	<3	1.01	P
MW-8	**06-20-00**	**456.97**	**15.29**	**441.68**	**06-20-00**	**Not sampled: well sampled annually, during the fourth quarter**						**2.4**	
MW-9	03-23-95	456.18	13.18	443.00	03-23-95	Not sampled: well sampled annually, during the fourth quarter							
MW-9	05-31-95	456.18	12.66	443.52	05-31-95	Not sampled: well sampled annually, during the fourth quarter							
MW-9	08-31-95	456.18	14.40	441.78	08-31-95	Not sampled: well sampled annually, during the fourth quarter							
MW-9	11-28-95	456.18	14.26	441.92	11-29-95	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-9	02-22-96	456.18	12.05	444.13	02-22-96	Not sampled: well sampled annually, during the fourth quarter							
MW-9	05-23-96	456.18	12.07	444.11	05-23-96	Not sampled: well sampled annually, during the fourth quarter							

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

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Well Number	Date Gauged	Top of Casing Elevation (ft-MSL)	Depth to Water (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPH Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-9	08-08-96	456.18	14.12	442.06	08-08-96	Not sampled: well sampled annually, during the fourth quarter							
MW-9	11-07-96	456.18	15.42	440.76	11-08-96	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-9	03-27-97	456.18	13.01	443.17	03-28-97	Not sampled: well sampled annually, during the fourth quarter							
MW-9	05-19-97	456.18	14.60	441.58	05-19-97	Not sampled: well sampled annually, during the fourth quarter							
MW-9	05-18-98	456.18	12.60	443.58	05-18-98	Not sampled: well sampled annually, during the fourth quarter							
MW-9	11-02-98	456.18	25.08	431.10	11-02-98	Not sampled							
MW-9	06-04-99	456.18	15.87	440.31	06-04-99	<50	<0.5	<0.5	<0.5	<0.5	<3	NM	P
MW-9	11-11-99	456.18	17.02	439.16	11-11-99	<50	<0.5	<0.5	<0.5	<1	<3	0.96	P
MW-9	**06-20-00**	**456.18**	**15.54**	**440.64**	**06-20-00**	**Not sampled: well sampled annually, during the fourth quarter**						**2.1**	
MW-10	03-23-95	456.85	14.86	441.99	03-23-95	Not sampled: well sampled annually, during the fourth quarter							
MW-10	05-31-95	456.85	15.63	441.22	05-31-95	Not sampled: well sampled annually, during the fourth quarter							
MW-10	08-31-95	456.85	14.40	442.45	08-31-95	Not sampled: well sampled annually, during the fourth quarter							
MW-10	11-28-95	456.85	17.24	439.61	11-29-95	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-10	02-22-96	456.85	14.30	442.55	02-22-96	Not sampled: well sampled annually, during the fourth quarter							
MW-10	05-23-96	456.85	14.93	441.92	05-23-96	Not sampled: well sampled annually, during the fourth quarter							
MW-10	08-08-96	456.85	17.20	439.65	08-08-96	Not sampled: well sampled annually, during the fourth quarter							
MW-10	11-07-96	456.85	18.25	438.60	11-08-96	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-10	03-27-97	456.85	15.77	441.08	03-28-97	Not sampled: well sampled annually, during the fourth quarter							
MW-10	05-19-97	456.85	17.38	439.47	05-19-97	Not sampled: well sampled annually, during the fourth quarter							
MW-10	05-18-98	456.85	15.47	441.38	05-18-98	Not sampled: well sampled annually, during the fourth quarter							
MW-10	11-02-98	456.85	26.94	429.91	11-02-98	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-10	06-04-99	456.85	17.19	439.66	06-04-99	Not sampled: well sampled annually, during the fourth quarter							
MW-10	11-11-99	456.85	19.35	437.50	11-11-99	<50	<0.5	<0.5	<0.5	<1	<3	0.68	P
MW-10	**06-20-00**	**456.85**	**17.92**	**438.93**	**06-20-00**	**Not sampled: well sampled annually, during the fourth quarter**						**2.9**	
MW-11	03-23-95	455.07	17.34	437.73	03-23-95	Not sampled: well sampled semi-annually, during the second and fourth quarters							

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Petroleum Hydrocarbons and Their Constituents
1995 - Present*

ARCO Service Station 6113
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Well Number	Date Gauged	Top of Casing Elevation (ft-MSL)	Depth to Water (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPH Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-11	05-31-95	455.07	16.68	438.39	05-31-95	<50	<0.5	<0.5	<0.5	<0.5	- -		
MW-11	08-31-95	455.07	20.20	434.87	08-31-95	Not sampled: well sampled semi-annually, during the second and fourth quarters							
MW-11	11-28-95	455.07	17.80	437.27	11-28-95	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-11	02-22-96	455.07	15.97	439.10	02-22-96	Not sampled: well sampled semi-annually, during the second and fourth quarters							
MW-11	05-23-96	455.07	15.50	439.57	05-23-96	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-11	08-08-96	455.07	17.77	437.30	08-08-96	Not sampled: well sampled semi-annually, during the second and fourth quarters							
MW-11	11-07-96	455.07	17.45	437.62	11-13-96	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-11	03-27-97	455.07	15.77	439.30	03-28-97	Not sampled: well sampled semi-annually, during the second and fourth quarters							
MW-11	05-19-97	455.07	16.80	438.27	05-19-97	<50	1.1	4.5	<0.5	2.2	<3		
MW-11	05-18-98	455.07	15.38	439.69	05-18-98	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-11	11-02-98	455.07	24.15	430.92	11-02-98	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-11	06-04-99	455.07	18.39	436.68	06-04-99	<50	<0.5	<0.5	<0.5	<0.5	<3	NM	P
MW-11	11-11-99	455.07	18.62	436.45	11-11-99	<50	<0.5	<0.5	<0.5	<1	<3	1.01	P
MW-11	**06-20-00**	**455.07**	**17.82**	**437.25**	**06-20-00**	**<50.0**	**0.631**	**<0.500**	**<0.500**	**<0.500**	**<2.50**	**4.1**	**P**
MW-12	03-23-95	455.04	15.54	439.50	03-23-95	Not sampled: well sampled semi-annually, during the second and fourth quarters							
MW-12	05-31-95	455.04	15.66	439.38	05-31-95	<50	<0.5	<0.5	<0.5	<0.5	- -		
MW-12	08-31-95	455.04	18.23	436.81	08-31-95	Not sampled: well sampled semi-annually, during the second and fourth quarters							
MW-12	11-28-95	455.04	17.53	437.51	11-28-95	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-12	02-22-96	455.04	14.45	440.59	02-22-96	Not sampled: well sampled semi-annually, during the second and fourth quarters							
MW-12	05-23-96	455.04	14.88	440.16	05-23-96	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-12	08-08-96	455.04	17.30	437.74	08-08-96	Not sampled: well sampled semi-annually, during the second and fourth quarters							
MW-12	11-07-96	455.04	18.30	436.74	11-13-96	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-12	03-27-97	455.04	15.69	439.35	03-28-97	Not sampled: well sampled semi-annually, during the second and fourth quarters							
MW-12	05-19-97	455.04	17.41	437.63	05-19-97	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-12	05-18-98	455.04	15.21	439.83	05-18-98	<50	<0.5	<0.5	<0.5	<0.5	<3		
MW-12	11-02-98	455.04	Not surveyed		11-02-98	Not sampled: unable to locate well							

Table 1
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Petroleum Hydrocarbons and Their Constituents
1995 - Present*

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Well Number	Date Gauged	Top of Casing Elevation (ft-MSL)	Depth to Water (feet)	Groundwater Elevation (ft-MSL)	Date Sampled	TPH Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-12	06-04-99	455.04	Not surveyed		06-04-99	Not sampled: unable to locate well							
MW-12	11-11-99	455.04	Not surveyed		11-11-99	Not sampled: unable to locate well							
MW-12	**06-20-00**	**455.04**	**Not surveyed**		**06-20-00**	**Not sampled: unable to locate well**							

TPH: Total petroleum hydrocarbons by modified EPA method 8015

BTEX: Benzene, toluene, ethylbenzene, total xylenes by EPA method 8021B. (EPA method 8020 prior to 11/11/99)

MTBE: Methyl tert-butyl ether by EPA method 8021B. (EPA method 8020 prior to 11/11/99).

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

µg/L: micrograms per liter

mg/L: milligrams per liter

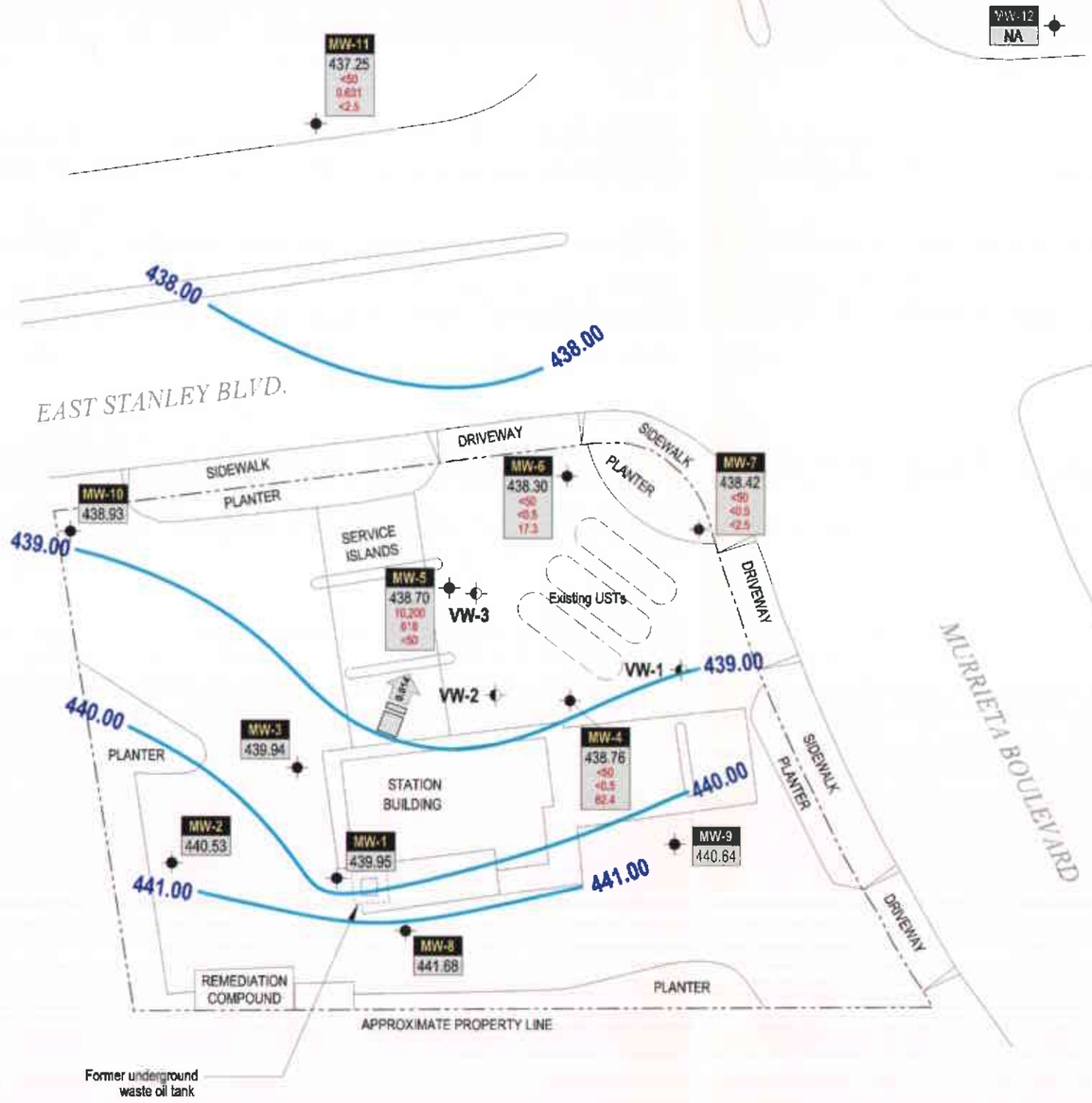
<: less than laboratory detection limit stated to the right

*: For previous historical groundwater elevation and analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Program Results, ARCO Service Station 6113, Livermore, California,* (EMCON, February 26, 1996).

Table 2
Groundwater Flow Direction and Gradient

ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California

Date Measured	Average Flow Direction	Average Hydraulic Gradient
03-23-95	Northwest	0.035
05-31-95	North-Northwest	0.028
08-31-95	North-Northwest	0.03
11-28-95	North-Northwest	0.025
02-22-96	North-Northwest	0.031
05-23-96	North-Northwest	0.025
08-08-96	North	0.019
11-07-96	North-Northeast	0.019
03-27-97	North-Northwest	0.021
05-19-97	North	0.019
05-18-98	North	0.02
11-02-98	North	0.02
06-04-99	North	0.02
11-11-99	North	0.03
06-20-00	**North-Northeast**	**0.014**



EXPLANATION

- MW-1 — Monitoring well location
- VW-1 — Vapor Extraction Well Location
- Well ID / ELEV / TPHg / Benzene / MTBE — Well Designation; Groundwater Elevation; Concentration of total petroleum hydrocarbons as gasoline, benzene, and MTBE in groundwater in micrograms per liter (ug/l). Samples collected on June 20, 2000
- NA — Well Not Accessible
- 438.00 — Groundwater elevation contour
- 0.014 — Approximate groundwater flow direction and gradient

Groundwater Elevation Contours

June 20, 00

CAMBRIA

ARCO Service Station 6113

785 East Stanley Boulevard

Livermore, California

FIGURE

1

H:\ARCO6113\FIGURES\DS-00.DWG

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 ARCO's Harbor water treatment location in Sacramento 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)
- Sample depth
- Date and time of collection
- Type of preservation used (if any)

Sampling and Analysis Chain-of-Custody Record

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

Groundwater Sampling and Analysis Request Form

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

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

APPENDIX B

CERTIFIED ANALYTICAL REPORTS, AND CHAIN-OF-CUSTODY DOCUMENTATION

Sequoia Analytical

819 Striker Avenue, Suite 8
Sacramento, CA 95834
(916) 921-9600
FAX (916) 921-0100
www.sequoialabs.com

July 9, 2000

Darryk Ataide
Cambria Environmental - Oakland
1144 65th Street, Ste. B
Oakland, CA 94608

RE: ARCO 6113, Livermore, CA/S006298

Dear Darryk Ataide

Enclosed are the results of analyses for sample(s) received by the laboratory on June 22, 2000. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Sandra R. Hanson
Client Services Representative

Lito Diaz
Laboratory Director

CA ELAP Certificate Number 1624

Sequoia Analytical

819 Striker Avenue, Suite 8
Sacramento, CA 95834
(916) 921-9600
FAX (916) 921-0100
www.sequoialabs.com

Cambria Environmental - Oakland	Project:	ARCO 6113, Livermore, CA	Sampled: 6/20/00
1144 65th Street, Ste. B	Project Number:	436-1611	Received: 6/22/00
Oakland, CA 94608	Project Manager:	Darryk Ataide	Reported: 7/9/00

ANALYTICAL REPORT FOR S006298

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
MW 11	S006298-01	Water	6/20/00
MW 6	S006298-02	Water	6/20/00
MW 7	S006298-03	Water	6/20/00
MW 4	S006298-04	Water	6/20/00
MW 5	S006298-05	Water	6/20/00
DUP 01	S006298-06	Water	6/20/00

Sequoia Analytical

819 Striker Avenue, Suite 8
Sacramento, CA 95834
(916) 921-9600
FAX (916) 921-0100
www.sequoialabs.com

Cambria Environmental - Oakland	Project:	ARCO 6113, Livermore, CA	Sampled: 6/20/00
1144 65th Street, Ste. B	Project Number:	436-1611	Received: 6/22/00
Oakland, CA 94608	Project Manager:	Darryk Ataide	Reported: 7/9/00

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

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
MW 11			**S006298-01**				**Water**	
Purgeable Hydrocarbons	0070041	7/3/00	7/3/00		50.0	ND	ug/l	
Benzene	"	"	"		0.500	**0.631**	"	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		0.500	ND	"	
Methyl tert-butyl ether	"	"	"		2.50	ND	"	
Surrogate: a,a,a-Trifluorotoluene	"	"	"	*60.0-140*		*104*	%	
MW 6			**S006298-02**				**Water**	
Purgeable Hydrocarbons	0070052	7/3/00	7/3/00		50.0	ND	ug/l	
Benzene	"	"	"		0.500	ND	"	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		0.500	ND	"	
Methyl tert-butyl ether	"	"	"		2.50	**17.3**	"	
Surrogate: a,a,a-Trifluorotoluene	"	"	"	*60.0-140*		*103*	%	
MW 7			**S006298-03**				**Water**	
Purgeable Hydrocarbons	0070052	7/3/00	7/3/00		50.0	ND	ug/l	
Benzene	"	"	"		0.500	ND	"	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		0.500	ND	"	
Methyl tert-butyl ether	"	"	"		2.50	ND	"	
Surrogate: a,a,a-Trifluorotoluene	"	"	"	*60.0-140*		*97.9*	%	
MW 4			**S006298-04**				**Water**	
Purgeable Hydrocarbons	0070052	7/3/00	7/3/00		50.0	ND	ug/l	
Benzene	"	"	"		0.500	ND	"	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		0.500	ND	"	
Methyl tert-butyl ether	"	"	"		2.50	**82.4**	"	
Surrogate: a,a,a-Trifluorotoluene	"	"	"	*60.0-140*		*98.0*	%	
MW 5			**S006298-05**				**Water**	
Purgeable Hydrocarbons	0070052	7/3/00	7/3/00		1000	**10200**	ug/l	1,D
Benzene	"	"	"		10.0	**618**	"	D
Toluene	"	"	"		10.0	**122**	"	D
Ethylbenzene	"	"	"		10.0	**832**	"	D
Xylenes (total)	"	"	"		10.0	**2020**	"	D

Sequoia Analytical - Sacramento

**Refer to end of report for text of notes and definitions.*

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Cambria Environmental - Oakland	Project:	ARCO 6113, Livermore, CA	Sampled: 6/20/00
1144 65th Street, Ste. B	Project Number:	436-1611	Received: 6/22/00
Oakland, CA 94608	Project Manager:	Darryk Ataide	Reported: 7/9/00

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

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
MW 5 (continued)			**S006298-05**				**Water**	
Methyl tert-butyl ether	0070052	7/3/00	7/3/00		50.0	ND	ug/l	D
Surrogate: a,a,a-Trifluorotoluene	"	"	"	*60.0-140*		*95.8*	%	
DUP 01			**S006298-06**				**Water**	
Purgeable Hydrocarbons	0070052	7/3/00	7/3/00		50.0	ND	ug/l	
Benzene	"	"	"		0.500	ND	"	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		0.500	ND	"	
Surrogate: a,a,a-Trifluorotoluene	"	"	"	*60.0-140*		*103*	%	

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Cambria Environmental - Oakland	Project:	ARCO 6113, Livermore, CA	Sampled: 6/20/00
1144 65th Street, Ste. B	Project Number:	436-1611	Received: 6/22/00
Oakland, CA 94608	Project Manager:	Darryk Ataide	Reported: 7/9/00

MTBE by DHS LUFT
Sequoia Analytical - Sacramento

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
DUP 01			S006298-06				Water	
Methyl tert-butyl ether	0070195	7/21/00	7/21/00		2.50	**62.3**	ug/l	2
Surrogate: a,a,a-Trifluorotoluene	"	"	"	*60.0-140*		*110*	%	

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Cambria Environmental - Oakland	Project:	ARCO 6113, Livermore, CA	Sampled: 6/20/00
1144 65th Street, Ste. B	Project Number:	436-1611	Received: 6/22/00
Oakland, CA 94608	Project Manager:	Darryk Ataide	Reported: 7/9/00

Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT/Quality Control
Sequoia Analytical - Sacramento

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0070041	**Date Prepared: 7/3/00**					**Extraction Method: EPA 5030B (MeOH)**				
Blank	**0070041-BLK1**									
Purgeable Hydrocarbons	7/3/00			**ND**	ug/l	**50.0**				
Benzene	"			**ND**	"	**0.500**				
Toluene	"			**ND**	"	**0.500**				
Ethylbenzene	"			**ND**	"	**0.500**				
Xylenes (total)	"			**ND**	"	**0.500**				
Methyl tert-butyl ether	"			**ND**	"	**2.50**				
Surrogate: a,a,a-Trifluorotoluene	"	*10.0*		*10.6*	"	*60.0-140*	*106*			
LCS	**0070041-BS1**									
Benzene	7/3/00	10.0		11.0	ug/l	70.0-130	110			
Toluene	"	10.0		10.7	"	70.0-130	107			
Ethylbenzene	"	10.0		10.8	"	70.0-130	108			
Xylenes (total)	"	30.0		32.4	"	70.0-130	108			
Methyl tert-butyl ether	"	10.0		11.7	"	70.0-130	117			
Surrogate: a,a,a-Trifluorotoluene	"	*10.0*		*10.5*	"	*60.0-140*	*105*			
Matrix Spike	**0070041-MS1**		**S006254-02**							
Benzene	7/3/00	10.0	ND	10.4	ug/l	60.0-140	**104**			
Toluene	"	10.0	ND	10.6	"	60.0-140	**106**			
Ethylbenzene	"	10.0	ND	10.7	"	60.0-140	**107**			
Xylenes (total)	"	30.0	ND	31.9	"	60.0-140	**106**			
Methyl tert-butyl ether	"	10.0	ND	8.66	"	60.0-140	**86.6**			
Surrogate: a,a,a-Trifluorotoluene	"	*10.0*		*10.0*	"	*60.0-140*	*100*			
Matrix Spike Dup	**0070041-MSD1**		**S006254-02**							
Benzene	7/3/00	10.0	ND	10.2	ug/l	60.0-140	**102**	25.0	**1.94**	
Toluene	"	10.0	ND	10.3	"	60.0-140	**103**	25.0	**2.87**	
Ethylbenzene	"	10.0	ND	10.3	"	60.0-140	**103**	25.0	**3.81**	
Xylenes (total)	"	30.0	ND	30.8	"	60.0-140	**103**	25.0	**2.87**	
Methyl tert-butyl ether	"	10.0	ND	11.4	"	60.0-140	**114**	25.0	**27.3**	3
Surrogate: a,a,a-Trifluorotoluene	"	*10.0*		*10.2*	"	*60.0-140*	*102*			
Batch: 0070052	**Date Prepared: 7/3/00**					**Extraction Method: EPA 5030B (MeOH)**				
Blank	**0070052-BLK1**									
Purgeable Hydrocarbons	7/3/00			**ND**	ug/l	**50.0**				
Benzene	"			**ND**	"	**0.500**				
Toluene	"			**ND**	"	**0.500**				
Ethylbenzene	"			**ND**	"	**0.500**				
Xylenes (total)	"			**ND**	"	**0.500**				
Methyl tert-butyl ether	"			**ND**	"	**2.50**				

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Cambria Environmental - Oakland	Project:	ARCO 6113, Livermore, CA	Sampled: 6/20/00
1144 65th Street, Ste. B	Project Number:	436-1611	Received: 6/22/00
Oakland, CA 94608	Project Manager:	Darryk Ataide	Reported: 7/9/00

Total Purgeable Hydrocarbons (C6-C12), BTEX and MTBE by DHS LUFT/Quality Control
Sequoia Analytical - Sacramento

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Blank (continued)	**0070052-BLK1**									
Surrogate: a,a,a-Trifluorotoluene	*7/3/00*	*10.0*		*10.2*	*ug/l*	*60.0-140*	*102*			
LCS	**0070052-BS1**									
Benzene	7/3/00	10.0		9.70	ug/l	70.0-130	97.0			
Toluene	"	10.0		9.97	"	70.0-130	99.7			
Ethylbenzene	"	10.0		9.90	"	70.0-130	99.0			
Xylenes (total)	"	30.0		27.0	"	70.0-130	90.0			
Methyl tert-butyl ether	"	10.0		11.0	"	70.0-130	110			
Surrogate: a,a,a-Trifluorotoluene	"	*10.0*		*10.2*	"	*60.0-140*	*102*			
Matrix Spike	**0070052-MS1**		**S006298-06**							
Benzene	7/3/00	10.0	ND	9.73	ug/l	60.0-140	**97.3**			
Toluene	"	10.0	ND	9.12	"	60.0-140	**91.2**			
Ethylbenzene	"	10.0	ND	9.43	"	60.0-140	**94.3**			
Xylenes (total)	"	30.0	ND	26.9	"	60.0-140	**89.7**			
Methyl tert-butyl ether	"	10.0	ND	66.8	"	60.0-140	**668**			3
Surrogate: a,a,a-Trifluorotoluene	"	*10.0*		*9.89*	"	*60.0-140*	*98.9*			
Matrix Spike Dup	**0070052-MSD1**		**S006298-06**							
Benzene	7/3/00	10.0	ND	9.02	ug/l	60.0-140	**90.2**	25.0	**7.57**	
Toluene	"	10.0	ND	9.12	"	60.0-140	**91.2**	25.0	**0**	
Ethylbenzene	"	10.0	ND	9.50	"	60.0-140	**95.0**	25.0	**0.740**	
Xylenes (total)	"	30.0	ND	26.2	"	60.0-140	**87.3**	25.0	**2.71**	
Methyl tert-butyl ether	"	10.0	ND	82.4	"	60.0-140	**824**	25.0	**20.9**	3
Surrogate: a,a,a-Trifluorotoluene	"	*10.0*		*9.42*	"	*60.0-140*	*94.2*			

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Cambria Environmental - Oakland	Project:	ARCO 6113, Livermore, CA	Sampled: 6/20/00
1144 65th Street, Ste. B	Project Number:	436-1611	Received: 6/22/00
Oakland, CA 94608	Project Manager:	Darryk Ataide	Reported: 7/9/00

MTBE by DHS LUFT/Quality Control
Sequoia Analytical - Sacramento

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0070195	**Date Prepared: 7/21/00**					**Extraction Method: EPA 5030B (MeOH)**				
Blank	**0070195-BLK1**									
Methyl tert-butyl ether	7/21/00			**ND**	ug/l	**2.50**				
Surrogate: a,a,a-Trifluorotoluene	"	*10.0*		*11.1*	"	*60.0-140*	*111*			
LCS	**0070195-BS1**									
Methyl tert-butyl ether	7/21/00	10.0		9.86	ug/l	70.0-130	98.6			
Surrogate: a,a,a-Trifluorotoluene	"	*10.0*		*11.4*	"	*60.0-140*	*114*			

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Cambria Environmental - Oakland	Project:	ARCO 6113, Livermore, CA	Sampled:	6/20/00
1144 65th Street, Ste. B	Project Number:	436-1611	Received:	6/22/00
Oakland, CA 94608	Project Manager:	Darryk Ataide	Reported:	7/9/00

Notes and Definitions

#	Note
D	Data reported from a dilution.
1	Chromatogram Pattern: Weathered Gasoline C6-C12
2	MTBE result confirmed past EPA recommended hold-time.
3	The RPD and/or spike recovery for this QC sample is outside of established control limits due to sample matrix interference.
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
Recov.	Recovery
RPD	Relative Percent Difference

Report was amended on 7/24/00.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. 24118.00

Chain of Custody

ARCO Facility no. 6113 | City (Facility) LIVERMORE | Project manager (Consultant) DERRYK ATAIDE | Laboratory name SEQUOIA

ARCO engineer Paul Supple 12AT 8 | Telephone no. (ARCO) 925 299 8891 | Telephone no. (Consultant) 510 6843339 | Fax no. (Consultant) 510 420 9170 | Contract number 436-1611

Consultant name CAMBRIA ENV. TECH | Address (Consultant) 1144 65TH ST. Suite B, OAKLAND | Method of shipment COURIER

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH/MTBE EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Semi Metals ☐ VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	
MW11		3		X			X	6/20/00	1140		X				5006298-01						
MW6		3		X			X		1220											02	
MW7		3		X			X		1306											03	
MW4		3		X			X		1329											04	
MW5		3		X			X		1415											05	
Dup01		3		X			X		—											06	

Special detection Limit/reporting: LOWEST POSSIBLE

Special QA/QC

Remarks

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/sampler	Date	Time	Received by
	6/22/00	1320	
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory: Monica Gregson

Date: 6/22/00 | Time: 1310

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

APPC 3292 (2-91)

APPENDIX C

FIELD DATA SHEETS

TOTAL PURGE = 318+ @ Harbor

CAMBRIA

WELL DEPTH MEASUREMENTS

ORDER	Well ID	Time	Top of Screen	DTB	DTP	DTW	DO YSI 55	Casing Dia	Comments
1	MW-1		29'	44		17.09	3.1	2"	
2	MW-2		28'	38		17.21	2.6	2"	
3	MW-3		28.5'	38.5'	~~0~~	17.03	2.8	2"	NEEDS NEW SCREWS (ALLEN lock)
11	MW-4			26.54		17.79	1.3		PURGE.
12	MW-5		43'	63'		17.14	1.6	4"	
10	MW-6		48'	68'		16.63	1.9	4"	
	MW-7		48'	68'		16.50	1.3	4"	
4	MW-8		47'	67'		15.29	2.4	4"	NEEDS NEW WELL CAP.
6	MW-9		48'	68'		15.54	2.1	4"	
5	MW-10		32'	52'		17.92	2.9	4"	
7	MW-11		38'	45'		17.82	4.1	2"	
9	MW-12		18'	34.5'	NO	READINGS		2"	UNABLE TO LOCATE

Project Name: **ARCO 6113**

Project Number: **436-1611**

Measured By: MARK Kavanaugh

Date: 6-20-00

CAMBRIA

WELL SAMPLING FORM

Project Name: **ARCO 6113**	Cambria Mgr: **Darryk Ataide**	Well ID: MW4
Project Number: **436 - 1611**	Date: 6-20-00	~~Well Yield:~~
Site Address: **785 E Stanley Blvd, Livermore**	Sampling Method: **Disposable bailer**	Well Diameter: 4 " **pvc**
		Technician(s):
Initial Depth to Water: 17.79	Total Well Depth: 26.54	Water Column Height: 8.75
Volume/ft: .65	1 Casing Volume: 5.68	3 Casing Volumes: 17.06
(Purge)/No Purge:		
Purging Device: **Submersible Pump**	Did Well Dewater?: NO	Total Gallons Purged: ± 17.5
Start Purge Time: 1310	Stop Purge Time: 1319	Total Time: 25

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
1315	10	21.0	7.1	415	
1316	12	21.0	7.0	398	
1317	14	21.1	6.9	397	
1318	16	21.0	6.9	396	

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW4	6-2000	1329	**4 VOA**	**HCL**	**TPHg, BTEX, MTBE**	**8021B**
Dup01	6-2000	—	"	"	"	"

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NSM 5/31/94

CAMBRIA

WELL SAMPLING FORM

Project Name: **ARCO 6113**	Cambria Mgr: **Darryk Ataide**	Well ID: MW5
Project Number: **436 - 1611**	Date: 6-20-00	Well Yield:
Site Address: **785 E Stanley Blvd, Livermore**	Sampling Method: **Disposable bailer**	Well Diameter: 4 " **pvc**
		Technician(s): MK
Initial Depth to Water: 17.14	Total Well Depth: 63	Water Column Height:
Volume/ft: .65	1 Casing Volume: 29.80	3 Casing Volumes: 89.42
Purge/No Purge:		
Purging Device: **Submersible Pump**	Did Well Dewater?: NO	Total Gallons Purged: ± 51
Start Purge Time: 1338	Stop Purge Time: 1404	Total Time: 40

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
1358	40	21.2	6.8	418	
1400	44	21.3	6.8	417	
1401	46	21.3	6.8	416	
1402	48	21.3	6.8	413	
1403	50	21.2	6.8	415	
	STABLE PARAMETERS, INTO AQUIFER				
	STOP PURGE.				

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW5	6-20-00	1415	**4 VOA**	**HCL**	**TPHg, BTEX, MTBE**	**8021B**

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NSM 5/31/94

TRAFFIC CONTROL

CAMBRIA

WELL SAMPLING FORM

Project Name: **ARCO 6113**	Cambria Mgr: **Darryk Ataide**	Well ID: MW6
Project Number: **436 - 1611**	Date: 6-20	~~Well Yield~~:
Site Address: **785 E Stanley Blvd, Livermore**	Sampling Method: **Disposable bailer**	Well Diameter: 4 " **pvc**
		Technician(s): MK
Initial Depth to Water: 16.63	Total Well Depth: 68	Water Column Height: 51.37
Volume/ft: .65	1 Casing Volume: 33.39	3 Casing Volumes: 100
Purge/No Purge:		
Purging Device: **Submersible Pump**	Did Well Dewater?: NO	Total Gallons Purged: ~68
Start Purge Time: 1146	Stop Purge Time: 1210	Total Time: 36

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
1156	40	20.3	6.8	442	
1201	50	20.0	6.8	427	
1206	60	20.1	6.8	429	
1207	62	19.9	6.8	428	
1208	64	19.9	6.8	426	
1209	66	19.8	6.8	427	
	STABLE PARAMETERS IN AQUIFER				
	STOP PURGE.				

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW6	6-20	1220	**4 VOA**	**HCL**	**TPHg, BTEX, MTBE**	**8021B**

CAMBRIA

WELL SAMPLING FORM

Project Name: **ARCO 6113**	Cambria Mgr: **Darryk Ataide**	Well ID: MW 7
Project Number: **436 - 1611**	Date: 6-20-00	~~Well Yield:~~
Site Address: **785 E Stanley Blvd, Livermore**	Sampling Method: **Disposable bailer**	Well Diameter: 4 " **pvc**
		Technician(s): MK
Initial Depth to Water: 16.50	Total Well Depth: 68	Water Column Height: 51.5
Volume/ft: .65	1 Casing Volume: 33.47	3 Casing Volumes: 100.4
Purge/No Purge:		
Purging Device: **Submersible Pump**	Did Well Dewater?: NO	Total Gallons Purged: ±57
Start Purge Time: 1228	Stop Purge Time: 1257	Total Time: 40

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
1248	40	20.9	6.8	387	
1253	50	20.8	6.8	379	
1254	52	20.5	6.8	382	
1255	54	20.4	6.8	381	
1256	56	20.5	6.8	384	
	STABLE READINGS, IN THE AQUIFER. STOP PURGE.				

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW7	6-20	1306	**4 VOA**	**HCL**	**TPHg, BTEX, MTBE**	**8021B**

CAMBRIA

WELL SAMPLING FORM

Project Name: **ARCO 6113**	Cambria Mgr: **Darryk Ataide**	Well ID: MW11
Project Number: **436 - 1611**	Date: 6-20-00	~~Well Yield:~~
Site Address: **785 E Stanley Blvd, Livermore**	Sampling Method: **Disposable bailer**	Well Diameter: 2 " **pvc**
		Technician(s):
Initial Depth to Water: 17.82	Total Well Depth: 45	Water Column Height: 27.18
Volume/ft: .16	1 Casing Volume: 4.34	3 Casing Volumes: 13.04
Purge/No Purge:		
Purging Device: **Submersible Pump**	Did Well Dewater?: NO	Total Gallons Purged:
Start Purge Time: 1123	Stop Purge Time: 1130	Total Time: 20

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
1126	6	21.3	6.8	474	
1127	8	21.2	6.8	465	
1128	10	21.0	6.8	472	

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW11	6-20	1140	**4 VOA**	**HCL**	**TPHg, BTEX, MTBE**	**8021B**

CAMBRIA

WELL SAMPLING FORM

Project Name: **ARCO 6113**	Cambria Mgr: **Darryk Ataide**	Well ID: MW 12
Project Number: **436 - 1611**	Date:	Well Yield:
Site Address: **785 E Stanley Blvd, Livermore**	Sampling Method: **Disposable bailer**	Well Diameter: **" pvc**
		Technician(s):
Initial Depth to Water:	Total Well Depth:	Water Column Height:
Volume/ft:	1 Casing Volume:	3 Casing Volumes:
Purge/No Purge:		
Purging Device: **Submersible Pump**	Did Well Dewater?:	Total Gallons Purged:
Start Purge Time:	Stop Purge Time:	Total Time:

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

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

Time	Casing Volume	Temp. C	pH	Cond. uS	Comments
NO SAMPLE.					
UNABLE TO LOCATE?					

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
			4 VOA	**HCL**	**TPHg, BTEX, MTBE**	**8021B**