RO-393

CAMBRIA

February 13, 2002

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

FEB 26 2002

Re: **Quarterly Groundwater Monitoring Report**
Fourth Quarter 2001
ARCO Service Station No. 6113
785 East Stanley Boulevard
Livermore, California
Cambria Project #438-1611

Dear Ms. chu:

On behalf of ARCO, Cambria Environmental Technology, Inc. (Cambria) is submitting the attached report which presents the results of the fourth quarter 2001 groundwater monitoring program and the installation of a replacement monitoring well MW-13 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.

Ron Scheele

dstefani@lpfire.org

Ron Scheele, RG
Senior Project Manager

Attachment: Quarterly Groundwater Monitoring Report, Fourth Quarter 2001

cc: Ms. Danielle Stefani, City of Livermore Fire Department, 4550 East Ave, Livermore, CA 94550
Mr. Paul Supple, ARCO, PO Box 6549 Moraga, CA 94570

Oakland, CA
San Ramon, CA
Sonoma, CA

Cambria Environmental Technology, Inc.

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

CAMBRIA

Quarterly Groundwater Monitoring Report

Fourth Quarter 2001

Arco Service Station 6113
785 East Stanley Boulevard
Livermore, California
Cambria Project #438-1611

Prepared For:

Mr. Paul Supple
ARCO

February 13, 2002

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

Oakland, CA
San Ramon, CA
Sonoma, CA

Cambria Environmental Technology, Inc.

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Written by:

Sara Dwight
Staff Environmental Scientist

Ron Scheele, RG
Senior Project Manager

CAMBRIA

Date: February 13, 2002
Quarter: 4th Quarter, 2001

ARCO QUARTERLY GROUNDWATER MONITORING REPORT

Station No.:	6113	Address:	785 East Stanley Boulevard, Livermore, California
ARCO Environmental Engineer:			Paul Supple
Consulting Co./Contact Person:			Cambria Environmental Technology Inc. / Ron Scheele, RG
Consultant Project No.:			438-1611
Primary Agency/Regulatory ID No.:			ACHCSA

WORK PERFORMED THIS QUARTER (FOURTH - 2001):

1. Prepared and submitted semi-annual groundwater monitoring report for third quarter 2001.
2. Performed fourth quarter groundwater monitoring and sampling on October 5, 2001.
3. Installed replacement well (MW-13) on November 9, 2001 as outlined in Cambria's *Well Replacement Workplan,* dated June 15, 2001.

WORK PROPOSED FOR NEXT QUARTER (FIRST - 2002):

1. Prepare and submit quarterly groundwater monitoring report for fourth quarter 2001.
2. Incorporate well MW-13 into quarterly groundwater monitoring program.

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, MW-6, MW-7, MW-11, MW-12 Onetime event (3rd Quarter): MW-6, MW-7, VW-1
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 2001 ft., impacted by site:	None
Current Remediation Techniques:	Natural attenuation
Average Depth to Groundwater	26.97 feet
Groundwater Flow Direction and Gradient :	0.031 ft/ft toward Northeast

DISCUSSION:

Based on field measurements collect on October 5, 2001, groundwater beneath the site flows towards the northeast, at a gradient of 0.031 ft/ft. This is consistent with the historic groundwater flow direction and gradient.

Hydrocarbon concentrations detected this quarter are consistent with the previous sampling event. The maximum TPHg, benzene, and MTBE concentrations were detected in well VW-1 at 1,500, 140, and 660 micrograms per liter (µg/L), respectively.

Monitoring Well Installation

On November 9, 2001, monitoring well MW-13 was installed to a depth of 30 feet below ground surface (bgs) using 8-inch diameter hollow stem augers. Matthew Myers, Cambria Geologist, was present for the installation, working under the supervision of Ron Scheele, a California Registered Geologist. The well was installed by V & W Drilling of Isleton, California (C57 License No. 720904).

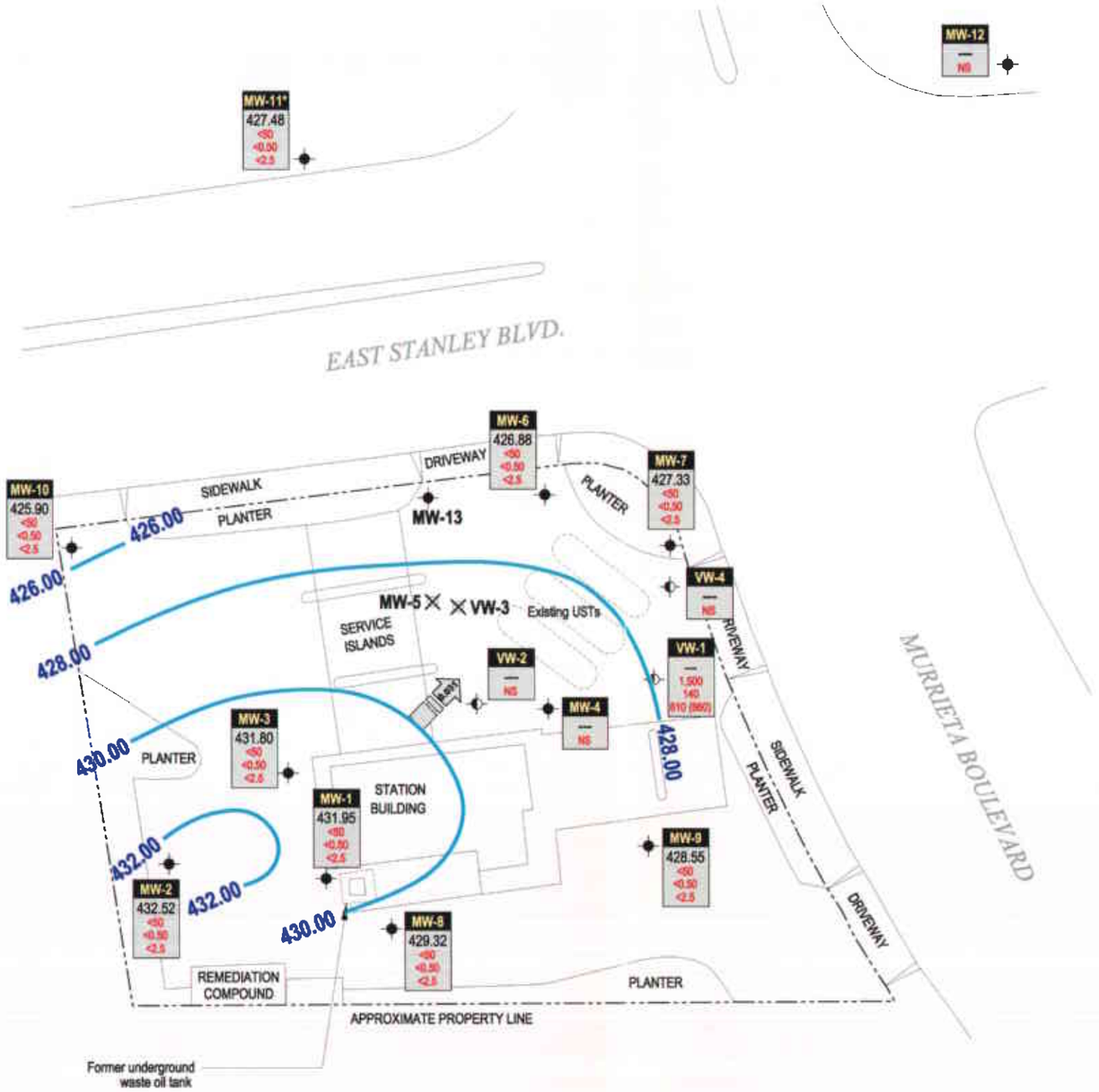
Well MW-13 was sampled to 31.5 feet bgs at 5-foot intervals using a California modified split spoon sampler. Soil types encountered consisted of fill and sandy gravel underlain by silty sand and sandy and clayey silt. Well MW-13 was constructed with 2-inch diameter schedule 40 PVC casing and screened with 20 feet of 0.010-inch slotted casing. The well was completed with No. 2/12 sand from the bottom of the boring to 2 feet above the top of screened casing, which was overlain by 1 foot of bentonite, and bentonite cement grout to the surface. See Appendix D for a copy of the soil boring log and well construction details.

Monitoring well MW-13 will be surveyed horizontally and vertically and incorporated into the quarterly monitoring and sampling beginning in the first quarter 2002.

ATTACHMENTS:

- Figure 1 – Groundwater Elevation Contour and Analytical Summary Map
- Table 1 – Historical Groundwater Elevation and Analytical Data
- Table 2 – Groundwater Flow Direction and Gradient
- Table 3 – Soil Analytical Results
- Appendix A – Field and Laboratory Procedures
- Appendix B – Certified Analytical Report, Chain-of-Custody Documentation
- Appendix C – Field Data Sheets
- Appendix D – Boring Log/Well Construction Details
- Appendix E – Soil Sampling Laboratory Results

02/04/02



EXPLANATION

- MW-1 — Monitoring well location
- VW-1 — Vapor Extraction Well Location
- MW-5 — Abandoned 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 (µg/l). Samples collected on 10/05/01
- — — Data Not Reported
- NS — Well Not Sampled
- • — Groundwater elevation anomalous, not used for contouring
- 434.00 — Groundwater elevation contour
- Approximate groundwater flow direction and gradient

Groundwater Elevation Contour and Analytical Summary Map

October 5, 2001

CAMBRIA

ARCO Service Station 6113
785 East Stanley Boulevard
Livermore, California

FIGURE
1

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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 8021B (µg/L)	MTBE 8260 (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-1	08-29-00	457.04	18.20	438.84	08-29-00	Not sampled: well sampled annually, during the fourth quarter							2.66	
MW-1	11-29-00	457.04	20.30	436.74	11-29-00	<50.0	<0.500	<0.500	<0.500	1.36	<2.50		0.71	P
MW-1	05-02-01	457.04	22.39	434.65	05-02-01	Not sampled: well sampled annually, during the fourth quarter								
MW-1	08-15-01	457.04	24.97	432.07	08-15-01	Not sampled: well sampled annually, during the fourth quarter								
MW-1	**10-05-01**	**457.04**	**25.09**	**431.95**	**10-05-01**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<2.5**		**0.78**	**P**
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								
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-2	08-29-00	457.74	18.25	439.49	08-29-00	Not sampled: well sampled annually, during the fourth quarter							2.65	

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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 8021B (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-2	11-29-00	457.74	20.69	437.05	11-29-00	<50.0	<0.500	0.581	0.827	4.38	<2.50		0.88	P
MW-2	05-02-01	457.74	22.69	435.05	05-02-01	Not sampled: well sampled annually, during the fourth quarter								
MW-2	08-15-01	457.74	25.15	432.59	08-15-01	Not sampled: well sampled annually, during the fourth quarter								
MW-2	**10-05-01**	**457.74**	**25.22**	**432.52**	**10-05-01**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<2.5**		**0.80**	**P**
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-3	08-29-00	456.97	18.25	438.72	08-29-00	Not sampled: well sampled annually, during the fourth quarter							3.39	
MW-3	11-29-00	456.97	20.27	436.70	11-29-00	<50.0	<0.500	<0.500	1.08	3.34	<2.50		0.67	
MW-3	05-02-01	456.97	22.33	434.64	05-02-01	Not sampled: well sampled annually, during the fourth quarter								
MW-3	08-15-01	456.97	25.03	431.94	08-15-01	Not sampled: well sampled annually, during the fourth quarter								
MW-3	**10-05-01**	**456.97**	**25.17**	**431.80**	**10-05-01**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<2.5**		**0.79**	**P**

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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			
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			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	NR	NR	NR	06-20-00	<50.0	<0.500	<0.500	<0.500	<0.500	62.3			
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-4	08-29-00	456.55	18.90	437.65	08-29-00	56.0	<0.500	<0.500	<0.500	<0.500	47.9		0.97	P
MW-4	11-29-00	456.55	20.50	436.05	11-29-00	<50.0	<0.500	<0.500	<0.500	<0.500	9.88	10.4	0.59	P
MW-4	05-02-01	456.55	22.65	433.90	05-02-01	<50.0	<0.500	<0.500	<0.500	<0.500	61.1	70.9	0.74	P
DUP 1	05-02-01	NR	NR	NR	05-02-01	<50.0	<0.500	<0.500	<0.500	<0.500	59.4	68.4		
MW-4	08-15-01	NR	NR	NR	08-15-01	Not sampled: well dry								
MW-4	**10-05-01**	**NR**	**NR**	**NR**	**10-05-01**	**Not sampled: well dry**								
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	NR	NR	05-31-95	Not sampled: well was inaccessible								
MW-5	08-31-95	455.84	NR	NR	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			

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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			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
MW-5	08-29-00	455.84	18.60	437.24	08-29-00	12,300	436	166	711	2,120	517		0.79	P
MW-5	11-29-00	455.84	20.57	435.27	11-29-00	26,000	491	149	1,090	3,810	671	<20.0	0.51	P
MW-5	05-02-01	NR	NR	NR	05-02-01	Well Abandoned								
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			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
DUP	08-29-00	NR	NR	NR	08-29-00	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50			
MW-6	08-29-00	454.93	17.91	437.02	08-29-00	<50.0	<0.500	0.551	<0.500	<0.500	<2.50		1.67	P
MW-6	11-29-00	454.93	20.30	434.63	11-29-00	<50.0	<0.500	<0.500	<0.500	1.03	<2.50		0.79	P
MW-6	05-02-01	454.93	22.20	432.73	05-02-01	3,230	1,300	33.6	89.4	136	1,810	2,310	0.95	P
MW-6	08-15-01	454.93	27.95	426.98	08-15-01	<50	<0.50	<0.50	<0.50	<0.50	21	25	0.63	P
MW-6	**10-05-01**	**454.93**	**28.05**	**426.88**	**10-05-01**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<2.5**		**0.85**	**P**
	11-21-01					<50	<0.5			<5.0				

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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 8021B (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
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	NR	NR	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			
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			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-7	08-29-00	454.92	17.80	437.12	08-29-00	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50		1.67	P
MW-7	11-29-00	454.92	19.61	435.31	11-29-00	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50		0.51	P
MW-7	05-02-01	454.92	22.05	432.87	05-02-01	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50	2.66	0.9	P
MW-7	08-15-01	454.92	27.55	427.37	08-15-01	<50	<0.50	<0.50	<0.50	<0.50	<2.5		0.84	P
MW-7	**10-05-01**	**454.92**	**27.59**	**427.33**	**10-05-01**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<2.5**		**0.62**	**P**
	1-21-01					<50	<0.5				15			
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-8	08-29-00	456.97	16.59	440.38	08-29-00	Not sampled: well sampled annually, during the fourth quarter							3.37	

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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 8021B (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
MW-8	11-29-00	456.97	19.80	437.17	11-29-00	<50.0	<0.500	<0.500	<0.500	0.772	<2.50		1.35	P
MW-8	05-02-01	456.97	22.12	434.85	05-02-01	Not sampled: well sampled annually, during the fourth quarter								
MW-8	08-15-01	456.97	27.63	429.34	08-15-01	Not sampled: well sampled annually, during the fourth quarter								
MW-8	**10-05-01**	**456.97**	**27.65**	**429.32**	**10-05-01**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<2.5**		**1.07**	**P**
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								
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			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-9	08-29-00	456.18	16.81	439.37	08-29-00	Not sampled: well sampled annually, during the fourth quarter							2.59	
MW-9	11-29-00	456.18	18.81	437.37	11-29-00	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50		0.81	P
MW-9	05-02-01	456.18	22.09	434.09	05-02-01	Not sampled: well sampled annually, during the fourth quarter								
MW-9	08-15-01	456.18	27.59	428.59	08-15-01	Not sampled: well sampled annually, during the fourth quarter								
MW-9	**10-05-01**	**456.18**	**27.63**	**428.55**	**10-05-01**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<2.5**		**0.93**	**P**
DUP	**10-05-01**	**NR**	**NR**	**NR**	**10-05-01**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<2.5**			

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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 8021B (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
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-10	08-29-00	456.85	19.15	437.70	08-29-00	Not sampled: well sampled annually, during the fourth quarter							1.54	
MW-10	11-29-00	456.85	21.30	435.55	11-29-00	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50		0.95	P
MW-10	05-02-01	456.85	29.95	426.90	05-02-01	Not sampled: well sampled annually, during the fourth quarter								
MW-10	08-15-01	456.85	30.74	426.11	08-15-01	Not sampled: well sampled annually, during the fourth quarter								
MW-10	**10-05-01**	**456.85**	**30.95**	**425.90**	**10-05-01**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<2.5**		**0.89**	**P**
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								
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								

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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 8021B (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
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			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-11	08-29-00	455.07	19.50	435.57	08-29-00	Not sampled: well sampled semi-annually, during the second and fourth quarters								
MW-11	11-29-00	455.07	20.60	434.47	11-29-00	<50.0	<0.500	<0.500	<0.500	1.63	<2.50		0.97	P
MW-11	05-02-01	455.07	22.42	432.65	05-02-01	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50		1.04	P
MW-11	08-15-01	455.07	27.41	427.66	08-15-01	Not sampled: well sampled semi-annually, during the second and fourth quarters								
MW-11	**10-05-01**	**455.07**	**27.59**	**427.48**	**10-05-01**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<2.5**		**1.05**	**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	NR	NR	11-02-98	Not sampled: unable to locate well								
MW-12	06-04-99	455.04	NR	NR	06-04-99	Not sampled: unable to locate well								
MW-12	11-11-99	455.04	NR	NR	11-11-99	Not sampled: unable to locate well								
MW-12	06-20-00	455.04	NR	NR	06-20-00	Not sampled: unable to locate well								
MW-12	08-29-00	455.04	NR	NR	08-29-00	Not sampled: unable to locate well								
MW-12	11-29-00	455.04	NR	NR	11-29-00	Not sampled: unable to locate well								
MW-12	05-02-01	455.04	NR	NR	05-02-01	Not sampled: unable to locate well								
MW-12	08-15-01	455.04	NR	NR	08-15-01	Not sampled: unable to locate well								
MW-12	**10-05-01**	**455.04**	**NR**	**NR**	**10-05-01**	**Not sampled: unable to locate well**								

MW-13 1-2-02 15,000 160 4,900

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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 8021B (µg/L)	MTBE 8260 (µg/L)	Dissolved Oxygen (mg/L)	Purged/ Not Purged (P/NP)
VW-1	08-29-00	NR	17.40	NR	08-29-00	2,360	27.6	11.6	26.3	33.2	110		4.47	P
VW-1	11-29-00	NR	18.75	NR	11-29-00	<50.0	<0.500	<0.500	<0.500	<0.500	<2.50		0.46	P
VW-1	05-02-01	NR	21.59	NR	05-02-01	Well not sampled								
VW-1	08-15-01	NR	24.62	NR	08-15-01	1,200	6.3	4.3	1.7	1.3	20	17		P
DUP	08-15-01	NR	NR	NR	08-15-01	1,200	6.2	4.1	1.8	1.1	20	17		
VW-1	**10-05-01** 1-24-02	**NR**	**24.75**	**NR**	**10-05-01**	**1,500** 6,700	**140** 540	**55**	**28**	**82**	**610** 2600	**660**	**0.71**	**P**
VW-2	08-29-00	NR	NR	NR	08-29-00	Well inaccessible								
VW-2	11-29-00	NR	NR	NR	11-29-00	Well inaccessible								
VW-2	05-02-01	NR	NR	NR	05-02-01	Well not sampled								
VW-2	05-02-01	NR	NR	NR	08-15-01	Well not sampled								
VW-2	**10-05-01**	**NR**	**NR**	**NR**	**10-05-01**	**Well inaccessible** well box damaged								
VW-3	08-29-00	NR	17.93	NR	08-29-00	25,400	3,540	10,600	1,280	43,000	44,700			P
VW-3	11-29-00	NR	19.75	NR	11-29-00	54,200	9,450	1,870	2,350	9,400	12,300	15,100	0.47	P
VW-3	05-02-01	NR	NR	NR	05-02-01	Well abandoned								
VW-4	08-29-00	NR	NR	NR	08-29-00	Well inaccessible								
VW-4	11-29-00	NR	19.45	NR	11-29-00	37,500	4,510	206	2,100	9,030	6,770	7,880	0.42	P
DUP	11-29-00	NR	NR	NR	11-29-00	36,100	3,700	206	1,850	7,890	6,430	8,460		
VW-4	05-02-01	NR	21.66	NR	05-02-01	Well not sampled								
VW-4	08-15-01	NR	NR	NR	08-15-01	Well not sampled								
VW-4	**10-05-01**	**NR**	**NR**	**NR**	**10-05-01**	**Not sampled: well dry** dry								

Notes:

--: Not analyzed, not applicable
NR: not reported; data not available or not measurable
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). Any MTBE Detection by 8021B was confirmed by EPA method 8260 beginning Third Quarter 2000 (08-29-00 Resuls)
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).
DUP: duplicate

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
08-29-00	North-Northeast	0.013
11-29-00	North-Northwest	0.026
05-02-01	Northeast	0.026
08-15-01	Northeast	0.047
10-05-01	**Northeast**	**0.031**

Table 3
Soil Analytical Results

November 9, 2001

ARCO Service Station No. 6113
785 East Stanley Boulevard, Livermore, California

Sample ID	Sample Depth (fbg)	TPHg (mg/kg)	Benzene (mg/kg)	Toulene (mg/kg)	Ethyl-benzene (mg/kg)	Xylene (mg/kg)	MTBE (mg/kg)
MW-13 5.5'	5.5	<1.0	<0.0050	**0.0068**	**0.0058**	**0.046**	<0.050
MW-13 10.5'	10.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	**0.28**
MW-13 15.5'	15.5	**13**	<0.010	<0.010	**0.045**	**0.30**	<0.10

Notes

fbg = feet below grade
mg/kg = milligrams per kilogram
TPHg = total petroluem hydrocarbons as gasoline
MTBE = methyl tertiary butyl ether by EPA Method 8020

APPENDIX A

SAMPLING AND ANALYSIS PROCEDURES

APPENDIX A

SAMPLING AND ANALYSIS PROCEDURES

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

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

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

Sample Collection

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

Equipment Cleaning

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

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

Water Level, Floating Hydrocarbon, and Total Well Depth Measurements

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

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

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

Well Purging

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

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

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

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

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

Well Sampling

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

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

Sample Preservation and Handling

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

Sample Containers and Preservation

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

Sample Handling

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

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

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

Sample Documentation

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

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

Field Logbook

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

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

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

Labels

Sample labels contained the following information:

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

Sampling and Analysis Chain-of-Custody Record

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

Groundwater Sampling and Analysis Request Form

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

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

APPENDIX B

CERTIFIED ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY DOCUMENTATION

Sequoia Analytical

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18 October, 2001

Ron Scheele
Cambria Environmental - Emeryville
6262 Hollis Street
Emeryville, CA 94608

RE: ARCO
Sequoia Report: P110234

Enclosed are the results of analyses for samples received by the laboratory on 10/09/01 16:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Angelee Cari

Angelee Cari
Client Services Representative

CA ELAP Certificate #2374

Sequoia Analytical

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Cambria Environmental - Emeryville
6262 Hollis Street
Emeryville CA, 94608

Project: ARCO
Project Number: Arco 6113/Livermore
Project Manager: Ron Scheele

Reported:
10/18/01 17:18

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	P110234-01	Water	10/05/01 00:00	10/09/01 16:30
MW-2	P110234-02	Water	10/05/01 00:00	10/09/01 16:30
MW-3	P110234-03	Water	10/05/01 00:00	10/09/01 16:30
MW-6	P110234-04	Water	10/05/01 00:00	10/09/01 16:30
MW-7	P110234-05	Water	10/05/01 00:00	10/09/01 16:30
MW-8	P110234-06	Water	10/05/01 00:00	10/09/01 16:30
MW-9	P110234-07	Water	10/05/01 00:00	10/09/01 16:30
MW-10	P110234-08	Water	10/05/01 00:00	10/09/01 16:30
MW-11	P110234-09	Water	10/05/01 00:00	10/09/01 16:30
VW-1	P110234-10	Water	10/05/01 00:00	10/09/01 16:30
DUP	P110234-11	Water	10/05/01 00:00	10/09/01 16:30

Sequoia Analytical - Petaluma

Angelee Cari

Angelee Cari, Client Services Representative

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.

Sequoia Analytical

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: Arco 6113/Livermore	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	10/18/01 17:18

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 (P110234-01) Water Sampled: 10/05/01 00:00 Received: 10/09/01 16:30									
Gasoline (C6-C12)	ND	50	ug/l	1	1100239	10/11/01	10/11/01	EPA 8015M/8020M	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*100 %*	*65-135*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*97.7 %*	*65-135*		"	"	"	"	
MW-2 (P110234-02) Water Sampled: 10/05/01 00:00 Received: 10/09/01 16:30									
Gasoline (C6-C12)	ND	50	ug/l	1	1100239	10/11/01	10/11/01	EPA 8015M/8020M	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*103 %*	*65-135*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*97.3 %*	*65-135*		"	"	"	"	
MW-3 (P110234-03) Water Sampled: 10/05/01 00:00 Received: 10/09/01 16:30									
Gasoline (C6-C12)	ND	50	ug/l	1	1100239	10/11/01	10/11/01	EPA 8015M/8020M	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*103 %*	*65-135*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*98.0 %*	*65-135*		"	"	"	"	

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: Arco 6113/Livermore	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	10/18/01 17:18

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-6 (P110234-04) Water Sampled: 10/05/01 00:00 Received: 10/09/01 16:30									
Gasoline (C6-C12)	ND	50	ug/l	1	1100239	10/11/01	10/11/01	EPA 8015M/8020M	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*104 %*		*65-135*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*97.7 %*		*65-135*	"	"	"	"	
MW-7 (P110234-05) Water Sampled: 10/05/01 00:00 Received: 10/09/01 16:30									
Gasoline (C6-C12)	ND	50	ug/l	1	1100281	10/11/01	10/11/01	EPA 8015M/8020M	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*108 %*		*65-135*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*95.7 %*		*65-135*	"	"	"	"	
MW-8 (P110234-06) Water Sampled: 10/05/01 00:00 Received: 10/09/01 16:30									
Gasoline (C6-C12)	ND	50	ug/l	1	1100281	10/11/01	10/11/01	EPA 8015M/8020M	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*95.3 %*		*65-135*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*94.0 %*		*65-135*	"	"	"	"	

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: Arco 6113/Livermore	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	10/18/01 17:18

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-9 (P110234-07) Water Sampled: 10/05/01 00:00 Received: 10/09/01 16:30									
Gasoline (C6-C12)	ND	50	ug/l	1	1100281	10/11/01	10/11/01	EPA 8015M/8020M	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*105 %*	*65-135*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*94.7 %*	*65-135*		"	"	"	"	
MW-10 (P110234-08) Water Sampled: 10/05/01 00:00 Received: 10/09/01 16:30									
Gasoline (C6-C12)	ND	50	ug/l	1	1100281	10/11/01	10/11/01	EPA 8015M/8020M	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*105 %*	*65-135*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*93.7 %*	*65-135*		"	"	"	"	
MW-11 (P110234-09) Water Sampled: 10/05/01 00:00 Received: 10/09/01 16:30									
Gasoline (C6-C12)	ND	50	ug/l	1	1100281	10/11/01	10/11/01	EPA 8015M/8020M	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*105 %*	*65-135*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*94.3 %*	*65-135*		"	"	"	"	

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: Arco 6113/Livermore	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	10/18/01 17:18

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-1 (P110234-10) Water Sampled: 10/05/01 00:00 Received: 10/09/01 16:30									
Gasoline (C6-C12)	**1500**	250	ug/l	5	1100281	10/11/01	10/11/01	EPA 8015M/8020M	
Benzene	**140**	2.5	"	"	"	"	"	"	
Toluene	**55**	2.5	"	"	"	"	"	"	
Ethylbenzene	**28**	2.5	"	"	"	"	"	"	
Xylenes (total)	**82**	2.5	"	"	"	"	"	"	
Methyl tert-butyl ether	**610**	12	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*104 %*	*65-135*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*91.0 %*	*65-135*		"	"	"	"	
DUP (P110234-11) Water Sampled: 10/05/01 00:00 Received: 10/09/01 16:30									
Gasoline (C6-C12)	ND	50	ug/l	1	1100281	10/11/01	10/11/01	EPA 8015M/8020M	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*101 %*	*65-135*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*93.0 %*	*65-135*		"	"	"	"	

Sequoia Analytical

1455 McDowell Blvd, North Ste D
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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: Arco 6113/Livermore	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	10/18/01 17:18

Volatile Organic Compounds by EPA Method 8260B

Sequoia Analytical - Petaluma

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
VW-1 (P110234-10) Water Sampled: 10/05/01 00:00 Received: 10/09/01 16:30									
Methyl tert-butyl ether	**660**	100	ug/l	200	1100343	10/15/01	10/15/01	EPA 8260B	
Surrogate: Dibromofluoromethane		*118 %*		*84-122*		"	"	"	

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: Arco 6113/Livermore	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	10/18/01 17:18

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
Batch 1100239 - EPA 5030, waters										
Blank (1100239-BLK1)				Prepared & Analyzed: 10/10/01						
Gasoline (C6-C12)	ND	50	ug/l							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Methyl tert-butyl ether	ND	2.5	"							
Surrogate: a,a,a-Trifluorotoluene	*307*		"	*300*		*102*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*288*		"	*300*		*96.0*	*65-135*			
Blank (1100239-BLK2)				Prepared & Analyzed: 10/11/01						
Gasoline (C6-C12)	ND	50	ug/l							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Methyl tert-butyl ether	ND	2.5	"							
Surrogate: a,a,a-Trifluorotoluene	*307*		"	*300*		*102*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*293*		"	*300*		*97.7*	*65-135*			
LCS (1100239-BS1)				Prepared & Analyzed: 10/10/01						
Gasoline (C6-C12)	2520	50	ug/l	2750		91.6	65-135			
Benzene	42.5	0.50	"	33.0		129	65-135			
Toluene	207	0.50	"	198		105	65-135			
Ethylbenzene	47.0	0.50	"	46.0		102	65-135			
Xylenes (total)	257	0.50	"	230		112	65-135			
Methyl tert-butyl ether	68.7	2.5	"	52.5		131	65-135			
Surrogate: a,a,a-Trifluorotoluene	*309*		"	*300*		*103*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*299*		"	*300*		*99.7*	*65-135*			

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: Arco 6113/Livermore	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	10/18/01 17:18

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
Batch 1100239 - EPA 5030, waters										
LCS (1100239-BS2)				Prepared & Analyzed: 10/11/01						
Gasoline (C6-C12)	2440	50	ug/l	2750		88.7	65-135			
Benzene	40.1	0.50	"	33.0		122	65-135			
Toluene	201	0.50	"	198		102	65-135			
Ethylbenzene	45.6	0.50	"	46.0		99.1	65-135			
Xylenes (total)	248	0.50	"	230		108	65-135			
Methyl tert-butyl ether	66.0	2.5	"	52.5		126	65-135			
Surrogate: a,a,a-Trifluorotoluene	*311*		"	*300*		*104*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*305*		"	*300*		*102*	*65-135*			
Matrix Spike (1100239-MS1)		**Source: P110199-01**		Prepared & Analyzed: 10/10/01						
Gasoline (C6-C12)	2490	50	ug/l	2750	ND	89.6	65-135			
Benzene	41.3	0.50	"	33.0	ND	125	65-135			
Toluene	211	0.50	"	198	ND	106	65-135			
Ethylbenzene	47.1	0.50	"	46.0	ND	102	65-135			
Xylenes (total)	257	0.50	"	230	0.55	112	65-135			
Methyl tert-butyl ether	58.4	2.5	"	52.5	ND	110	65-135			
Surrogate: a,a,a-Trifluorotoluene	*316*		"	*300*		*105*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*300*		"	*300*		*100*	*65-135*			
Matrix Spike Dup (1100239-MSD1)		**Source: P110199-01**		Prepared & Analyzed: 10/10/01						
Gasoline (C6-C12)	2410	50	ug/l	2750	ND	86.7	65-135	3.27	20	
Benzene	41.2	0.50	"	33.0	ND	125	65-135	0.242	20	
Toluene	206	0.50	"	198	ND	104	65-135	2.40	20	
Ethylbenzene	46.7	0.50	"	46.0	ND	102	65-135	0.853	20	
Xylenes (total)	256	0.50	"	230	0.55	111	65-135	0.390	20	
Methyl tert-butyl ether	56.7	2.5	"	52.5	ND	107	65-135	2.95	20	
Surrogate: a,a,a-Trifluorotoluene	*319*		"	*300*		*106*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*297*		"	*300*		*99.0*	*65-135*			

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: Arco 6113/Livermore	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	10/18/01 17:18

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
Batch 1100281 - EPA 5030, waters										
Blank (1100281-BLK1)				Prepared & Analyzed: 10/11/01						
Gasoline (C6-C12)	ND	50	ug/l							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Methyl tert-butyl ether	ND	2.5	"							
Surrogate: a,a,a-Trifluorotoluene	*303*		"	*300*		*101*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*277*		"	*300*		*92.3*	*65-135*			
LCS (1100281-BS1)				Prepared & Analyzed: 10/11/01						
Gasoline (C6-C12)	2330	50	ug/l	2750		84.7	65-135			
Benzene	37.1	0.50	"	33.0		112	65-135			
Toluene	201	0.50	"	198		102	65-135			
Ethylbenzene	41.7	0.50	"	46.0		90.7	65-135			
Xylenes (total)	218	0.50	"	230		94.8	65-135			
Methyl tert-butyl ether	62.7	2.5	"	52.5		119	65-135			
Surrogate: a,a,a-Trifluorotoluene	*337*		"	*300*		*112*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*298*		"	*300*		*99.3*	*65-135*			
Matrix Spike (1100281-MS1)	**Source: P110244-01**			Prepared & Analyzed: 10/11/01						
Gasoline (C6-C12)	2290	50	ug/l	2750	ND	83.3	65-135			
Benzene	36.3	0.50	"	33.0	ND	110	65-135			
Toluene	199	0.50	"	198	ND	100	65-135			
Ethylbenzene	43.5	0.50	"	46.0	ND	94.6	65-135			
Xylenes (total)	220	0.50	"	230	ND	95.4	65-135			
Methyl tert-butyl ether	61.4	2.5	"	52.5	ND	116	65-135			
Surrogate: a,a,a-Trifluorotoluene	*343*		"	*300*		*114*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*293*		"	*300*		*97.7*	*65-135*			

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: Arco 6113/Livermore	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	10/18/01 17:18

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
Batch 1100281 - EPA 5030, waters										
Matrix Spike Dup (1100281-MSD1)	**Source: P110244-01**			Prepared & Analyzed: 10/11/01						
Gasoline (C6-C12)	2280	50	ug/l	2750	ND	82.9	65-135	0.438	20	
Benzene	34.9	0.50	"	33.0	ND	106	65-135	3.93	20	
Toluene	199	0.50	"	198	ND	100	65-135	0.00	20	
Ethylbenzene	41.8	0.50	"	46.0	ND	90.9	65-135	3.99	20	
Xylenes (total)	216	0.50	"	230	ND	93.7	65-135	1.83	20	
Methyl tert-butyl ether	64.6	2.5	"	52.5	ND	122	65-135	5.08	20	
Surrogate: a,a,a-Trifluorotoluene	*332*		"	*300*		*111*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*295*		"	*300*		*98.3*	*65-135*			

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: Arco 6113/Livermore	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	10/18/01 17:18

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
Batch 1100343 - EPA 5030 waters										
Blank (1100343-BLK1)				Prepared & Analyzed: 10/15/01						
Methyl tert-butyl ether	ND	0.50	ug/l							
Surrogate: Dibromofluoromethane	*5.76*		"	*5.00*		*115*	*84-122*			
LCS (1100343-BS1)				Prepared & Analyzed: 10/15/01						
Methyl tert-butyl ether	5.18	0.50	ug/l	5.00		104	79-118			
Surrogate: Dibromofluoromethane	*5.75*		"	*5.00*		*115*	*84-122*			
Matrix Spike (1100343-MS1)		**Source: P110269-04**		Prepared & Analyzed: 10/15/01						
Methyl tert-butyl ether	512	50	ug/l	500	ND	102	79-118			
Surrogate: Dibromofluoromethane	*5.93*		"	*5.00*		*119*	*84-122*			
Matrix Spike Dup (1100343-MSD1)		**Source: P110269-04**		Prepared & Analyzed: 10/15/01						
Methyl tert-butyl ether	517	50	ug/l	500	ND	103	79-118	0.972	20	
Surrogate: Dibromofluoromethane	*5.94*		"	*5.00*		*119*	*84-122*			

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: Arco 6113/Livermore	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	10/18/01 17:18

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

ARCO Products Company Division of Atlantic-Richfield Company — RAT #8 — **Task Order No.** WAR# 27198.00 — **Chain of Custody**

ARCO Facility no. 6113	City (Facility) Livermore	Project manager (Consultant) Ron Scheele	Laboratory name Seqhoia
ARCO engineer Paul Supple	Telephone no. (ARCO) 925-299-8891	Telephone no. (Consultant) 510-450-1983	Fax no. (Consultant) 510-450-8295
Consultant name Cambria Env. Tech	Address (Consultant) 6262 Hollis St. Emeryville Ca		Contract number

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 EPA M8020/8015 (MTBE)	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 ☐		
MW-1		4		X		X	X	10-5-01			X	P110234-01										
MW-2		4		X		X	X	10-5-01			X					02						
MW-3		4		X		X	X	10-5-01			X					03						
MW-4																						
MW-6		4		X		X	X	10-5-01			X					04						
MW-7		4		X		X	X	10-5-01			X					05						
MW-8		4		X		X	X	10-5-01			X					06						
MW-9		4		X		X	X	10-5-01			X					07						
MW-10		4		X		X	X	10-5-01			X					08						
MW-11		4		X		X	X	10-5-01			X					09						
VW-1		4		X		X	X	10-5-01			X					10						
DUP		4		X		X	X	10-5-01			X					11						

COOLER CUSTODY SEALS INTACT ☐

NOT INTACT ☐

COOLER TEMPERATURE 3.9 °C

Special detection Limit/reporting: Lowest Possible

Special QA/QC

Remarks: Confirm all MTBE by 8260 Report results in EDF format

Lab number

Turnaround time

- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days X

Condition of sample:

Temperature received:

	Date	Time		Date	Time
Relinquished by sampler: L. Hall	10-8-01	3:00	Received by: secure location		
Relinquished by:	10-9-01	1322	Received by:		1430
Relinquished by:			Received by:		

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

APC-3292 (2-91)

APPENDIX C

FIELD DATA SHEETS

CAMBRIA

WELL DEPTH MEASUREMENTS

Well ID	Time	Product Depth	Water Depth	Product Thickness	Well Depth	Comments
MW-1	10:40		25.09			
MW-2	10:45		25.22			
MW-3	10:35		25.17			
MW-4	11:00		dry			
MW-6	11:05		28.05			
MW-7	11:10		27.59			
MW-8	10:50		27.65			
MW-9	10:55		27.63			
MW-10	12:05		30.95			
MW-11	10:30		27.59			
MW-12	11:45	unable to locate				
VW-1	11:20		24.75			
VW-2	12:00	unable to open				
VW-4	11:15		dry			

Project Name: Asco 6113 Project Number: 438-1611

Measured By: L. Hill Date: 10-5-01

F:\TEMPLATE\FORMS\FIELD\GW-DEPTH.WPD

CAMBRIA

WELL SAMPLING FORM

Project Name: Arco 6113	Cambria Mgr: RS	Well ID: MW-1
Project Number: 438-1611	Date: 10-5-01	Well Yield: -----
Site Address: 785 East Stanley Blvd Livermore, Ca	Sampling Method: Disposable bailer	Well Diameter: 2" pvc
		Technician(s): SG
Initial Depth to Water: 25.09	Total Well Depth: 44.00	Water Column Height: 18.91
Volume/ft: 0.16	1 Casing Volume: 3.02	3 Casing Volumes: 9.06
Purging Device: disposable bailer	Did Well Dewater?: NO	Total Gallons Purged: 9
Start Purge Time: 03:45	Stop Purge Time: 3:59	Total Time: 14 mins

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

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

Time	Casing Volume	Temp. C	pH	Cond. uS	Comments
03:50	3	17.1	7.92	850	
03:55	6	18.3	7.54	970	
04:00	9	18.1	7.50	922	DO = 0.78 mg/L

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-1	10-5-01	04:05	4 x 40a	HCl	TPHg BTEX MTBE	8015/8020/8260
MW-						

CAMBRIA

WELL SAMPLING FORM

Project Name: Arco 6113	Cambria Mgr: RS	Well ID: MW-2
Project Number: 438-1611	Date: 10-5-01	Well Yield: ----
Site Address: 785 East Stanley Blvd Livermore, Ca	Sampling Method: Disposable bailer	Well Diameter: 2" pvc
		Technician(s): SG
Initial Depth to Water: 25.22	Total Well Depth: 38.00	Water Column Height: 12.78
Volume/ft: 0.16	1 Casing Volume: 2.04	3 Casing Volumes: 6.12
Purging Device: disposable bailer	Did Well Dewater?: no	Total Gallons Purged: 6
Start Purge Time: 02:35	Stop Purge Time: 12:49	Total Time: 14mins

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
02:40	2	16.3	7.70	851	
02:45	4	17.5	7.84	890	
02:50	6	17.8	7.73	899	
					DO=0.80mg/L

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-2	10-5-01	02:55	4 voa	HCl	TPHg BTEX MTBE	8015/8020/8260
MW-						

CAMBRIA

WELL SAMPLING FORM

Project Name: ARCO 6113	Cambria Mgr: RS	Well ID: MW- 3
Project Number: 438-1611	Date: 10-5-01	Well Yield: -----
Site Address: 785 East Stanley Blvd Livermore, Ca	Sampling Method: Disposable bailer	Well Diameter: 2" pvc
		Technician(s): SG
Initial Depth to Water: 25.17	Total Well Depth: 38.50	Water Column Height: 13.33
Volume/ft: 0.16	1 Casing Volume: 2.13	3 Casing Volumes: 6.39
Purging Device: disposable bailer	Did Well Dewater?: no	Total Gallons Purged: 6
Start Purge Time: 03:15	Stop Purge Time: 3:29	Total Time: 14mins

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
03:20	2	17.8	7.20	1020	
03:25	4	17.5	7.23	1054	
03:30	6	17.9	7.29	1092	
					DO = 0.79 mg/L

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW- 3	10-5-01	03:35	4 x 40a	HCl	TPHg BTEX MTBE	8015/8020/8260
MW-						

CAMBRIA

WELL SAMPLING FORM

Project Name: Arco 6113	Cambria Mgr: RS	Well ID: MW-4
Project Number: 438-1611	Date: 10-5-01	Well Yield: -----
Site Address: 785 East Stanley Blvd Livermore, Ca	Sampling Method: Disposable bailer	Well Diameter: 2" pvc
		Technician(s): SG
Initial Depth to Water: dry	Total Well Depth:	Water Column Height:
Volume/ft:	1 Casing Volume:	3 Casing Volumes:
Purging Device:	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
	1				
	2				
	3				

NO Sample

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-	10-5-01		4 voa	HCl	TPHg BTEX MTBE	8015/8020/8260
MW-						

[illegible]

CAMBRIA

WELL SAMPLING FORM

Project Name: Arco 6113	Cambria Mgr: RS	Well ID: MW-6
Project Number: 438-1611	Date: 10-5-01	Well Yield: -----
Site Address: 785 East Stanley Blvd Livermore, Ca	Sampling Method: Disposable bailer	Well Diameter: 4" pvc
		Technician(s): SG
Initial Depth to Water: 28.05	Total Well Depth: 68.00	Water Column Height: 39.95
Volume/ft: 0.65	1 Casing Volume: 25.96	3 Casing Volumes: 77.90
Purging Device: 4" pvc bailer	Did Well Dewater?:	Total Gallons Purged:
Start Purge Time: 06:15	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
6:30	1 25	18.3	7.35	872	
6:45	2 50	18.5	7.43	851	
7:00	3 78	18.7	7.40	855	
					DO=0.85mg/L

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-6	10-5-01	7:05	4 voa	HCl	TPHg BTEX MTBE	8015/8020/8260
MW-						

CAMBRIA

WELL SAMPLING FORM

Project Name: Arco 6113	Cambria Mgr: RS	Well ID: MW-7
Project Number: 438-1611	Date: 10-5-01	Well Yield: -----
Site Address: 785 East Stanley Blvd Livermore, Ca	Sampling Method: Disposable bailer	Well Diameter: 4" pvc
		Technician(s): SG
Initial Depth to Water: 27.59	Total Well Depth: 68.00	Water Column Height: 40.41
Volume/ft: 0.65	1 Casing Volume: 26.26	3 Casing Volumes: 78.79
Purging Device: 4" pvc bailer	Did Well Dewater?: no	Total Gallons Purged: 79
Start Purge Time: 7:15	Stop Purge Time: 7:59	Total Time: 44 mins

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

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

Time	Casing Volume	Temp. C	pH	Cond. uS	Comments
7:30	1 26	18.3	7.20	985	
7:45	2 32	18.3	7.23	1035	
8:00	3 79	18.3	7.29	1072	
					DO = 0.62 mg/L

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-7	10-5-01	8:05	4 voa	HCl	TPHg BTEX MTBE	8015/8020/8260
MW-						

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CAMBRIA

WELL SAMPLING FORM

Project Name: ASCO 6113	Cambria Mgr: RS	Well ID: MW- 8
Project Number: 438-1611	Date: 10-5-01	Well Yield: -----
Site Address: 785 East Stanley Blvd Livermore, Ca	Sampling Method: Disposable bailer	Well Diameter: 4" pvc
		Technician(s): SG
Initial Depth to Water: 27.65	Total Well Depth: 67.00	Water Column Height: 39.35
Volume/ft: 0.65	1 Casing Volume: 25.57	3 Casing Volumes: 76.73
Purging Device: 4" pvc bailer	Did Well Dewater?: no	Total Gallons Purged:
Start Purge Time: 04:15	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
4:30	25	18.5	7.20	951	
4:45	50	18.1	7.29	973	
5:00	77	18.3	7.31	981	DO = 1.07 mg/L

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW- 8	10-5-01	5:05	4 x 40a	HCl	TPHg BTEX MTBE	8015/8020/8260
MW-						

CAMBRIA

WELL SAMPLING FORM

Project Name: Arco 6113	Cambria Mgr: RS	Well ID: MW-9
Project Number: 438-1611	Date: 10-5-01	Well Yield: -----
Site Address: 785 East Stanley Blvd Livermore, Ca	Sampling Method: Disposable bailer	Well Diameter: 4" pvc
		Technician(s): SG
Initial Depth to Water: 27.63	Total Well Depth: 68.00	Water Column Height: 40.37
Volume/ft: 0.65	1 Casing Volume: 26.24	3 Casing Volumes: 78.72
Purging Device: 4" pvc bailer	Did Well Dewater?: no	Total Gallons Purged: 78
Start Purge Time: 05:15	Stop Purge Time: 05:59	Total Time: 44 mins

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

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

Time	Casing Volume	Temp C	pH	Cond. uS	Comments
05:30	1 26	18.2	7.42	890	
05:45	2 32	18.3	7.39	1075	
06:00	3 78	18.3	7.47	1011	
					DO= 0.93mg/L

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-9	10-5-01	06:05	4 voa	HCl	TPHg BTEX MTBE	8015/8020/8260
MW-						
DUP						

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CAMBRIA

WELL SAMPLING FORM

Project Name: Arco 6113	Cambria Mgr: RS	Well ID: MW- 10
Project Number: 438-1611	Date: 10-5-01	Well Yield: -----
Site Address: 785 East Stanley Blvd Livermore, Ca	Sampling Method: Disposable bailer	Well Diameter: 2" pvc
		Technician(s): SG
Initial Depth to Water: 30.95	Total Well Depth: 52.00	Water Column Height: 21.05
Volume/ft: 0.65	1 Casing Volume: 13.68	3 Casing Volumes: 41.04
Purging Device: ~~Disposable bailer~~ 4" bailer pvc	Did Well Dewater?: no	Total Gallons Purged: 41
Start Purge Time: 02:00	Stop Purge Time: 13:29	Total Time: 29mins

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
02:10	1 1.4	17.9	7.70	815	
02:20	2 28	17.9	7.75	871	DO = 0.89mg/L
02:30	3 41	17.5	7.80	892	

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW- 10	10-5-01	02:35	4 voa	HCl	TPHg BTEX MTBE	8015/8020/8260
MW-						

CAMBRIA

WELL SAMPLING FORM

Project Name: Arco 6113	Cambria Mgr: RS	Well ID: MW-11
Project Number: 438-1611	Date: 10-5-01	Well Yield: -----
Site Address: 785 East Stanley Blvd Livermore, Ca	Sampling Method: Disposable bailer	Well Diameter: 2" pvc
		Technician(s): SG
Initial Depth to Water: 27.59	Total Well Depth: 45.00	Water Column Height: 17.41
Volume/ft: 0.16	1 Casing Volume: 2.78	3 Casing Volumes: 8.35
Purging Device: disposable bailer	Did Well Dewater?: no	Total Gallons Purged: 8
Start Purge Time: 12:30	Stop Purge Time: 12:44	Total Time: 14 mins

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

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

Time	Casing Volume	Temp. C	pH	Cond. uS	Comments
12:35	3	17.4	7.62	791	
12:40	6	17.9	7.59	1020	
12:45	8	17.8	7.77	1054	DO=105 mg/l

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-11	10-5-01	12:50	4 voa	HCl	TPHg BTEX MTBE	8015/8020/8260
MW-						

CAMBRIA

WELL SAMPLING FORM

Project Name: Arco 6113	Cambria Mgr: RS	Well ID: VW-1
Project Number: 438-1611	Date: 10-5-01	Well Yield: -----
Site Address: 785 East Stanley Blvd Livermore, Ca	Sampling Method: Disposable bailer	Well Diameter: 4" pvc
		Technician(s): SG
Initial Depth to Water: 24.75	Total Well Depth: 45.00	Water Column Height: 20.25
Volume/ft: 0.65	1 Casing Volume: 13.16	3 Casing Volumes: 39.48
Purging Device: 4" pvc bailer	Did Well Dewater?:	Total Gallons Purged:
Start Purge Time: 8:15	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
8:25	1 13	18.9	7.25	822	
8:35	2 26	18.3	7.32	874	
8:45	3 39	18.3	7.37	958	
					DO = 0.71 mg/L

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
VW-1	10-5-01	8:50	4 voa	HCl	TPHg BTEX MTBE	8015/8020/8260
MW-						

CAMBRIA

WELL SAMPLING FORM

Project Name: Arco 6113	Cambria Mgr: RS	Well ID: MW- VW-4
Project Number: 438-1611	Date: 10-5-01	Well Yield: -----
Site Address: 785 East Stanley Blvd Livermore, Ca	Sampling Method: Disposable bailer	Well Diameter: 2" pvc
		Technician(s): SG
Initial Depth to Water: dry	Total Well Depth:	Water Column Height:
Volume/ft:	1 Casing Volume:	3 Casing Volumes:
Purging Device:	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
	1				
	2				
	3				

No Sample

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-	10-5-01		4 voa	HCl	TPHg BTEX MTBE	8015/8020/8260
MW-						

APPENDIX D

BORING LOG/WELL CONSTRUCTION DETAILS

Cambria Environmental Technology, Inc.
1144 - 65th St.
Oakland, CA 94608
Telephone: (510) 420-0700
Fax: (510) 420-9170

BORING/WELL LOG

CLIENT NAME	ARCO	**BORING/WELL NAME**	MW-13
JOB/SITE NAME	ARCO 6113	**DRILLING STARTED**	09-Nov-01
LOCATION	785 East Stanley Blvd., Livermore	**DRILLING COMPLETED**	09-Nov-01
PROJECT NUMBER	438-1611	**WELL DEVELOPMENT DATE (YIELD)**	NA
DRILLER	V&W Drilling	**GROUND SURFACE ELEVATION**	
DRILLING METHOD	Hollow-stem auger	**TOP OF CASING ELEVATION**	NA
BORING DIAMETER	8"	**SCREENED INTERVAL**	10 to 30 ft bgs
LOGGED BY	Matt Meyers	**DEPTH TO WATER (First Encountered)**	13.0 ft (09-Nov-01)
REVIEWED BY	Ron Scheele	**DEPTH TO WATER (Static)**	NA
REMARKS	Hand Augered to 5' below ground surface.		

PID (ppm)	TPHg (ppm)	BLOW COUNTS	SAMPLE ID	DEPTH (ft bgs)	U.S.C.S.	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (ft bgs)
						CONCRETE	0.6
						FILL: Medium gray; moist; dense; 40% sand, 60% gravel; very high estimated permeability; 10% cobbles.	
NA		50/6"	MW-13 -5.0	5	GW	**Sandy GRAVEL** (GW): Medium gray; very dense; moist; 10% clay, 40% sand, 50% gravel; high estimated permeability; some large gravels.	5.0
							7.5
NA		7 4 9	MW-13 -10.0	10	ML	**Sandy SILT** (ML): Dark gray-brown; medium dense; damp; 10% gravel, 15% sand, 75% silt; low estimated permeability.	
							13.0
NA		50/6"	MW-13 -15.0	15	SM	**Silty SAND** (SM): Dark gray-brown; very dense; saturated; 10% silt, 90% sand; high estimated permeability.	
							17.5
NA		3 7 9	MW-13 -20	20	ML	**Clayey SILT** (ML): Olive-gray; stiff; saturated; 25% clay, 75% silt; low plasticity; low estimated permeability; iron-oxide staining.	
NA		3 7 10	MW-13 -25	25		@ 28' very stiff; 2% coarse sand, 2% gravel to 2-inch diameter.	
NA		6 15 45	MW-13 -30	30		@ 30' mottled; hard; 15% clay; 85% silt; iron-oxide staining.	30.5

WELL DIAGRAM

- Portland Type I/II Cement
- Bentonite Seal
- Monterey Sand #2/12
- 2"-diameter, 0.010" Slotted Schedule 40 PVC
- Bottom of Boring @ 30 ft

WELL LOG (PID/TPHG) H:\ARCO\6113\ARCO6113.GPJ DEFAULT.GDT 2/15/02

APPENDIX E

SOIL SAMPLING LABORATORY RESULTS

Sequoia
Analytical

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

20 November, 2001

Ron Scheele
Cambria Environmental - Emeryville
6262 Hollis Street
Emeryville, CA 94608

RE: ARCO
Sequoia Work Order: P111279

Enclosed are the results of analyses for samples received by the laboratory on 11/13/01 12:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Angelee Cari

Angelee Cari
Client Services Representative

CA ELAP Certificate #2374

Sequoia Analytical

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Petaluma, CA 94954
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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: Arco/6113, Livermore	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	11/20/01 18:08

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-13 5.5'	P111279-01	Soil	11/09/01 10:00	11/13/01 12:00
MW-13 10.5'	P111279-02	Soil	11/09/01 10:15	11/13/01 12:00
MW-13 15.5'	P111279-03	Soil	11/09/01 10:30	11/13/01 12:00

Sequoia Analytical - Petaluma

Angelee Cari

Angelee Cari, Client Services Representative

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.

Sequoia Analytical

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: Arco/6113, Livermore	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	11/20/01 18:08

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-13 5.5' (P111279-01) Soil Sampled: 11/09/01 10:00 Received: 11/13/01 12:00									
Gasoline (C6-C12)	ND	1.0	mg/kg	1	1110358	11/14/01	11/14/01	EPA 8015M/8020M	
Benzene	ND	0.0050	"	"	"	"	"	"	
Toluene	**0.0068**	0.0050	"	"	"	"	"	"	
Ethylbenzene	**0.0058**	0.0050	"	"	"	"	"	"	
Xylenes (total)	**0.046**	0.0050	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	0.050	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*102 %*	*65-135*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*108 %*	*65-135*		"	"	"	"	
MW-13 10.5' (P111279-02) Soil Sampled: 11/09/01 10:15 Received: 11/13/01 12:00									
Gasoline (C6-C12)	ND	1.0	mg/kg	1	1110358	11/14/01	11/14/01	EPA 8015M/8020M	
Benzene	ND	0.0050	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Methyl tert-butyl ether	**0.28**	0.050	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*102 %*	*65-135*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*102 %*	*65-135*		"	"	"	"	
MW-13 15.5' (P111279-03) Soil Sampled: 11/09/01 10:30 Received: 11/13/01 12:00									
Gasoline (C6-C12)	**13**	2.0	mg/kg	2	1110358	11/14/01	11/14/01	EPA 8015M/8020M	HC-12
Benzene	ND	0.010	"	"	"	"	"	"	
Toluene	ND	0.010	"	"	"	"	"	"	
Ethylbenzene	**0.045**	0.010	"	"	"	"	"	"	
Xylenes (total)	**0.30**	0.010	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	0.10	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*93.7 %*	*65-135*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*122 %*	*65-135*		"	"	"	"	

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: Arco/6113, Livermore	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	11/20/01 18:08

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
Batch 1110358 - EPA 5030, soils										
Blank (1110358-BLK1)				Prepared & Analyzed: 11/14/01						
Gasoline (C6-C12)	ND	1.0	mg/kg							
Benzene	ND	0.0050	"							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.0050	"							
Methyl tert-butyl ether	ND	0.050	"							
Surrogate: a,a,a-Trifluorotoluene	*0.582*		"	*0.600*		*97.0*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*0.631*		"	*0.600*		*105*	*65-135*			
Blank (1110358-BLK2)				Prepared & Analyzed: 11/15/01						
Gasoline (C6-C12)	ND	1.0	mg/kg							
Benzene	ND	0.0050	"							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.0050	"							
Methyl tert-butyl ether	ND	0.050	"							
Surrogate: a,a,a-Trifluorotoluene	*0.574*		"	*0.600*		*95.7*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*0.626*		"	*0.600*		*104*	*65-135*			
Blank (1110358-BLK3)				Prepared & Analyzed: 11/19/01						
Gasoline (C6-C12)	ND	1.0	mg/kg							
Benzene	ND	0.0050	"							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.0050	"							
Methyl tert-butyl ether	ND	0.050	"							
Surrogate: a,a,a-Trifluorotoluene	*0.583*		"	*0.600*		*97.2*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*0.639*		"	*0.600*		*106*	*65-135*			

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: Arco/6113, Livermore	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	11/20/01 18:08

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
Batch 1110358 - EPA 5030, soils										
LCS (1110358-BS1)				Prepared & Analyzed: 11/14/01						
Gasoline (C6-C12)	4.81	1.0	mg/kg	5.50		87.5	65-135			
Benzene	0.0704	0.0050	"	0.0660		107	65-135			
Toluene	0.357	0.0050	"	0.397		89.9	65-135			
Ethylbenzene	0.0817	0.0050	"	0.0920		88.8	65-135			
Xylenes (total)	0.450	0.0050	"	0.461		97.6	65-135			
Methyl tert-butyl ether	0.121	0.050	"	0.105		115	65-135			
Surrogate: a,a,a-Trifluorotoluene	*0.586*		"	*0.600*		*97.7*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*0.646*		"	*0.600*		*108*	*65-135*			
LCS (1110358-BS2)				Prepared & Analyzed: 11/15/01						
Gasoline (C6-C12)	4.89	1.0	mg/kg	5.50		88.9	65-135			
Benzene	0.0691	0.0050	"	0.0660		105	65-135			
Toluene	0.366	0.0050	"	0.397		92.2	65-135			
Ethylbenzene	0.0859	0.0050	"	0.0920		93.4	65-135			
Xylenes (total)	0.465	0.0050	"	0.461		101	65-135			
Methyl tert-butyl ether	0.121	0.050	"	0.105		115	65-135			
Surrogate: a,a,a-Trifluorotoluene	*0.585*		"	*0.600*		*97.5*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*0.663*		"	*0.600*		*110*	*65-135*			
LCS (1110358-BS3)				Prepared & Analyzed: 11/19/01						
Gasoline (C6-C12)	5.91	1.0	mg/kg	5.50		107	65-135			
Benzene	0.0870	0.0050	"	0.0660		132	65-135			
Toluene	0.414	0.0050	"	0.397		104	65-135			
Ethylbenzene	0.0932	0.0050	"	0.0920		101	65-135			
Xylenes (total)	0.505	0.0050	"	0.461		110	65-135			
Methyl tert-butyl ether	0.141	0.050	"	0.105		134	65-135			
Surrogate: a,a,a-Trifluorotoluene	*0.590*		"	*0.600*		*98.3*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*0.652*		"	*0.600*		*109*	*65-135*			

Sequoia Analytical

1455 McDowell Blvd, North Ste D
Petaluma, CA 94954
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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: Arco/6113, Livermore	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	11/20/01 18:08

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
Batch 1110358 - EPA 5030, soils										
Matrix Spike (1110358-MS1)	**Source: P111258-01**			Prepared & Analyzed: 11/14/01						
Gasoline (C6-C12)	4.53	1.0	mg/kg	5.50	ND	79.3	65-135			
Benzene	0.0856	0.0050	"	0.0660	ND	129	65-135			
Toluene	0.429	0.0050	"	0.397	ND	108	65-135			
Ethylbenzene	0.0978	0.0050	"	0.0920	ND	101	65-135			
Xylenes (total)	0.543	0.0050	"	0.461	0.026	112	65-135			
Methyl tert-butyl ether	0.137	0.050	"	0.105	ND	130	65-135			
Surrogate: a,a,a-Trifluorotoluene	*0.626*		"	*0.600*		*104*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*0.530*		"	*0.600*		*88.3*	*65-135*			
Matrix Spike Dup (1110358-MSD1)	**Source: P111258-01**			Prepared & Analyzed: 11/14/01						
Gasoline (C6-C12)	4.85	1.0	mg/kg	5.50	ND	85.1	65-135	6.82	20	
Benzene	0.0886	0.0050	"	0.0660	ND	134	65-135	3.44	20	
Toluene	0.449	0.0050	"	0.397	ND	113	65-135	4.56	20	
Ethylbenzene	0.103	0.0050	"	0.0920	ND	107	65-135	5.18	20	
Xylenes (total)	0.568	0.0050	"	0.461	0.026	118	65-135	4.50	20	
Methyl tert-butyl ether	0.142	0.050	"	0.105	ND	135	65-135	3.58	20	
Surrogate: a,a,a-Trifluorotoluene	*0.617*		"	*0.600*		*103*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*0.544*		"	*0.600*		*90.7*	*65-135*			

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: Arco/6113, Livermore	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	11/20/01 18:08

Notes and Definitions

HC-12	Hydrocarbon pattern is present in the requested fuel quantitation range but does not resemble the pattern of the requested fuel.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

ARCO Products Company

Division of Atlantic Richfield Company

Task Order No. WA# 28039.00

Chain of Custody

ARCO Facility no. 6113	City (Facility) LIVERMORE	Project manager (Consultant) RON SCHEELE / CAMBRIA	Laboratory name SEQUOIA
ARCO engineer PAUL SUPPLE	Telephone no. (ARCO) (925) 299-8891	Telephone no. (Consultant) 510 450-8291	Fax no. (Consultant) 510 450-8295
Consultant name CAMBRIA	Address (Consultant) 6262 HOLLIS ST. EMERYVILLE, CA		Contract number

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 / MTBE	BTEX/TPH 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 602/8240	EPA 625/8270	TCLP Semi-Metals, VOA, VOA	CAM METALS EPA 6010/7000 TTLC STLC	Lead Org./DHS Lead EPA 7420/7421	
MW-13 5.5'		1	X			X		11/9/01	10 AM	X		X	P111279-01								
MW-13 10.5'		1	X			X		↓	10:15	X		X					2				
MW-13 15.5'		1	X			X		↓	10:30	X		X					3				

COOLER CUSTODY SEALS INTACT ☐

NOT INTACT ☐

COOLER TEMPERATURE 3.9 °C

Method of shipment: COOLER/ICE

Special detection Limit/reporting: LOWEST POSSIBLE

Special QA/QC

Remarks: EDF FORMAT

Lab number

Turnaround time

Priority Rush 1 Business Day

Rush 2 Business Days

Expedited 5 Business Days

Standard 10 Business Days X

Condition of sample:		Temperature received:	
Relinquished by sampler	Date 11/9/01 Time 1330	Received by SECURE LOCATION	
Relinquished by Ron Scheele	Date 11/13/01 Time 1200	Received by	Date 11-13-01 Time 1200
Relinquished by	Date Time	Received by	Date Time

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

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15 November, 2001

Ron Scheele
Cambria Environmental - Emeryville
6262 Hollis Street
Emeryville, CA 94608

RE: ARCO
Sequoia Work Order: P111308

Enclosed are the results of analyses for samples received by the laboratory on 11/14/01 13:40. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Angelee Cari

Angelee Cari
Client Services Representative

CA ELAP Certificate #2374

Sequoia Analytical

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: ARCO/6113 Livermore, Ca	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	11/15/01 15:19

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
S-(1-4)	P111308-01	Soil	11/09/01 11:45	11/14/01 13:40

Sequoia Analytical - Petaluma

Angelee Cari

Angelee Cari, Client Services Representative

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.

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: ARCO/6113 Livermore, Ca	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	11/15/01 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
S-(1-4) (P111308-01) Soil Sampled: 11/09/01 11:45 Received: 11/14/01 13:40									
Gasoline (C6-C12)	**15**	2.0	mg/kg	2	1110358	11/15/01	11/15/01	EPA 8015M/8020M	
Benzene	ND	0.010	"	"	"	"	"	"	
Toluene	ND	0.010	"	"	"	"	"	"	
Ethylbenzene	**0.14**	0.010	"	"	"	"	"	"	
Xylenes (total)	**0.39**	0.010	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	0.10	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		*88.5 %*	*65-135*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*116 %*	*65-135*		"	"	"	"	

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: ARCO/6113 Livermore, Ca	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	11/15/01 15:19

Total Metals by EPA 6000/7000 Series Methods

Sequoia Analytical - Petaluma

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
S-(1-4) (P111308-01) Soil Sampled: 11/09/01 11:45 Received: 11/14/01 13:40									
Lead	**7.2**	6.8	mg/kg	1	1110392	11/15/01	11/15/01	EPA 6010B	

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: ARCO/6113 Livermore, Ca	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	11/15/01 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
Batch 1110358 - EPA 5030, soils										
Blank (1110358-BLK1)				Prepared & Analyzed: 11/14/01						
Gasoline (C6-C12)	ND	1.0	mg/kg							
Benzene	ND	0.0050	"							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.0050	"							
Methyl tert-butyl ether	ND	0.050	"							
Surrogate: a,a,a-Trifluorotoluene	*0.582*		"	*0.600*		*97.0*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*0.631*		"	*0.600*		*105*	*65-135*			
Blank (1110358-BLK2)				Prepared & Analyzed: 11/15/01						
Gasoline (C6-C12)	ND	1.0	mg/kg							
Benzene	ND	0.0050	"							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.0050	"							
Methyl tert-butyl ether	ND	0.050	"							
Surrogate: a,a,a-Trifluorotoluene	*0.574*		"	*0.600*		*95.7*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*0.626*		"	*0.600*		*104*	*65-135*			
LCS (1110358-BS1)				Prepared & Analyzed: 11/14/01						
Gasoline (C6-C12)	4.81	1.0	mg/kg	5.50		87.5	65-135			
Benzene	0.0704	0.0050	"	0.0660		107	65-135			
Toluene	0.357	0.0050	"	0.397		89.9	65-135			
Ethylbenzene	0.0817	0.0050	"	0.0920		88.8	65-135			
Xylenes (total)	0.450	0.0050	"	0.461		97.6	65-135			
Methyl tert-butyl ether	0.121	0.050	"	0.105		115	65-135			
Surrogate: a,a,a-Trifluorotoluene	*0.586*		"	*0.600*		*97.7*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*0.646*		"	*0.600*		*108*	*65-135*			

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: ARCO/6113 Livermore, Ca	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	11/15/01 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
Batch 1110358 - EPA 5030, soils										
LCS (1110358-BS2)				Prepared & Analyzed: 11/15/01						
Gasoline (C6-C12)	4.89	1.0	mg/kg	5.50		88.9	65-135			
Benzene	0.0691	0.0050	"	0.0660		105	65-135			
Toluene	0.366	0.0050	"	0.397		92.2	65-135			
Ethylbenzene	0.0859	0.0050	"	0.0920		93.4	65-135			
Xylenes (total)	0.465	0.0050	"	0.461		101	65-135			
Methyl tert-butyl ether	0.121	0.050	"	0.105		115	65-135			
Surrogate: a,a,a-Trifluorotoluene	*0.585*		"	*0.600*		*97.5*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*0.663*		"	*0.600*		*110*	*65-135*			
Matrix Spike (1110358-MS1)		**Source: P111258-01**		Prepared & Analyzed: 11/14/01						
Gasoline (C6-C12)	4.53	1.0	mg/kg	5.50	ND	79.3	65-135			
Benzene	0.0856	0.0050	"	0.0660	ND	129	65-135			
Toluene	0.429	0.0050	"	0.397	ND	108	65-135			
Ethylbenzene	0.0978	0.0050	"	0.0920	ND	101	65-135			
Xylenes (total)	0.543	0.0050	"	0.461	0.026	112	65-135			
Methyl tert-butyl ether	0.137	0.050	"	0.105	ND	130	65-135			
Surrogate: a,a,a-Trifluorotoluene	*0.626*		"	*0.600*		*104*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*0.530*		"	*0.600*		*88.3*	*65-135*			
Matrix Spike Dup (1110358-MSD1)		**Source: P111258-01**		Prepared & Analyzed: 11/14/01						
Gasoline (C6-C12)	4.85	1.0	mg/kg	5.50	ND	85.1	65-135	6.82	20	
Benzene	0.0886	0.0050	"	0.0660	ND	134	65-135	3.44	20	
Toluene	0.449	0.0050	"	0.397	ND	113	65-135	4.56	20	
Ethylbenzene	0.103	0.0050	"	0.0920	ND	107	65-135	5.18	20	
Xylenes (total)	0.568	0.0050	"	0.461	0.026	118	65-135	4.50	20	
Methyl tert-butyl ether	0.142	0.050	"	0.105	ND	135	65-135	3.58	20	
Surrogate: a,a,a-Trifluorotoluene	*0.617*		"	*0.600*		*103*	*65-135*			
Surrogate: 4-Bromofluorobenzene	*0.544*		"	*0.600*		*90.7*	*65-135*			

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Cambria Environmental - Emeryville	Project: ARCO	
6262 Hollis Street	Project Number: ARCO/6113 Livermore, Ca	**Reported:**
Emeryville CA, 94608	Project Manager: Ron Scheele	11/15/01 15:19

Total Metals by EPA 6000/7000 Series Methods - Quality Control

Sequoia Analytical - Petaluma

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1110392 - EPA 3050B										
Blank (1110392-BLK1)				Prepared & Analyzed: 11/15/01						
Lead	ND	7.5	mg/kg							
LCS (1110392-BS1)				Prepared & Analyzed: 11/15/01						
Lead	48.8	7.5	mg/kg	50.0		97.6	80-120			
Matrix Spike (1110392-MS1)	**Source: P111308-01**			Prepared & Analyzed: 11/15/01						
Lead	49.4	6.6	mg/kg	43.9	7.2	96.1	75-125			
Matrix Spike Dup (1110392-MSD1)	**Source: P111308-01**			Prepared & Analyzed: 11/15/01						
Lead	46.4	6.4	mg/kg	42.4	7.2	92.5	75-125	6.26	35	

WATER

ARCO Products Company
Division of Atlantic Richfield Company

Task Order No. 28039.00

Chain of Custody

ARCO Facility no. 6113	City (Facility) LIVERMORE	Project manager (Consultant) RON SCHEELE / M. MEYERS	Laboratory name SEQUOIA
ARCO engineer PAUL SUPPLE	Telephone no. (ARCO) 925-299-8891	Telephone no. (Consultant) 510-450-8291	Fax no. (Consultant) 510-450-8295
Consultant name CAMBRIA	Address (Consultant) 6262 HOLLIS STREET, EMERYVILLE, CA		Contract number

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 EPA M602/8020/8015	TPH Modified 8015 Gas X Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM METALS EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	TOTAL LEAD
S-1		1	X			X		11/9/01	11:45am	X		X		P111308-01							X
S-2		1	↓			↓		↓	↓	↓		↓									↓
S-3		1	↓			↓		↓	↓	↓		↓									↓
S-4		1	↓			↓		↓	↓	↓		↓									↓
COMPOSITE SAMPLES S-1 THRU S-4																					

COOLER CUSTODY SEALS INTACT ☐
NOT INTACT ☐
COOLER TEMPERATURE 4.2 °C

Special detection Limit/reporting: LOWEST POSSIBLE

Special QA/QC

Remarks: COMPOSITE SAMPLES S-1 → S-4 IF TOTAL LEAD >50ppm, RUN STLC FOR LEAD IF BENZENE >10ppm RUN TLCP

Lab number

Turnaround time

Condition of sample:		Temperature received:	
Relinquished by sampler	Date 11/9/01 Time 1:30pm	Received by SECURE LOCATION	
Relinquished by	Date	Time	Received by	11/14/01 1345
Relinquished by	Date	Time	Received by	Date	Time

Turnaround time

Priority Rush 1 Business Day	X
Rush 2 Business Days	☐
Expedited 5 Business Days	☐
Standard 10 Business Days	☐

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