

# Atlantic Richfield Company

**Chuck Carmel**  
Environmental Business Manager

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San Ramon, CA 94583  
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5 January 2010

Re: Fourth Quarter 2009 Semi-Annual Ground-Water Monitoring Report  
Atlantic Richfield Company Service Station #4977  
2770 Castro Valley Boulevard  
Castro Valley, California  
ACEH Case # RO0002436

**RECEIVED**

9:06 am, Jan 06, 2010

Alameda County  
Environmental Health

"I declare, that to the best of my knowledge at the present time, that the information and/or recommendations contained in the attached document are true and correct.

Submitted by,



Chuck Carmel  
Environmental Business Manager

Attachment

**Fourth Quarter 2009 Semi-Annual  
Ground-Water Monitoring Report**  
Atlantic Richfield Company Station #4977  
2770 Castro Valley Boulevard, Castro Valley, California  
ACEH Case # RO0002436

Prepared for

Mr. Chuck Carmel  
Environmental Business Manager  
Atlantic Richfield Company  
P.O. Box 1257  
San Ramon, California 94583

Prepared by



1324 Mangrove Avenue, Suite 212  
Chico, California 95926  
(530) 566-1400  
*www.broadbentinc.com*

5 January 2010

Project No. 06-82-625

5 January 2010

Project No. 06-82-625

Atlantic Richfield Company  
P.O. Box 1257  
San Ramon, California 94583  
Submitted via ENFOS

Attn.: Mr. Chuck Carmel

Re: Fourth Quarter 2009 Semi-Annual Ground-Water Monitoring Report, Atlantic Richfield Company Station #4977, 2770 Castro Valley Boulevard, Castro Valley, Alameda County, California; ACEH Case #RO0002436

Dear Mr. Carmel:

Provided herein is the *Fourth Quarter 2009 Semi-Annual Ground-Water Monitoring Report* for Atlantic Richfield Company (a BP affiliated company) Station #4977 located at 2770 Castro Valley Boulevard, Castro Valley, California (Site). This report presents a summary of results from semi-annual ground-water monitoring conducted at the Site during the Fourth Quarter of 2009.

Should you have questions regarding the work performed or results obtained, please do not hesitate to contact me at (530) 566-1400.

Sincerely,

BROADBENT & ASSOCIATES, INC.



Thomas A. Venus, P.E.  
Senior Engineer



Enclosures

cc: Mr. Paresh Khatri, Alameda County Environmental Health (Submitted via ACEH ftp site)  
Electronic copy uploaded to GeoTracker

## STATION #4977 SEMI-ANNUAL GROUND-WATER MONITORING REPORT

Facility: #4977	Address:	2770 Castro Valley Boulevard, Castro Valley, California
BP Environmental Business Manager:		Mr. Chuck Carmel
Consulting Co./Contact Person:		Broadbent & Associates, Inc. (BAI) / Mr. Tom Venus, PE (530) 566-1400
Primary Agency/Regulatory ID No.:		Alameda County Environmental Health (ACEH) ACEH Case #RO0002436
Consultant Project No.:		06-82-625

### WORK PERFORMED THIS QUARTER (Fourth Quarter 2009):

1. Prepared and submitted *Third Quarter 2009 Status Report* (BAI, 10/26/2009).
2. Conducted semi-annual ground-water monitoring/sampling for Fourth Quarter 2009 on 6 November 2009. Work performed by BAI.

### WORK PROPOSED FOR NEXT QUARTER (First Quarter 2010):

1. Prepare and submit this *Fourth Quarter 2009 Semi-Annual Ground-Water Monitoring Report* (contained herein).
2. No environmental work activities are scheduled to be conducted at the Site during the First Quarter 2010.

### QUARTERLY RESULTS SUMMARY:

Current phase of project:	<b>Ground-water monitoring/sampling</b>
Frequency of ground-water monitoring:	<b>Semi-Annually (2Q &amp; 4Q): Wells MW-1, MW-2 and MW-3</b>
Frequency of ground-water sampling:	<b>Semi-Annually (2Q &amp; 4Q): Wells MW-2 and MW-3 Annually (4Q): Well MW-1</b>
Is free product (FP) present on-site:	<b>No</b>
Current remediation techniques:	<b>NA</b>
Depth to ground water (below TOC):	<b>6.52 ft (MW-2) to 8.46 ft (MW-1)</b>
General ground-water flow direction:	<b>South-Southwest</b>
Approximate hydraulic gradient:	<b>0.025 ft/ft</b>

### DISCUSSION:

Fourth Quarter 2009 semi-annual ground-water monitoring and sampling was conducted at Station #4977 by BAI on 6 November 2009. Water levels were gauged in the three wells associated with Station #4977. A sheen was observed in well MW-2. No other irregularities were noted during water level gauging at Station #4977. Depth to water measurements at the Site ranged from 6.52 ft at well MW-2 to 8.46 ft at MW-1. Resulting ground-water surface elevations at the Site ranged from 157.77 ft above mean sea level in well MW-2 to 154.98 ft at well MW-1. Water level elevations yielded a potentiometric ground-water flow direction and gradient to the south-southwest at 0.025 ft/ft. Ground-water monitoring field data sheets are provided within Appendix A. Measured depths to ground water and respective ground-water elevations are summarized in Table 1. Current and historic ground-water flow directions and gradients are provided within Table 3. A Site Location Map is provided as Drawing 1.

Consistent with the current ground-water monitoring schedule for the Site, water samples were collected from Station #4977 wells MW-1, MW-2, and MW-3. Well MW-1 purged dry before three casing volumes were removed, but recovered adequately before sampling. No other irregularities were encountered during sampling at the Site. Samples were submitted under chain-of-custody protocol to Calscience Environmental Laboratories, Inc. (Garden Grove, California) for analysis of Gasoline Range Organics (GRO, C6-12) by EPA Method 8015B; for Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTEX) by EPA Method 8260B; and Methyl Tert-Butyl Ether (MTBE), Ethyl Tert-Butyl Ether (ETBE), Di-Isopropyl Ether (DIPE), Tert-Amyl Methyl Ether (TAME), Tert-Butyl Alcohol (TBA), 1,2-Dibromomethane (EDB), 1,2-Dichloroethane (1,2-DCA), and Ethanol by EPA Method 8260B. No significant irregularities were reported during analysis of the samples. Ground-water sampling field data sheets and the laboratory analytical report, including chain-of-custody documentation, are provided in Appendix A.

Gasoline range organics (GRO) were detected above the laboratory reporting limits in two of the three wells sampled at concentrations of 14,000 micrograms per liter ( $\mu\text{g/L}$ ) in well MW-2 and 99  $\mu\text{g/L}$  in well MW-3. Benzene, Ethylbenzene, and Total Xylenes were detected above the laboratory reporting limits in well MW-2 at concentrations of 470  $\mu\text{g/L}$ , 400  $\mu\text{g/L}$ , and 110  $\mu\text{g/L}$ , respectively. MTBE was detected above the laboratory reporting limit in each of the three wells sampled at concentrations of 1.9  $\mu\text{g/L}$  in well MW-1, 76  $\mu\text{g/L}$  in well MW-2, and 5.8  $\mu\text{g/L}$  in well MW-3. TBA was detected in well MW-3 at a concentration of 11  $\mu\text{g/L}$ . The remaining fuel constituents were not detected above their respective laboratory reporting limits in the three wells sampled this quarter. Historic laboratory analytical results for the Site are summarized in Table 1 and Table 2. The most recent GRO, Benzene, and MTBE concentrations are also presented in Drawing 2. Ground-water monitoring data (GEO\_WELL) and laboratory analytical results (EDF) were uploaded to the GeoTracker AB2886 database. Upload confirmation receipts are provided in Appendix B.

## **CONCLUSIONS AND RECOMMENDATIONS:**

Ground-water elevations were between the historic minimum and maximum values for each well gauged this quarter at Station #4977. The potentiometric ground-water flow direction and gradient of 0.025 ft/ft to the south-southwest was generally consistent with historical data. Detected analyte concentrations were within the historic minimum and maximum ranges recorded for each well with the following exceptions: MTBE (5.8  $\mu\text{g/L}$ ) reached an historic minimum concentration in well MW-3; Ethylbenzene (400  $\mu\text{g/L}$ ) and Total Xylenes (110  $\mu\text{g/L}$ ) reached historic minimum concentrations in well MW-2.

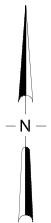
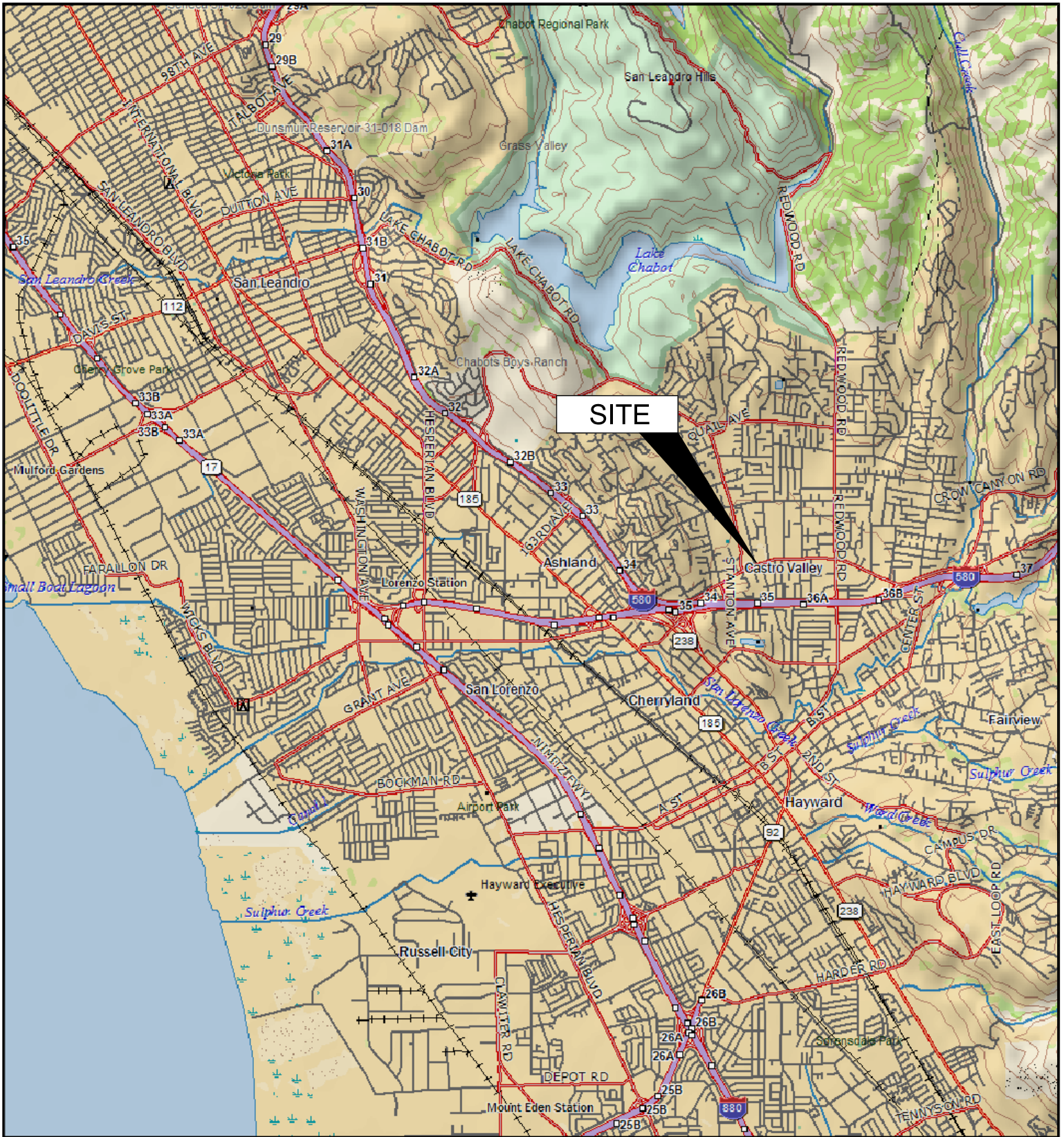
## **CLOSURE:**

The findings presented in this report are based upon: observations of BAI field personnel (see Appendix A), the points investigated, and results of laboratory tests performed by Calscience Environmental Laboratories, Inc. (Garden Grove, California). Our services were performed in accordance with the generally accepted standard of practice at the time this report was written. No other warranty, expressed or implied was made. This report has been prepared for the exclusive use of Atlantic Richfield Company (a BP affiliated company). It is possible that variations in soil or ground-water conditions could exist beyond points explored in this investigation. Also, changes in site conditions could occur in the future due to variations in rainfall, temperature, regional water usage, or other factors.

**ATTACHMENTS:**

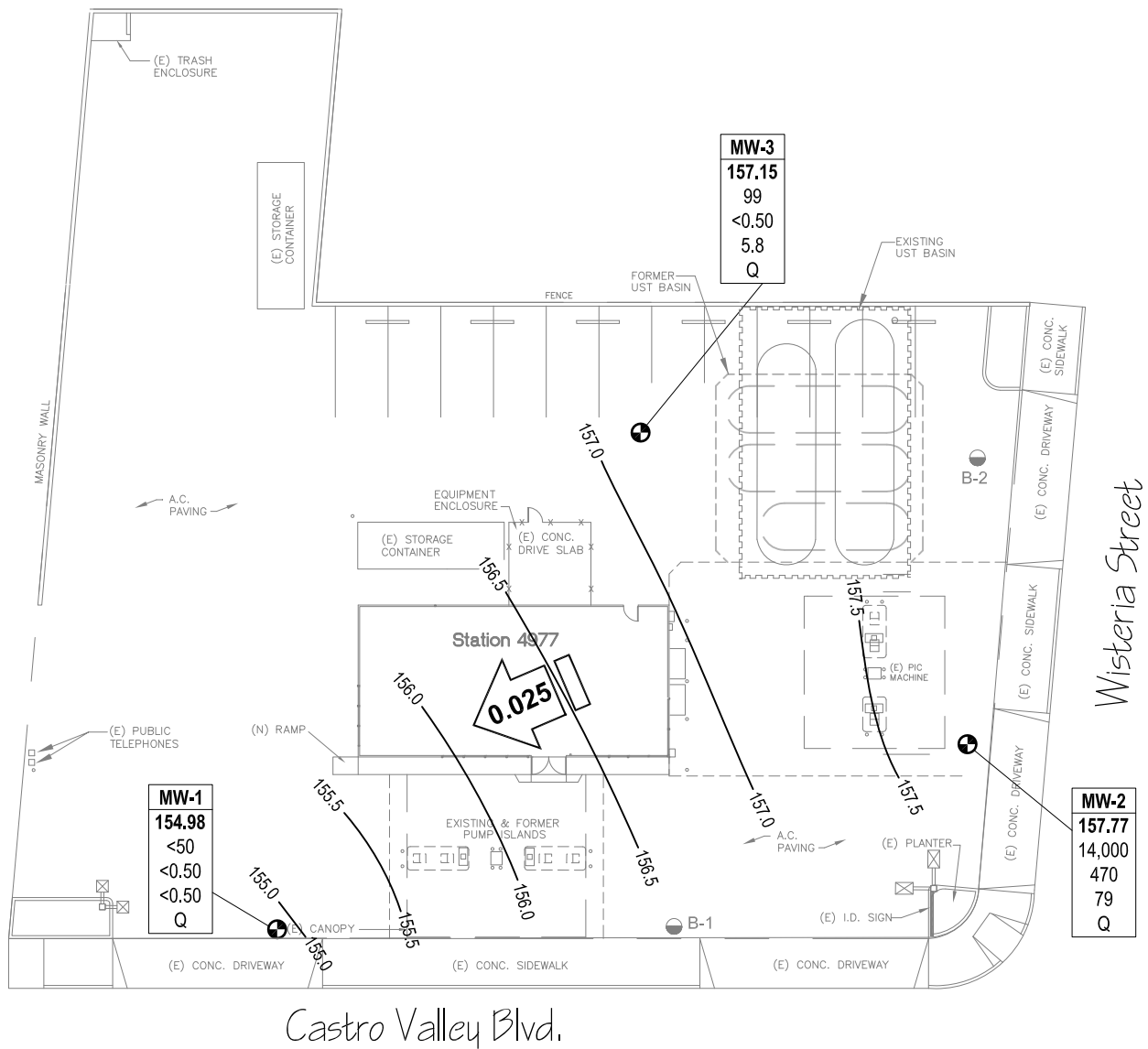
- Drawing 1. Site Location Map, Station #4977, 2770 Castro Valley Boulevard, Castro Valley, California
- Drawing 2. Ground-Water Elevation Contour and Analytical Summary Map, 6 November 2009, Station #4977, 2770 Castro Valley Boulevard, Castro Valley, California
- Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses, Station #4977, 2770 Castro Valley Boulevard, Castro Valley, California
- Table 2. Summary of Fuel Additives Analytical Data, Station #4977, 2770 Castro Valley Boulevard, Castro Valley, California
- Table 3. Historical Ground-Water Flow Direction and Gradient, Station #4977, 2770 Castro Valley Boulevard, Castro Valley, California
- Appendix A. BAI Ground-Water Sampling Data Package (Includes Field Data Sheets, Laboratory Report, Chain-of-Custody Documentation, and Field Procedures)
- Appendix B. GeoTracker Upload Confirmation Receipts





APPROXIMATE SCALE (mi)

IMAGE SOURCE: DELORME



**LEGEND**

- ⊕ MONITORING WELL
- SOIL BORING

Well	WELL DESIGNATION
ELEV	GROUND-WATER ELEVATION (FT)
GRO	CONCENTRATION OF GRO, BENZENE AND MTBE IN GROUND WATER (µg/L)
BZ	
MTBE	
Q	SAMPLING FREQUENCY

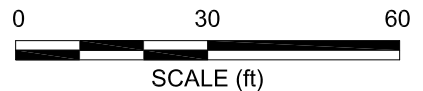
< NOT DETECTED AT OR ABOVE LABORATORY REPORTING LIMITS

Q SAMPLED QUARTERLY

—155.5 GROUND-WATER ELEVATION CONTOUR (FT)

←0.025 GROUND-WATER FLOW DIRECTION AND GRADIENT (FT/FT)

NOTE: SITE MAP ADAPTED FROM DELTA ENVIRONMENTAL FIGURES. SITE DIMENSIONS AND FACILITY LOCATIONS NOT VERIFIED.





**Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses**

**Station #4977, 2770 Castro Valley Blvd., Castro Valley, CA**

Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
								GRO/TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
<b>MW-1</b>															
4/19/2002	--		161.11	5.0	15.0	11.21	149.90	660	12	1.3	4.3	0.8	38	--	--
9/27/2002	--		161.11	5.0	15.0	9.29	151.82	130	7.7	0.87	5.4	0.79	39	1.7	6.9
12/16/2002	--	a	161.11	5.0	15.0	8.55	152.56	77	1.8	<0.50	0.69	<1.0	42	1.6	6.9
3/11/2003	--		161.11	5.0	15.0	8.07	153.04	140	9.8	<0.50	5.6	<0.50	20	1.4	7.4
6/17/2003	--		161.11	5.0	15.0	8.31	152.80	510	60	1.4	81	<1.0	23	2.2	7
9/18/2003	--	b	161.11	5.0	15.0	9.45	151.66	72	2.4	1.4	1.6	1.5	39	2.7	7
12/11/2003	P		161.11	5.0	15.0	8.80	152.31	79	1.5	<0.50	1.5	4.4	48	2.1	7.0
03/11/2004	P		163.44	5.0	15.0	7.61	155.83	<50	1.3	<0.50	0.77	1.3	17	1.4	6.8
06/02/2004	P		163.44	5.0	15.0	8.95	154.49	53	1.4	<0.50	0.93	<0.50	39	2.3	7.1
09/22/2004	P		163.44	5.0	15.0	9.42	154.02	70	<0.50	<0.50	<0.50	<0.50	48	1.7	6.8
12/15/2004	P		163.44	5.0	15.0	7.88	155.56	63	<0.50	<0.50	<0.50	<0.50	45	1.8	6.9
03/07/2005	P		163.44	5.0	15.0	7.02	156.42	<50	<0.50	<0.50	<0.50	<0.50	4.0	2.4	6.8
06/27/2005	P		163.44	5.0	15.0	7.53	155.91	52	2.0	<0.50	1.9	0.78	8.1	2.8	7.1
09/16/2005	P		163.44	5.0	15.0	9.20	154.24	<50	<0.50	<0.50	<0.50	0.76	14	1.82	6.9
12/27/2005	P		163.44	5.0	15.0	7.60	155.84	<50	1.3	<0.50	1.5	<0.50	9.4	2.02	7.87
03/16/2006	P		163.44	5.0	15.0	6.97	156.47	71	3.0	<0.50	3.5	<0.50	3.4	1.6	7.1
6/26/2006	P		163.44	5.0	15.0	8.58	154.86	71	0.69	<0.50	1.1	3.5	3.2	2.2	6.9
9/29/2006	P		163.44	5.0	15.0	8.85	154.59	<50	<0.50	<0.50	<0.50	<0.50	5.2	2.35	6.7
12/19/2006	P		163.44	5.0	15.0	8.00	155.44	<50	<0.50	<0.50	<0.50	<0.50	4.3	4.80	7.21
3/29/2007	P		163.44	5.0	15.0	7.70	155.74	<50	<0.50	<0.50	<0.50	<0.50	2.3	3.44	7.18
6/5/2007	P		163.44	5.0	15.0	8.77	154.67	<50	<0.50	<0.50	<0.50	<0.50	3.2	3.45	7.29
9/25/2007	P		163.44	5.0	15.0	9.18	154.26	<50	<0.50	<0.50	<0.50	<0.50	5.3	2.61	7.41
12/26/2007	P		163.44	5.0	15.0	8.45	154.99	<50	<0.50	<0.50	<0.50	<0.50	2.9	5.57	7.43
3/25/2008	P		163.44	5.0	15.0	8.29	155.15	<50	<0.50	<0.50	<0.50	<0.50	0.94	3.52	7.80
6/10/2008	P		163.44	5.0	15.0	9.17	154.27	<50	<0.50	<0.50	<0.50	<0.50	1.3	3.38	7.01
9/2/2008	P		163.44	5.0	15.0	9.15	154.29	<50	<0.50	<0.50	<0.50	<0.50	5.6	2.30	6.81
12/2/2008	P		163.44	5.0	15.0	8.90	154.54	<50	<0.50	<0.50	<0.50	<0.50	2.7	2.41	6.96
3/5/2009	P		163.44	5.0	15.0	8.05	155.39	<50	<0.50	<0.50	<0.50	<0.50	1.3	2.48	7.47
6/2/2009	P		163.44	5.0	15.0	14.91	148.53	<50	<0.50	<0.50	<0.50	<0.50	0.60	0.83	7.01
<b>11/6/2009</b>	<b>P</b>		<b>163.44</b>	<b>5.0</b>	<b>15.0</b>	<b>8.46</b>	<b>154.98</b>	<b>&lt;50</b>	<b>&lt;0.50</b>	<b>&lt;0.50</b>	<b>&lt;0.50</b>	<b>&lt;0.50</b>	<b>1.9</b>	<b>1.15</b>	<b>6.8</b>

**Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses**

**Station #4977, 2770 Castro Valley Blvd., Castro Valley, CA**

Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
								GRO/TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
<b>MW-2</b>															
4/19/2002	--		161.87	5.0	15.0	6.59	155.28	28,000	970	120	860	6,900	760	--	--
9/27/2002	--		161.87	5.0	15.0	7.18	154.69	17,000	1,400	<50	1,200	3,700	1,400	1.5	6.8
12/16/2002	--	a	161.87	5.0	15.0	7.31	154.56	17,000	1,000	<50	980	3,300	980	1.9	6.8
3/11/2003	--		161.87	5.0	15.0	6.02	155.85	24,000	1,600	70	1,300	4,300	920	1.7	7.4
6/17/2003	--		161.87	5.0	15.0	6.31	155.56	28,000	1,300	55	1,300	4,500	610	1.4	6.9
9/18/2003	--		161.87	5.0	15.0	7.61	154.26	19,000	960	63	1,100	3,100	580	2.7	6.8
12/11/2003	P		161.87	5.0	15.0	6.50	155.37	29,000	710	53	1,300	3,800	490	2.0	7.0
03/11/2004	P		164.29	5.0	15.0	6.02	158.27	19,000	830	49	1,500	4,000	410	0.8	6.5
06/02/2004	P		164.29	5.0	15.0	7.14	157.15	25,000	680	<50	1,300	3,900	240	4.3	7.1
09/22/2004	--		164.29	5.0	15.0	7.63	156.66	15,000	980	<25	980	940	390	--	6.7
12/15/2004	P	c	164.29	5.0	15.0	6.48	157.81	22,000	610	26	1,300	3,200	290	0.3	6.9
03/07/2005	P		164.29	5.0	15.0	6.08	158.21	25,000	570	33	1,400	3,900	120	2.3	6.8
06/27/2005	P		164.29	5.0	15.0	6.90	157.39	24,000	630	32	1,200	2,900	86	2.5	7.2
09/16/2005	P		164.29	5.0	15.0	7.66	156.63	25,000	550	<25	1,400	3,000	82	1.41	7.0
12/27/2005	P		164.29	5.0	15.0	5.60	158.69	33,000	540	<25	1,300	2,700	100	2.26	7.19
03/16/2006	P	c	164.29	5.0	15.0	7.25	157.04	29,000	710	<50	1,400	2,600	78	1.4	7.1
6/26/2006	P	c	164.29	5.0	15.0	6.60	157.69	20,000	630	<25	1,200	1,100	110	0.64	6.8
9/29/2006	P		164.29	5.0	15.0	6.85	157.44	24,000	530	<25	1,300	1,800	86	1.36	6.7
12/19/2006	P		164.29	5.0	15.0	6.02	158.27	21,000	500	<25	1,400	1,700	70	1.11	7.42
3/29/2007	P		164.29	5.0	15.0	6.03	158.26	16,000	530	<25	1,100	1,100	80	2.98	7.18
6/5/2007	P		164.29	5.0	15.0	6.85	157.44	21,000	420	<25	1,100	1,100	50	2.09	7.20
9/25/2007	P		164.29	5.0	15.0	7.15	157.14	25,000	620	<25	1,400	1,200	70	3.25	7.59
12/26/2007	P		164.29	5.0	15.0	6.25	158.04	16,000	440	<5.0	760	570	80	1.84	7.66
3/25/2008	P		164.29	5.0	15.0	6.63	157.66	16,000	530	7.8	790	470	96	1.78	7.72
6/10/2008	P		164.29	5.0	15.0	7.04	157.25	14,000	480	<25	730	240	100	1.83	6.96
9/2/2008	P		164.29	5.0	15.0	7.25	157.04	13,000	440	<25	690	240	91	3.09	6.61
12/2/2008	P		164.29	5.0	15.0	6.42	157.87	31,000	490	<10	670	120	97	3.05	7.00
3/5/2009	P		164.29	5.0	15.0	5.83	158.46	16,000	470	<10	490	130	82	2.99	7.35
6/2/2009	P		164.29	5.0	15.0	14.51	149.78	11,000	340	<10	490	210	34	1.07	6.89
<b>11/6/2009</b>	<b>P</b>		<b>164.29</b>	<b>5.0</b>	<b>15.0</b>	<b>6.52</b>	<b>157.77</b>	<b>14,000</b>	<b>470</b>	<b>&lt;10</b>	<b>400</b>	<b>110</b>	<b>76</b>	<b>0.32</b>	<b>6.8</b>

**Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses**  
**Station #4977, 2770 Castro Valley Blvd., Castro Valley, CA**

Well and Sample Date	P/NP	Comments	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in (µg/L)						DO (mg/L)	pH
								GRO/TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE		
<b>MW-3</b>															
4/19/2002	--		162.14	5.0	15.0	6.94	155.20	1,200	29	1.1	43	62	1,700	--	--
9/27/2002	--		162.14	5.0	15.0	8.26	153.88	740	7.8	<2.5	6.8	4.4	1,100	1	6.7
12/16/2002	--	a	162.14	5.0	15.0	6.76	155.38	1,200	13	<10	170	88	910	2.3	6.8
3/11/2003	--		162.14	5.0	15.0	6.92	155.22	<2,500	<25	<25	<25	<25	470	1.7	7.5
6/17/2003	--		162.14	5.0	15.0	7.44	154.70	<1,000	<10	<10	14	<10	530	1.9	7
9/18/2003	--		162.14	5.0	15.0	8.43	153.71	470	4.8	<2.5	10	9.2	300	2.9	6.8
12/11/2003	P		162.14	5.0	15.0	6.72	155.42	<500	<5.0	<5.0	7.0	13	180	1.9	6.9
03/11/2004	P		164.53	5.0	15.0	6.09	158.44	360	1.9	<1.0	5.6	5.0	110	2.6	6.8
06/02/2004	P		164.53	5.0	15.0	7.50	157.03	380	2.8	<0.50	8.0	2.1	43	3.6	7.3
09/22/2004	P		164.53	5.0	15.0	8.00	156.53	270	<0.50	<0.50	0.54	<0.50	50	1.8	6.9
12/15/2004	P		164.53	5.0	15.0	6.43	158.10	390	3.5	<0.50	20	3.7	49	1.1	6.9
03/07/2005	P		164.53	5.0	15.0	6.12	158.41	1,900	13	<1.0	93	29	70	2.3	6.8
06/27/2005	P		164.53	5.0	15.0	7.08	157.45	830	4.0	<0.50	13	2.8	33	3.3	7.3
09/16/2005	P		164.53	5.0	15.0	7.28	157.25	320	2.1	<0.50	5.4	0.60	21	2.11	7.0
12/27/2005	P		164.53	5.0	15.0	6.47	158.06	770	6.0	<0.50	33	2.7	36	2.96	7.42
03/16/2006	P		164.53	5.0	15.0	6.10	158.43	1,600	11	<0.50	59	6.4	45	1.4	7.1
6/26/2006	P		164.53	5.0	15.0	6.92	157.61	400	<0.50	<0.50	1.6	2.1	26	2.41	7.0
9/29/2006	P		164.53	5.0	15.0	7.38	157.15	220	0.86	<0.50	2.2	0.58	14	1.95	7.0
12/19/2006	P		164.53	5.0	15.0	6.65	157.88	450	4.3	<0.50	19	1.4	19	3.68	7.30
3/29/2007	P		164.53	5.0	15.0	6.92	157.61	390	3.0	<0.50	9.1	0.60	27	1.98	7.16
6/5/2007	P		164.53	5.0	15.0	7.01	157.52	390	1.9	<0.50	6.9	<0.50	20	1.99	7.34
9/25/2007	P		164.53	5.0	15.0	7.52	157.01	260	1.3	<0.50	2.7	<0.50	12	3.44	7.41
12/26/2007	P		164.53	5.0	15.0	6.65	157.88	460	3.1	<0.50	15	0.89	17	4.05	7.46
3/25/2008	P		164.53	5.0	15.0	6.71	157.82	260	0.91	0.71	2.5	0.54	29	2.40	7.63
6/10/2008	P		164.53	5.0	15.0	7.33	157.20	120	<0.50	<0.50	2.0	<0.50	12	2.29	7.59
9/2/2008	P		164.53	5.0	15.0	7.53	157.00	97	<0.50	<0.50	<0.50	<0.50	9.3	3.28	6.81
12/2/2008	P		164.53	5.0	15.0	7.38	157.15	140	<0.50	<0.50	<0.50	<0.50	8.4	3.18	7.06
3/5/2009	P		164.53	5.0	15.0	5.21	159.32	530	3.3	<0.50	22	0.71	18	3.11	7.46
6/2/2009	P		164.53	5.0	15.0	14.81	149.72	490	2.1	<0.50	6.2	<0.50	13	0.83	7.03
<b>11/6/2009</b>	<b>P</b>		<b>164.53</b>	<b>5.0</b>	<b>15.0</b>	<b>7.38</b>	<b>157.15</b>	<b>99</b>	<b>&lt;0.50</b>	<b>&lt;0.50</b>	<b>&lt;0.50</b>	<b>&lt;0.50</b>	<b>5.8</b>	<b>0.32</b>	<b>6.97</b>

SYMBOLS AND ABBREVIATIONS:

< = Not detected at or above specified laboratory reporting limits

-- = Not measured, sampled, analyzed, applicable

ft bgs = Feet below ground surface

DO = Dissolved oxygen

DTW = Depth to water in ft

GRO = Gasoline range organics

GWE = Groundwater elevation in ft

mg/L = Milligrams per liter

MTBE = Methyl tert-butyl ether analyzed by EPA Method 8021B unless otherwise noted (before 12/16/02)

P/NP = Well was purged/not purged prior to sampling

TPH-g = Total petroleum hydrocarbons as gasoline (C5-C9)

TOC = Top of casing measured in ft MSL

µg/L = Micrograms per liter

FOOTNOTES:

a = TPH, benzene, toluene, ethylbenzene, total xylenes, and MTBE analyzed by EPA Method 8260B beginning on 4th quarter sampling event (12/16/02).

b = This sample was originally analyzed within the EPA recommended hold time. Re-analysis for confirmation or dilution was performed past the recommended hold time. The results may still be used for their intended purpose.

c = Sheen in well.

NOTES:

Beginning in the fourth quarter 2003, the laboratory modified the reported analyte list. TPH-g was changed to GRO. The resulting data may be impacted by the potential inclusion of non-TPH-g analytes within the requested fuel range resulting in a higher concentration being reported.

Wells were re-surveyed on 3/23/2004.

Values for DO and pH were field measurements.

Beginning in the second quarter 2004, the carbon range for GRO was changed from C6-C10 to C4-C12.

GRO analysis was completed by EPA method 8260B (C4-C12) for samples collected from the time period April 2006 through February 4, 2008. The analysis for GRO was changed to EPA method 8015B (C6-C12) for samples collected from the time period February 5, 2008 through the present.

Note: The data within this table collected prior to April 2006 was provided to Broadbent & Associates, Inc. by Atlantic Richfield Company and their previous consultants. Broadbent & Associates, Inc. has not verified the accuracy of this information.

**Table 2. Summary of Fuel Additives Analytical Data**  
**Station #4977, 2770 Castro Valley Blvd., Castro Valley, CA**

Well and Sample Date	Concentrations in (µg/L)								Comments
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
<b>MW-1</b>									
12/16/2002	<50	<5.0	42	<0.50	<0.50	<0.50	<0.50	<0.50	
3/11/2003	<100	<20	20	<0.50	<0.50	<0.50	<0.50	<0.50	
6/17/2003	<200	<40	23	<1.0	<1.0	<1.0	<1.0	<1.0	
9/18/2003	<100	<20	39	<0.50	<0.50	<0.50	<0.50	<0.50	a
12/11/2003	<100	<20	48	<0.50	<0.50	<0.50	<0.50	<0.50	
03/11/2004	<100	<20	17	<0.50	<0.50	<0.50	<0.50	<0.50	
06/02/2004	<100	<20	39	<0.50	<0.50	<0.50	<0.50	<0.50	
09/22/2004	<100	<20	48	<0.50	<0.50	<0.50	<0.50	<0.50	
12/15/2004	<100	<20	45	<0.50	<0.50	<0.50	<0.50	<0.50	a
03/07/2005	<100	<20	4.0	<0.50	<0.50	<0.50	<0.50	<0.50	
06/27/2005	<100	<20	8.1	<0.50	<0.50	<0.50	<0.50	<0.50	
09/16/2005	<100	<20	14	<0.50	<0.50	<0.50	<0.50	<0.50	
12/27/2005	<100	<20	9.4	<0.50	<0.50	<0.50	<0.50	<0.50	b
03/16/2006	<300	<20	3.4	<0.50	<0.50	<0.50	<0.50	<0.50	c
6/26/2006	<300	<20	3.2	<0.50	<0.50	<0.50	<0.50	<0.50	
9/29/2006	<300	<20	5.2	<0.50	<0.50	<0.50	<0.50	<0.50	
12/9/2006	<300	<20	4.3	<0.50	<0.50	<0.50	<0.50	--	b
3/29/2007	<300	<20	2.3	<0.50	<0.50	<0.50	<0.50	<0.50	
6/5/2007	<300	<20	3.2	<0.50	<0.50	<0.50	<0.50	<0.50	
9/25/2007	<300	<20	5.3	<0.50	<0.50	<0.50	<0.50	<0.50	
12/26/2007	<300	<20	2.9	<0.50	<0.50	<0.50	<0.50	<0.50	
3/25/2008	<300	<10	0.94	<0.50	<0.50	<0.50	<0.50	<0.50	
6/10/2008	<300	<10	1.3	<0.50	<0.50	<0.50	<0.50	<0.50	
9/2/2008	<300	<10	5.6	<0.50	<0.50	<0.50	<0.50	<0.50	
12/2/2008	<300	<10	2.7	<0.50	<0.50	<0.50	<0.50	<0.50	
3/5/2009	<300	<10	1.3	<0.50	<0.50	<0.50	<0.50	<0.50	
6/2/2009	<300	<10	0.60	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>11/6/2009</b>	<b>&lt;300</b>	<b>&lt;10</b>	<b>1.9</b>	<b>&lt;0.50</b>	<b>&lt;0.50</b>	<b>&lt;0.50</b>	<b>&lt;0.50</b>	<b>&lt;0.50</b>	
<b>MW-2</b>									
12/16/2002	<5,000	<500	980	<50	<50	<50	<50	<50	
3/11/2003	<10,000	<2,000	920	<50	<50	<50	<50	<50	

**Table 2. Summary of Fuel Additives Analytical Data  
Station #4977, 2770 Castro Valley Blvd., Castro Valley, CA**

Well and Sample Date	Concentrations in (µg/L)								Comments
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
<b>MW-2 Cont.</b>									
6/17/2003	<10,000	<2,000	610	<50	<50	<50	<50	<50	
9/18/2003	<5,000	<1,000	580	<25	<25	<25	<25	<25	
12/11/2003	<5,000	<1,000	490	<25	<25	<25	<25	<25	
03/11/2004	<2,000	<400	410	<10	<10	<10	<10	<10	
06/02/2004	<10,000	<2,000	240	<50	<50	<50	<50	<50	
09/22/2004	<5,000	<1,000	390	<25	<25	<25	<25	<25	
12/15/2004	<2,000	<400	290	<10	<10	<10	<10	<10	a
03/07/2005	<5,000	<1,000	120	<25	<25	<25	<25	<25	
06/27/2005	<5,000	<1,000	86	<25	<25	<25	<25	<25	
09/16/2005	<5,000	<1,000	82	<25	<25	<25	<25	<25	
12/27/2005	<5,000	<1,000	100	<25	<25	<25	<25	<25	b
03/16/2006	<30,000	<2,000	78	<50	<50	<50	<50	<50	c
6/26/2006	<15,000	<1,000	110	<25	<25	<25	<25	<25	
9/29/2006	<15,000	<1,000	86	<25	<25	<25	<25	<25	
12/9/2006	<15,000	<1,000	70	<25	<25	<25	<25	--	b
3/29/2007	<15,000	<1,000	80	<25	<25	<25	<25	<25	
6/5/2007	<15,000	<1,000	50	<25	<25	<25	<25	<25	
9/25/2007	<15,000	<1,000	70	<25	<25	<25	<25	<25	
12/26/2007	<3,000	<200	80	<5.0	<5.0	<5.0	<5.0	<5.0	
3/25/2008	<1,500	<50	96	<2.5	<2.5	<2.5	<2.5	<2.5	
6/10/2008	<15,000	<500	100	<25	<25	<25	<25	<25	
9/2/2008	<15,000	<500	91	<25	<25	<25	<25	<25	
12/2/2008	<6,000	<200	97	<10	<10	<10	<10	<10	
3/5/2009	<6,000	<200	82	<10	<10	<10	<10	<10	
6/2/2009	<6,000	<200	34	<10	<10	<10	<10	<10	
<b>11/6/2009</b>	<b>&lt;6,000</b>	<b>&lt;200</b>	<b>76</b>	<b>&lt;10</b>	<b>&lt;10</b>	<b>&lt;10</b>	<b>&lt;10</b>	<b>&lt;10</b>	
<b>MW-3</b>									
12/16/2002	<1,000	<100	910	<10	<10	12	<10	<10	
3/11/2003	<5,000	<1,000	470	<25	<25	<25	<25	<25	
6/17/2003	<2,000	<400	530	<10	<10	<10	<10	<10	
9/18/2003	<500	<100	300	<2.5	<2.5	3.2	<2.5	<2.5	



**Table 2. Summary of Fuel Additives Analytical Data  
Station #4977, 2770 Castro Valley Blvd., Castro Valley, CA**

Well and Sample Date	Concentrations in (µg/L)								Comments
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
<b>MW-3 Cont.</b>									
12/11/2003	<1,000	<200	180	<5.0	<5.0	<5.0	<5.0	<5.0	
03/11/2004	<200	570	110	<1.0	<1.0	<1.0	<1.0	<1.0	
06/02/2004	<100	130	43	<0.50	<0.50	0.56	<0.50	<0.50	
09/22/2004	<100	28	50	<0.50	<0.50	0.51	<0.50	<0.50	
12/15/2004	<100	110	49	<0.50	0.52	0.61	<0.50	<0.50	a
03/07/2005	<200	190	70	<1.0	<1.0	<1.0	<1.0	<1.0	
06/27/2005	<100	130	33	<0.50	<0.50	<0.50	<0.50	<0.50	
09/16/2005	<100	44	21	<0.50	<0.50	<0.50	<0.50	<0.50	
12/27/2005	<100	150	36	<0.50	<0.50	<0.50	<0.50	<0.50	b
03/16/2006	<300	160	45	<0.50	<0.50	0.84	<0.50	<0.50	c
6/26/2006	<300	53	26	<0.50	<0.50	<0.50	<0.50	<0.50	
9/29/2006	<300	55	14	<0.50	<0.50	<0.50	<0.50	<0.50	
12/9/2006	<300	<20	19	<0.50	<0.50	<0.50	<0.50	--	b
3/29/2007	<300	130	27	<0.50	<0.50	<0.50	<0.50	<0.50	
6/5/2007	<300	77	20	<0.50	<0.50	<0.50	<0.50	<0.50	
9/25/2007	<300	30	12	<0.50	<0.50	<0.50	<0.50	<0.50	
12/26/2007	<300	76	17	<0.50	<0.50	<0.50	<0.50	<0.50	
3/25/2008	<300	100	29	<0.50	<0.50	<0.50	<0.50	<0.50	
6/10/2008	<300	25	12	<0.50	<0.50	<0.50	<0.50	<0.50	
9/2/2008	<300	<10	9.3	<0.50	<0.50	<0.50	<0.50	<0.50	
12/2/2008	<300	<10	8.4	<0.50	<0.50	<0.50	<0.50	<0.50	
3/5/2009	<300	98	18	<0.50	<0.50	<0.50	<0.50	<0.50	
6/2/2009	<300	89	13	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>11/6/2009</b>	<b>&lt;300</b>	<b>11</b>	<b>5.8</b>	<b>&lt;0.50</b>	<b>&lt;0.50</b>	<b>&lt;0.50</b>	<b>&lt;0.50</b>	<b>&lt;0.50</b>	

SYMBOLS AND ABBREVIATIONS:

< = Not detected at or above specified laboratory reporting limit

1,2-DCA = 1,2-Dichloroethane

DIPE = Di-isopropyl ether

EDB = 1,2-Dibromoethane

ETBE = Ethyl tert-butyl ether

MTBE = Methyl tert-butyl ether

TAME = tert-Amyl methyl ether

TBA = tert-Butyl alcohol

µg/L = Micrograms per liter

FOOTNOTES:

a = This sample was originally analyzed within the EPA recommended hold time. Re-analysis for confirmation or dilution was performed past the recommended hold time. The results may still be used for their intended purpose.

b = Calibration verification for ethanol was within method limits but outside contract limits.

c = Possible high bias for DIPE, 1,2-DCA, and ethanol due to CCV falling outside acceptance criteria.

Note: The data within this table collected prior to April 2006 was provided to Broadbent & Associates, Inc. by Atlantic Richfield Company and their previous consultants. Broadbent & Associates, Inc. has not verified the accuracy of this information.

**Table 3. Historical Ground-Water Flow Direction and Gradient  
Station #4977, 2770 Castro Valley Blvd., Castro Valley, CA**

<b>Date Sampled</b>	<b>Approximate Flow Direction</b>	<b>Approximate Hydraulic Gradient</b>
4/19/2002	Southwest	0.038
9/27/2002	Southwest	0.021
12/16/2002	Southeast	0.029
3/11/2003	South	0.024
6/17/2003	South-Southwest	0.022
9/18/2003	South-Southwest	0.022
3/11/2004	South-Southwest	0.024
6/2/2004	South	0.025
9/22/2004	South	0.025
12/15/2004	South	0.020
3/7/2005	South	0.02
6/27/2005	South	0.01
9/16/2005	Southeast	0.03
12/27/2005	South-Southeast	0.02
3/16/2006	Southeast	0.02
6/26/2006	South	0.03
9/29/2006	South	0.025
12/19/2006	South	0.024
3/29/2007	South	0.020
6/5/2007	South	0.027
9/25/2007	South	0.023
12/26/2007	South	0.027
3/25/2008	South	0.026
6/10/2008	South	0.026
9/2/2008	South	0.026
12/2/2008	South	0.028
3/5/2009	South	0.037
6/2/2009	South	0.011
<b>11/6/2009</b>	<b>South-Southwest</b>	<b>0.025</b>

Note: The data within this table collected prior to April 2006 was provided to Broadbent & Associates, Inc. by Atlantic Richfield Company and their previous consultants. Broadbent & Associates, Inc. has not verified the accuracy of this information.

**APPENDIX A**

**BAI GROUND-WATER SAMPLING DATA PACKAGE**

(Includes Field Data Sheets, Laboratory Analytical Report, Chain-Of-Custody Documentation,  
and Field Procedures)

5788

Project: BP4977, BP 2162 Project No.: 09-88-625, 09-88-620

Field Representative(s): FETG Day: Friday Date: 11/6/09

Time Onsite: From: \_\_\_\_\_ To: \_\_\_\_\_; From: \_\_\_\_\_ To: \_\_\_\_\_; From: \_\_\_\_\_ To: \_\_\_\_\_

- Signed HASP     Safety Glasses     Hard Hat     Steel Toe Boots     Safety Vest
- UST Emergency System Shut-off Switches Located     Proper Gloves
- Proper Level of Barricading     Other PPE (describe) \_\_\_\_\_

Weather: Clear 160°

Equipment In Use: \_\_\_\_\_

Visitors: \_\_\_\_\_

TIME:	WORK DESCRIPTION:	
0600	@ office	
0645	Depart office for 4977	2605.5
0745	Arrive BP4977	2672
0925	Depart BP4977	
0940	Arrive BP 2162	2676.0
1150	Depart BP2162	
1300	Arrive Vacaville office	2742.4
	23gal	

Signature: \_\_\_\_\_

**Facility:** 4977  
**Address:** 2770 Castro Valley Road, Castro Valley  
**County:** Alameda

**Sampler:** Doulos  
**RT Mileage:** 260  
**QM Enfos #:** 000QV-0003  
**Global ID #:** T0600100089

**Last sampled:** Jun-09  
**Sample Month:** 3  
**System:** None

Well ID	Sample Order	WELL SAMPLING SCHEDULE				Purge Method	FIELD TESTING			WELL CONSTRUCTION AND SAMPLING VOLUMES								
		1Q	2Q	3Q	4Q		pH/ temp/ cond.	DO	Redox	well dia. (in)	top of screen (ft bgs)	TD (ft bgs)	DTW (ft bgs)	Purge volume (gal)	FP	Fire Watch	Traffic Control	Well Vault > 24"
MW-1					GBOE	Purge	Y	Y	N	4.0	5.0	15.12	8.85	12.27	N	Y	N	
MW-2			GBOE		GBOE	Purge	Y	Y	N	4.0	5.0	14.65	6.85	15.27	Possible	Y	N	
MW-3			GBOE		GBOE	Purge	Y	Y	N	4.0	5.0	14.96	7.38	14.84	N	Y	N	

Take post-purge D.O. readings (in a cup) on all sampled wells.

**Analyses:**

**GBOE =** GRO by 8015M  
 BTEX/5 FO + EDB, 1,2-DCA, Ethanol all by 8260B  
**QA/QC =** Trip & Temp blanks to be submitted with all sampling events. Contact coordinator if blanks are not supplied with bottle set.  
 Trip blanks to be submit "ON HOLD". TB ID = TB -"site#" - "MMDDYYYY" (ex. TB - 4977 - 01012007)

**Gauging:** All wells semi-annually

**Regulatory Agency:** ACEH, Don Hwang (510) 567-6746

**Purge Method:**  
**P =** Purge  
**NP =** No Purge  
**TBD =** To Be Determined based on DTW vs. Top of Screen

**Tenant:**  
**Owner:**  
**Notification:**  
**Permits:**

**Comments/Notes:**

MW-1 and MW-2 Well Dewaters

*For Internal Use only*

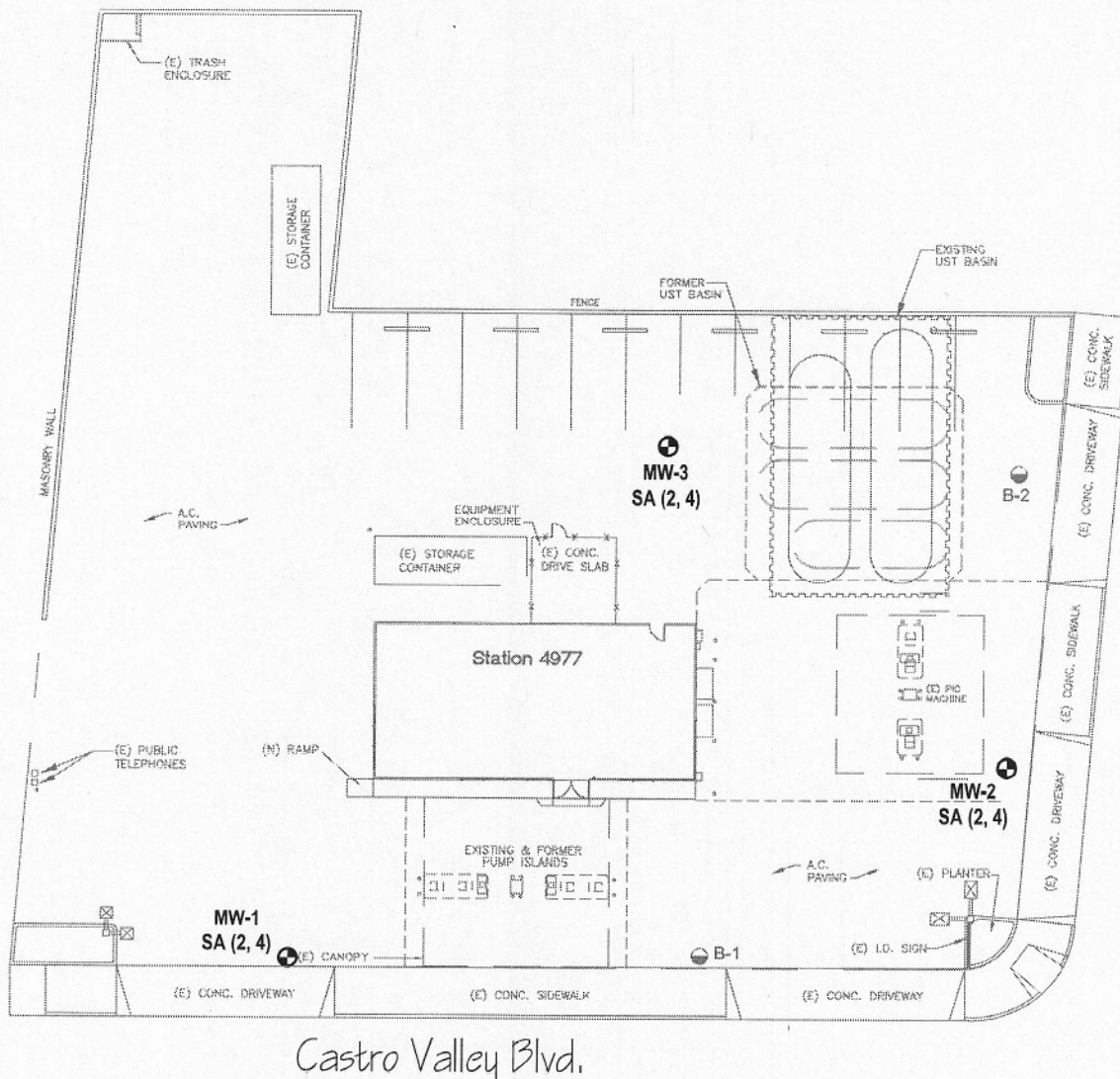
**Stratus Submittal Date:**

CH 9/8/2009

**Broadbent Approval Date:**

MH 9/23/2009

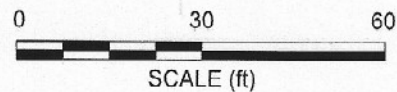
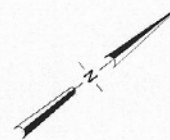




**LEGEND**

- ⊕ MONITORING WELL
- ⊙ SOIL BORING
- Well WELL DESIGNATION
- SA SAMPLING FREQUENCY
- SA (2, 4) SAMPLED SEMI-ANNUALLY, 2ND AND 4TH QUARTERS

NOTE: SITE MAP ADAPTED FROM DELTA ENVIRONMENTAL FIGURES.  
SITE DIMENSIONS AND FACILITY LOCATIONS NOT VERIFIED.





# BROADBENT & ASSOCIATES, INC.

ENGINEERING, WATER RESOURCES & ENVIRONMENTAL

## Groundwater Sampling Data Sheet

Well I.D.: MW-1  
 Project Name/Location: BP4977 Project #: 09-88-625  
 Sampler's Name: EP TG Date: 1/6/89  
 Purging Equipment: Boiler  
 Sampling Equipment: Boiler

Casing Type: PVC

Casing Diameter: 4 inch

### \*UNIT CASING VOLUMES

Total Well Depth: 15.12 feet

2" = 0.16 gal/lin ft.

Depth to Water: - 8.46 feet

3" = 0.37 gal/lin ft.

Water Column Thickness: = 6.66 feet

4" = 0.65 gal/lin ft.

Unit Casing Volume\*: x 0.65 gallon / foot

6" = 1.47 gal/lin ft.

Casing Water Volume: = 4.32 gallons

Casing Volume: x 3 each

Estimated Purge Volume: = 12.93 gallons

Free product measurement (if present): \_\_\_\_\_

Purged (gallons)	Time (24:00)	DO	ORP (mV)	Fe	Conductance (µS)	Temperature (Fahrenheit)	pH	Observations
0	0820	6.15	32		1304	21.3	6.85	
4	0825	X	X	X	1231	21.7	6.83	
6	0830	X	X	X	1246	21.5	6.83	
		X	X	X				
		X	X	X				
		X	X	X				
		X	X	X				
		X	X	X				

Total Water Volume Purged: 6 gallons

Depth to Water at Sample Collection: 12.91 feet

Sample Collection Time: 0850

Purged Dry?  (Y)  (N)

Comments: Purged Dry @ 6 G, allowed to recharge

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**Groundwater Sampling Data Sheet**

Well I.D.: MW-2  
 Project Name/Location: BP 4977 Project #: 09-88-625  
 Sampler's Name: T. Geddes E. Farrar Date: 11/6/09  
 Purging Equipment: Davit  
 Sampling Equipment: Beiler

Casing Type: PVC  
 Casing Diameter: 4 1/2 inch  
 Total Well Depth: 11.65 feet  
 Depth to Water: - 6.52 feet  
 Water Column Thickness: = 8.13 feet  
 Unit Casing Volume\*: x .65 gallon / foot  
 Casing Water Volume: = 5.2 gallons  
 Casing Volume: x 3 each  
 Estimated Purge Volume: = 15.8 gallons

**\*UNIT CASING VOLUMES**

2" = 0.16 gal/lin ft.  
 3" = 0.37 gal/lin ft.  
 4" = 0.65 gal/lin ft.  
 6" = 1.47 gal/lin ft.

Free product measurement (if present):

Purged (gallons)	Time (24:00)	DO	ORP (mV)	Fe	Conductance (µS)	Temperature (Fahrenheit)	pH	Observations
0	0824	2.2	-59		854.2	22.1	6.7	
4.5	0650	X	X	X	864.7	22.3	6.8	
9	0905	X	X	X	858.7	22.6	6.8	
		X	X	X				
		X	X	X				
		X	X	X				
		X	X	X				
		X	X	X				

Total Water Volume Purged: 9 gallons  
 Depth to Water at Sample Collection: 10.80 feet  
 Sample Collection Time: 0905

Purged Dry?  (Y)  (N)

Comments: small vacuum - slight sheen

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# BROADBENT & ASSOCIATES, INC.

ENGINEERING, WATER RESOURCES & ENVIRONMENTAL

## Groundwater Sampling Data Sheet

Well I.D.: MW-3

Project Name/Location: BP4977 Project #: CR-88-625

Sampler's Name: EFTB Date: 11/6/09

Purging Equipment: Baird

Sampling Equipment: Baird

Casing Type: PVC

Casing Diameter: 4 inch

Total Well Depth: 14.95 feet

Depth to Water: - 7.38 feet

Water Column Thickness: = 7.57 feet

Unit Casing Volume\*: x 0.65 gallon / foot

Casing Water Volume: = 4.92 gallons

Casing Volume: x 3 each

Estimated Purge Volume: = 14.7 gallons

### \*UNIT CASING VOLUMES

2" = 0.16 gal/lin ft.  
 3" = 0.37 gal/lin ft.  
 4" = 0.65 gal/lin ft.  
 6" = 1.47 gal/lin ft.

Free product measurement (if present): \_\_\_\_\_

Purged (gallons)	Time (24:00)	DO	ORP (mV)	Fe	Conductance (µS)	Temperature (Fahrenheit)	pH	Observations
<u>0</u>	<u>0910</u>	<u>0.32</u>	<u>-89</u>		<u>780.5</u>	<u>22.4</u>	<u>6.90</u>	
<u>5</u>	<u>0915</u>	X	X	X	<u>748.2</u>	<u>23.7</u>	<u>7.05</u>	
<u>8</u>	<u>0920</u>	X	X	X	<u>747.8</u>	<u>23.7</u>	<u>6.97</u>	
		X	X	X				
		X	X	X				
		X	X	X				
		X	X	X				
		X	X	X				

Total Water Volume Purged: 8 gallons

Depth to Water at Sample Collection: 11.40 feet

Sample Collection Time: 0925 Purged Dry? ( Y / N )

Comments: small vacuum

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# Laboratory Management Program LaMP Chain of Custody Record

BP/ARC Project Name: BP 4977

Req Due Date (mm/dd/yy): \_\_\_\_\_

Rush TAT: Yes \_\_\_ No X

BP/ARC Facility No: \_\_\_\_\_ 4977

Lab Work Order Number: \_\_\_\_\_

Lab Name: Calscience	BP/ARC Facility Address: 2770 Castro Valley Road	Consultant/Contractor: Broadbent & Associates, Inc.
Lab Address: 7440 Lincoln Way	City, State, ZIP Code: Castro Valley, CA	Consultant/Contractor Project No: 06-88-625-5-822
Lab PM: Richard Villafania	Lead Regulatory Agency: ACEH	Address: 1324 Mangrove Ave. Ste. 212, Chico, CA 95926
Lab Phone: 714-895-5494	California Global ID No.: T0600100089	Consultant/Contractor PM: Tom Venus
Lab Shipping Acct: 9225	Enfos Proposal No: 000QV-0003	Phone: 530-566-1400
Lab Bottle Order No:	Accounting Mode: Provision <u>X</u> OOC-BU ___ OOC-RM ___	Email EDD To: tvenus@broadbentinc.com
Other Info:	Stage: Operate (5) Activity: Monitoring/MNA (22)	Invoice To: BP/ARC <u>X</u> Contractor ___

BP/ARC EBM: Chuck Carmel				Matrix			No. Containers / Preservative						Requested Analyses						Report Type & QC Level	
EBM Phone:				Soil / Solid	Water / Liquid	Air / Vapor	Total Number of Containers	Unpreserved	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	HCl	Methanol	GRO (8015)	BTEX (8260)	5 Oxys (8260)	EDB (8260)	1,2-DCA (8260)	Ethanol (8260)	Standard <u>X</u>	
EBM Email:																			Full Data Package ___	
Lab No.	Sample Description	Date	Time																Comments	
MW-1		11/6/09	0850	X								X	X	X	X	X	X			
MW-2		I	0905	X								X	X	X	X	X	X			
MW-3		I	0925	X								X	X	X	X	X	X			
	Trip blank																			Hold Trip Blank

Sampler's Name: <u>Eric Farrer</u>	Relinquished By / Affiliation		Date	Time	Accepted By / Affiliation		Date	Time
Sampler's Company: <u>BAT</u>	<u>Eric Farrer / BAT</u>		<u>11/09/09</u>	<u>0702</u>				
Shipment Method: <u>GSN</u>	Ship Date: <u>11/09/09</u>							
Shipment Tracking No: <u>106462453</u>								

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals in Place: Yes / No    Temp Blank: Yes / No    Cooler Temp on Receipt: \_\_\_\_\_ °F/C    Trip Blank: Yes / No    MS/MSD Sample Submitted: Yes / No



PLEASE PRESS FIRMLY

<b>FROM</b>	1 DATE: <u>11/09/09</u> SHIPPERS GSO ACCOUNT NO. <u>9255</u>
	COMPANY: <u>BAI</u>
	ADDRESS: <u>875 Cottines Lane, Ste F</u>
	CITY: <u>Yacaville</u> ZIP CODE: <u>95688</u>
	SENDER'S NAME: <u>E. Farrar</u> PHONE NUMBER: <u>775-247-7901</u>
<b>TO</b>	2 COMPANY: <u>CAL SCIENCE</u>
	NAME: _____ PHONE NUMBER: _____
	ADDRESS: <u>7440 LINCOLN WAY</u>
ADDRESS: _____ STE/ROOM: _____	
CITY: <u>GARDEN GROVE</u> ZIP CODE: <u>92841</u>	
3 YOUR INTERNAL BILLING REFERENCE WILL APPEAR ON YOUR INVOICE	
SPECIAL INSTRUCTIONS	



1-800-322-5555

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SHIPPING AIR BILL

4 PACKAGE INFORMATION

LETTER (MAX 8 OZ)

PACKAGE (WT) \_\_\_\_\_

DECLARED VALUE \$ \_\_\_\_\_

COD AMOUNT \$ \_\_\_\_\_ (CASH NOT ACCEPTED)

5 DELIVERY SERVICE  PRIORITY OVERNIGHT BY 10:30 AM  EARLY PRIORITY BY 8:00 AM  SATURDAY DELIVERY

\*DELIVERY TIMES MAY BE LATER IN SOME AREAS • CONSULT YOUR SERVICE GUIDE OR CALL GOLDEN STATE OVERNIGHT.

6 RELEASE SIGNATURE \_\_\_\_\_

SIGN TO AUTHORIZE DELIVERY WITHOUT OBTAINING SIGNATURE

7 CREDIT CARD  M/C  VISA  AM EX CREDIT CARD NUMBER \_\_\_\_\_ EXP. DATE \_\_\_\_\_

8 PICK UP INFORMATION TIME \_\_\_\_\_ DRIVER # \_\_\_\_\_ ROUTE # \_\_\_\_\_

106462453

9 GSO TRACKING NUMBER

ON PLY 3 LIFT TAB AND REMOVE FOR YOUR RECORD

SHIPPERS COPY

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## FIELD PROCEDURES

### A.1 QUALITY ASSURANCE/QUALITY CONTROL FIELD PROTOCOLS

Field protocols have been implemented to maximize the accuracy and reliability of data collection, ground-water sample collection, transportation and laboratory analysis. Discussion of these protocols is provided below.

#### A.1.1 Water Level & Free-Phase Product Measurement

Prior to ground-water sample collection from each monitor well, the presence of free-phase product and depth to ground water shall be measured. Depth to ground water will be measured with a standard M-Scope water level indicator (or equivalent) that has been decontaminated prior to its use in accordance with procedures discussed below. Depth to ground water will be gauged from a saw cut notch at the top of the well casing on each well head. Once depth to water has been measured, a new disposable bailer will be utilized to monitor for the presence and thickness of free-phase product.

#### A.1.2 Monitor Well Purging

Subsequent to measuring depth to ground water, a minimum of three casing volumes of water will be purged from each monitor well using a Geosquirt submersible pump (or equivalent) and disposable plastic tubing dedicated to each individual well. The well will be purged at a low flow rate to minimize the possibility of purging the well dry. To assure that the sample collected is representative of formation water, several field parameters will be monitored during the purging process and the sample will not be collected until these parameters have stabilized to within 10% of a measured value. These parameters will include temperature, pH, and conductivity. If a well is purged dry, the sample will not be collected until the well has recovered to a minimum 50% of its initial volume.

Ground-water sampling equipment (e.g., M-scope and the Geosquirt purge pump) will be thoroughly cleansed with a solution of Liquinox, rinsed with tap water, and finally rinsed with control water prior to use in each well. Pre-cleaned disposable bailers and disposable plastic tubing will be dedicated to each individual well.

#### A.1.3 Ground-Water Sample Collection

Once the wells are satisfactorily purged, water samples will be collected from each well. Water samples for organic analyses will be collected using a clean disposable bailer and transferred to laboratory-prepared 40 ml vials, in duplicate; such that no head space or air bubbles are present in the sample. The samples will be properly labeled (sample identification, sampler initials, date and time of collection, site location, and requested analyses), placed in an ice chest with blue ice, and delivered to an analytical laboratory.

#### A.1.4 Surface Water Sample Collection

Surface water samples will be collected from mid-depth in the central area of the associated stream. Water samples will be collected in laboratory-prepared 40 ml vials by dipping the vial into the stream water. Each vial will be inverted to check that no head space or bubbles are present. The samples will be properly labeled and transported as described above.

### A.1.5 Chain of Custody Procedure

Sample identification documents will be carefully prepared so identification and chain of custody can be maintained and sample disposition can be controlled. The sample identification documents include Chain-of-Custody (COC) records and Daily Field Report forms. Chain of custody procedures are outlined below.

#### Field Custody Procedures

The field sampler is personally responsible for the care and custody of the samples collected until they are properly transferred.

Samples will have individual labels. The information on these labels will correspond to the COC which shows the identification of individual samples and the contents of the shipping container. The original COC will accompany the shipment and a copy will be retained by the sampler for the client.

The staff person conducting the sampling will determine whether proper custody procedures were followed during the field work.

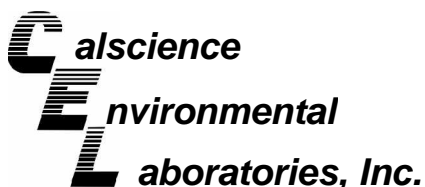
#### Transfer of Custody and Shipment

A COC will accompany samples during transfer and shipment. When transferring samples, the individual's relinquishing and receiving the samples will sign, date, and note the time on the COC. This COC documents the sample custody transfer.

Samples will be packaged properly for shipment and dispatched to the appropriate laboratory for analysis, with a separate COC accompanying each shipment. Shipments will be accompanied by the original COC. Samples will be delivered by BAI personnel to the laboratory, or shipped by courier.

### A.1.6 Field Records

In addition to sample identification numbers and Chain-of-Custody records, Daily Field Report records will be maintained by staff personnel to provide daily records of significant events, observations, and measurements during field investigations. These documents will contain information such as: personnel present, site conditions, sampling procedures, measurement procedures, calibration records, etc. Field measurements will be recorded on the appropriate forms. Entries on the data forms will be signed and dated. The data forms will be kept as permanent records.



November 19, 2009

Aric Morton  
Broadbent & Associates, Inc.  
1324 Mangrove Ave, Ste 212  
Chico, CA 95926-2642

Subject: **CalScience Work Order No.: 09-11-0742**  
**Client Reference: BP 4977**

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 11/10/2009 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Systems Manual, applicable standard operating procedures, and other related documentation. The original report of subcontracted analysis, if any, is provided herein, and follows the standard CalScience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Sincerely,

A handwritten signature in black ink, appearing to read 'Richard Villafania'.

CalScience Environmental  
Laboratories, Inc.  
Richard Villafania  
Project Manager

## Analytical Report



Broadbent & Associates, Inc.  
1324 Mangrove Ave, Ste 212  
Chico, CA 95926-2642

Date Received: 11/10/09  
Work Order No: 09-11-0742  
Preparation: EPA 5030B  
Method: EPA 8015B (M)

Project: BP 4977

Page 1 of 1

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
<b>MW-1</b>	<b>09-11-0742-1-C</b>	<b>11/06/09 08:50</b>	<b>Aqueous</b>	<b>GC 11</b>	<b>11/11/09</b>	<b>11/12/09 05:50</b>	<b>091111B01</b>

<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Units</u>
Gasoline Range Organics (C6-C12)	ND	50	1		ug/L
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>	
1,4-Bromofluorobenzene	52	38-134			

<b>MW-2</b>	<b>09-11-0742-2-C</b>	<b>11/06/09 09:05</b>	<b>Aqueous</b>	<b>GC 11</b>	<b>11/11/09</b>	<b>11/12/09 06:24</b>	<b>091111B01</b>
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<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Units</u>
Gasoline Range Organics (C6-C12)	14000	1000	20		ug/L
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>	
1,4-Bromofluorobenzene	53	38-134			

<b>MW-3</b>	<b>09-11-0742-3-C</b>	<b>11/06/09 09:25</b>	<b>Aqueous</b>	<b>GC 11</b>	<b>11/11/09</b>	<b>11/12/09 06:58</b>	<b>091111B01</b>
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<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Units</u>
Gasoline Range Organics (C6-C12)	99	50	1		ug/L
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>	
1,4-Bromofluorobenzene	50	38-134			

<b>Method Blank</b>	<b>099-12-695-687</b>	<b>N/A</b>	<b>Aqueous</b>	<b>GC 11</b>	<b>11/11/09</b>	<b>11/11/09 15:47</b>	<b>091111B01</b>
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<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Units</u>
Gasoline Range Organics (C6-C12)	ND	50	1		ug/L
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>	
1,4-Bromofluorobenzene	49	38-134			

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

## Analytical Report



Broadbent & Associates, Inc.  
1324 Mangrove Ave, Ste 212  
Chico, CA 95926-2642

Date Received: 11/10/09  
Work Order No: 09-11-0742  
Preparation: EPA 5030B  
Method: EPA 8260B  
Units: ug/L

Project: BP 4977

Page 1 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
MW-1	09-11-0742-1-A	11/06/09 08:50	Aqueous	GC/MS BB	11/12/09	11/12/09 21:05	091112L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	ND	0.50	1		Methyl-t-Butyl Ether (MTBE)	1.9	0.50	1	
1,2-Dibromoethane	ND	0.50	1		Tert-Butyl Alcohol (TBA)	ND	10	1	
1,2-Dichloroethane	ND	0.50	1		Diisopropyl Ether (DIPE)	ND	0.50	1	
Ethylbenzene	ND	0.50	1		Ethyl-t-Butyl Ether (ETBE)	ND	0.50	1	
Toluene	ND	0.50	1		Tert-Amyl-Methyl Ether (TAME)	ND	0.50	1	
Xylenes (total)	ND	0.50	1		Ethanol	ND	300	1	
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>	<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>
1,2-Dichloroethane-d4	85	80-128			Dibromofluoromethane	93	80-127		
Toluene-d8	100	80-120			1,4-Bromofluorobenzene	94	68-120		

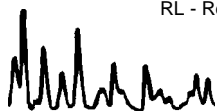
Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
MW-2	09-11-0742-2-A	11/06/09 09:05	Aqueous	GC/MS BB	11/12/09	11/13/09 09:03	091112L02

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	470	10	20		Methyl-t-Butyl Ether (MTBE)	76	10	20	
1,2-Dibromoethane	ND	10	20		Tert-Butyl Alcohol (TBA)	ND	200	20	
1,2-Dichloroethane	ND	10	20		Diisopropyl Ether (DIPE)	ND	10	20	
Ethylbenzene	400	10	20		Ethyl-t-Butyl Ether (ETBE)	ND	10	20	
Toluene	ND	10	20		Tert-Amyl-Methyl Ether (TAME)	ND	10	20	
Xylenes (total)	110	10	20		Ethanol	ND	6000	20	
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>	<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>
1,2-Dichloroethane-d4	95	80-128			Dibromofluoromethane	98	80-127		
Toluene-d8	100	80-120			1,4-Bromofluorobenzene	96	68-120		

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
MW-3	09-11-0742-3-B	11/06/09 09:25	Aqueous	GC/MS BB	11/12/09	11/13/09 08:35	091112L02

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	ND	0.50	1		Methyl-t-Butyl Ether (MTBE)	5.8	0.50	1	
1,2-Dibromoethane	ND	0.50	1		Tert-Butyl Alcohol (TBA)	11	10	1	
1,2-Dichloroethane	ND	0.50	1		Diisopropyl Ether (DIPE)	ND	0.50	1	
Ethylbenzene	ND	0.50	1		Ethyl-t-Butyl Ether (ETBE)	ND	0.50	1	
Toluene	ND	0.50	1		Tert-Amyl-Methyl Ether (TAME)	ND	0.50	1	
Xylenes (total)	ND	0.50	1		Ethanol	ND	300	1	
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>	<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>
1,2-Dichloroethane-d4	97	80-128			Dibromofluoromethane	98	80-127		
Toluene-d8	98	80-120			1,4-Bromofluorobenzene	94	68-120		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers



## Analytical Report



Broadbent & Associates, Inc.  
1324 Mangrove Ave, Ste 212  
Chico, CA 95926-2642

Date Received: 11/10/09  
Work Order No: 09-11-0742  
Preparation: EPA 5030B  
Method: EPA 8260B  
Units: ug/L

Project: BP 4977


Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-12-703-1,123	N/A	Aqueous	GC/MS BB	11/12/09	11/12/09 11:52	091112L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	ND	0.50	1		Methyl-t-Butyl Ether (MTBE)	ND	0.50	1	
1,2-Dibromoethane	ND	0.50	1		Tert-Butyl Alcohol (TBA)	ND	10	1	
1,2-Dichloroethane	ND	0.50	1		Diisopropyl Ether (DIPE)	ND	0.50	1	
Ethylbenzene	ND	0.50	1		Ethyl-t-Butyl Ether (ETBE)	ND	0.50	1	
Toluene	ND	0.50	1		Tert-Amyl-Methyl Ether (TAME)	ND	0.50	1	
Xylenes (total)	ND	0.50	1		Ethanol	ND	300	1	
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>	<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>
1,2-Dichloroethane-d4	94	80-128			Dibromofluoromethane	94	80-127		
Toluene-d8	99	80-120			1,4-Bromofluorobenzene	97	68-120		

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	ND	0.50	1		Methyl-t-Butyl Ether (MTBE)	ND	0.50	1	
1,2-Dibromoethane	ND	0.50	1		Tert-Butyl Alcohol (TBA)	ND	10	1	
1,2-Dichloroethane	ND	0.50	1		Diisopropyl Ether (DIPE)	ND	0.50	1	
Ethylbenzene	ND	0.50	1		Ethyl-t-Butyl Ether (ETBE)	ND	0.50	1	
Toluene	ND	0.50	1		Tert-Amyl-Methyl Ether (TAME)	ND	0.50	1	
Xylenes (total)	ND	0.50	1		Ethanol	ND	300	1	
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>	<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>
1,2-Dichloroethane-d4	96	80-128			Dibromofluoromethane	97	80-127		
Toluene-d8	100	80-120			1,4-Bromofluorobenzene	96	68-120		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers







## Quality Control - Spike/Spike Duplicate



Broadbent & Associates, Inc.  
1324 Mangrove Ave, Ste 212  
Chico, CA 95926-2642

Date Received: 11/10/09  
Work Order No: 09-11-0742  
Preparation: EPA 5030B  
Method: EPA 8015B (M)

Project BP 4977

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
09-11-0843-5	Aqueous	GC 11	11/11/09	11/11/09	091111S01

<u>Parameter</u>	<u>MS %REC</u>	<u>MSD %REC</u>	<u>%REC CL</u>	<u>RPD</u>	<u>RPD CL</u>	<u>Qualifiers</u>
Gasoline Range Organics (C6-C12)	76	81	38-134	7	0-25	

RPD - Relative Percent Difference , CL - Control Limit



## Quality Control - Spike/Spike Duplicate



Broadbent & Associates, Inc.  
1324 Mangrove Ave, Ste 212  
Chico, CA 95926-2642

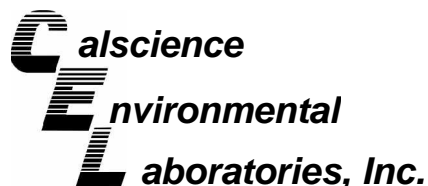
Date Received: 11/10/09  
Work Order No: 09-11-0742  
Preparation: EPA 5030B  
Method: EPA 8260B

Project BP 4977

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
09-11-0506-8	Aqueous	GC/MS BB	11/12/09	11/12/09	091112S01

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	97	97	76-124	1	0-20	
Carbon Tetrachloride	96	99	74-134	3	0-20	
Chlorobenzene	98	98	80-120	0	0-20	
1,2-Dibromoethane	94	95	80-120	1	0-20	
1,2-Dichlorobenzene	93	96	80-120	3	0-20	
1,1-Dichloroethene	104	102	73-127	1	0-20	
Ethylbenzene	97	98	78-126	1	0-20	
Toluene	95	96	80-120	0	0-20	
Trichloroethene	97	98	77-120	1	0-20	
Vinyl Chloride	75	78	72-126	3	0-20	
Methyl-t-Butyl Ether (MTBE)	86	85	67-121	1	0-49	
Tert-Butyl Alcohol (TBA)	104	109	36-162	4	0-30	
Diisopropyl Ether (DIPE)	90	88	60-138	2	0-45	
Ethyl-t-Butyl Ether (ETBE)	88	86	69-123	2	0-30	
Tert-Amyl-Methyl Ether (TAME)	89	89	65-120	0	0-20	
Ethanol	106	115	30-180	8	0-72	

RPD - Relative Percent Difference , CL - Control Limit



## Quality Control - Spike/Spike Duplicate



Broadbent & Associates, Inc.  
1324 Mangrove Ave, Ste 212  
Chico, CA 95926-2642

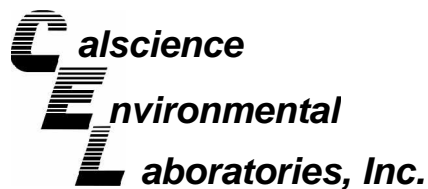
Date Received: 11/10/09  
Work Order No: 09-11-0742  
Preparation: EPA 5030B  
Method: EPA 8260B

Project BP 4977

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
09-11-0615-7	Aqueous	GC/MS BB	11/12/09	11/13/09	091112S02

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	105	104	76-124	1	0-20	
Toluene	102	101	80-120	1	0-20	
Ethylbenzene	101	99	78-126	2	0-20	
Methyl-t-Butyl Ether (MTBE)	97	96	67-121	0	0-49	
Tert-Butyl Alcohol (TBA)	104	105	36-162	2	0-30	
Diisopropyl Ether (DIPE)	95	95	60-138	1	0-45	
Ethyl-t-Butyl Ether (ETBE)	95	95	69-123	0	0-30	
Tert-Amyl-Methyl Ether (TAME)	98	94	65-120	4	0-20	
Ethanol	112	117	30-180	4	0-72	
1,1-Dichloroethene	104	100	73-127	4	0-20	
1,2-Dibromoethane	104	100	80-120	4	0-20	
1,2-Dichlorobenzene	102	102	80-120	1	0-20	
Carbon Tetrachloride	105	109	74-134	3	0-20	
Chlorobenzene	103	102	80-120	0	0-20	
Trichloroethene	105	104	77-120	1	0-20	
Vinyl Chloride	82	83	72-126	1	0-20	

RPD - Relative Percent Difference , CL - Control Limit



## Quality Control - LCS/LCS Duplicate



Broadbent & Associates, Inc.  
1324 Mangrove Ave, Ste 212  
Chico, CA 95926-2642

Date Received: N/A  
Work Order No: 09-11-0742  
Preparation: EPA 5030B  
Method: EPA 8015B (M)

Project: BP 4977

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-695-687	Aqueous	GC 11	11/11/09	11/11/09	091111B01

<u>Parameter</u>	<u>LCS %REC</u>	<u>LCSD %REC</u>	<u>%REC CL</u>	<u>RPD</u>	<u>RPD CL</u>	<u>Qualifiers</u>
Gasoline Range Organics (C6-C12)	79	83	78-120	6	0-20	

RPD - Relative Percent Difference , CL - Control Limit



## Quality Control - LCS/LCS Duplicate



Broadbent & Associates, Inc.  
1324 Mangrove Ave, Ste 212  
Chico, CA 95926-2642

Date Received: N/A  
Work Order No: 09-11-0742  
Preparation: EPA 5030B  
Method: EPA 8260B

Project: BP 4977

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number		
099-12-703-1,123	Aqueous	GC/MS BB	11/12/09	11/12/09	091112L01		
Parameter	LCS %REC	LCSD %REC	%REC CL	ME CL	RPD	RPD CL	Qualifiers
Benzene	92	100	80-120	73-127	8	0-20	
Carbon Tetrachloride	94	104	74-134	64-144	10	0-20	
Chlorobenzene	93	100	80-120	73-127	7	0-20	
1,2-Dibromoethane	90	99	79-121	72-128	10	0-20	
1,2-Dichlorobenzene	91	97	80-120	73-127	6	0-20	
1,1-Dichloroethene	100	109	78-126	70-134	8	0-28	
Ethylbenzene	93	100	80-120	73-127	7	0-20	
Toluene	92	99	80-120	73-127	8	0-20	
Trichloroethene	92	101	79-127	71-135	9	0-20	
Vinyl Chloride	79	83	72-132	62-142	4	0-20	
Methyl-t-Butyl Ether (MTBE)	81	93	69-123	60-132	13	0-20	
Tert-Butyl Alcohol (TBA)	101	99	63-123	53-133	1	0-20	
Diisopropyl Ether (DIPE)	85	95	59-137	46-150	11	0-37	
Ethyl-t-Butyl Ether (ETBE)	83	93	69-123	60-132	12	0-20	
Tert-Amyl-Methyl Ether (TAME)	84	94	70-120	62-128	12	0-20	
Ethanol	106	104	28-160	6-182	1	0-57	

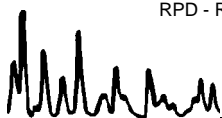
Total number of LCS compounds : 16

Total number of ME compounds : 0

Total number of ME compounds allowed : 1

LCS ME CL validation result : Pass

RPD - Relative Percent Difference , CL - Control Limit





## Quality Control - LCS/LCS Duplicate



Broadbent & Associates, Inc.  
1324 Mangrove Ave, Ste 212  
Chico, CA 95926-2642

Date Received: N/A  
Work Order No: 09-11-0742  
Preparation: EPA 5030B  
Method: EPA 8260B

Project: BP 4977

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number		
099-12-703-1,125	Aqueous	GC/MS BB	11/12/09	11/12/09	091112L02		
<u>Parameter</u>	<u>LCS %REC</u>	<u>LCSD %REC</u>	<u>%REC CL</u>	<u>ME CL</u>	<u>RPD</u>	<u>RPD CL</u>	<u>Qualifiers</u>
Benzene	105	105	80-120	73-127	0	0-20	
Carbon Tetrachloride	108	108	74-134	64-144	1	0-20	
Chlorobenzene	105	104	80-120	73-127	1	0-20	
1,2-Dibromoethane	104	109	79-121	72-128	5	0-20	
1,2-Dichlorobenzene	103	106	80-120	73-127	3	0-20	
1,1-Dichloroethene	113	115	78-126	70-134	2	0-28	
Ethylbenzene	102	103	80-120	73-127	1	0-20	
Toluene	104	103	80-120	73-127	2	0-20	
Trichloroethene	106	106	79-127	71-135	0	0-20	
Vinyl Chloride	86	87	72-132	62-142	2	0-20	
Methyl-t-Butyl Ether (MTBE)	97	100	69-123	60-132	3	0-20	
Tert-Butyl Alcohol (TBA)	107	98	63-123	53-133	8	0-20	
Diisopropyl Ether (DIPE)	97	94	59-137	46-150	3	0-37	
Ethyl-t-Butyl Ether (ETBE)	96	96	69-123	60-132	0	0-20	
Tert-Amyl-Methyl Ether (TAME)	100	99	70-120	62-128	1	0-20	
Ethanol	104	98	28-160	6-182	6	0-57	

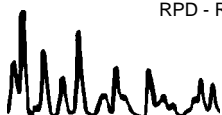
Total number of LCS compounds : 16

Total number of ME compounds : 0

Total number of ME compounds allowed : 1

LCS ME CL validation result : Pass

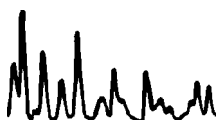
RPD - Relative Percent Difference , CL - Control Limit



Work Order Number: 09-11-0742
 

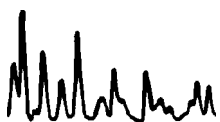
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<u>Qualifier</u>	<u>Definition</u>
AX	Sample too dilute to quantify surrogate.
BA	Relative percent difference out of control.
BA,AY	BA = Relative percent difference out of control. AY = Matrix interference suspected.
BB	Sample > 4x spike concentration.
BF	Reporting limits raised due to high hydrocarbon background.
BH	Reporting limits raised due to high level of non-target analytes.
BU	Sample analyzed after holding time expired.
BV	Sample received after holding time expired.
BY	Sample received at improper temperature.
BZ	Sample preserved improperly.
CL	Initial analysis within holding time but required dilution.
CQ	Analyte concentration greater than 10 times the blank concentration.
CU	Surrogate concentration diluted to not detectable during analysis.
DF	Reporting limits elevated due to matrix interferences.
DU	Insufficient sample quantity for matrix spike/dup matrix spike.
ET	Sample was extracted past end of recommended max. holding time.
EY	Result exceeds normal dynamic range; reported as a min est.
GR	Internal standard recovery is outside method recovery limit.
IB	CCV recovery above limit; analyte not detected.
IH	Calibrtn. verif. recov. below method CL for this analyte.
IJ	Calibrtn. verif. recov. above method CL for this analyte.
J,DX	J=EPA Flag -Estimated value; DX= Value < lowest standard (MQL), but > than MDL.
LA	Confirmatory analysis was past holding time.
LG,AY	LG= Surrogate recovery below the acceptance limit. AY= Matrix interference suspected.
LH,AY	LH= Surrogate recovery above the acceptance limit. AY= Matrix interference suspected.
LM,AY	LM= MS and/or MSD above acceptance limits. See Blank Spike (LCS). AY= Matrix interference suspected.
LN,AY	LN= MS and/or MSD below acceptance limits. See Blank Spike (LCS). AY= Matrix interference suspected.
LQ	LCS recovery above method control limits.





<u>Qualifier</u>	<u>Definition</u>
LR	LCS recovery below method control limits.
LW	Quantitation of unknown hydrocarbon(s) in sample based on gasoline.
LX	Quantitation of unknown hydrocarbon(s) in sample based on diesel.
MB	Analyte present in the method blank.
PC	Sample taken from VOA vial with air bubble > 6mm diameter.
PI	Primary and confirm results varied by > than 40% RPD.
RB	RPD exceeded method control limit; % recoveries within limits.
SG	A silica gel cleanup procedure was performed.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture.





Laboratory Management Program LaMP Chain of Custody Record

BP/ARC Project Name: BP 4977  
 BP/ARC Facility No: 4977

Req Due Date (mm/dd/yy):  
 Lab Work Order Number:

*OFH2*

Rush TAT: Yes  No

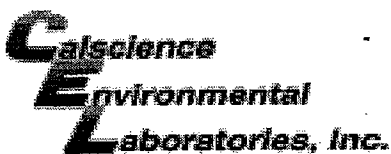
Lab Name: Calscience	BP/ARC Facility Address: 2770 Castro Valley Road	Consultant/Contractor: Broadbent & Associates, Inc.
Lab Address: 7440 Lincoln Way	City, State, ZIP Code: Castro Valley, CA	Consultant/Contractor Project No: 06-88-625-5-822
Lab PM: Richard Villafania	Lead Regulatory Agency: ACEH	Address: 1324 Mangrove Ave. Ste. 212, Chico, CA 95926
Lab Phone: 714-895-5494	California Global ID No.: T0600100089	Consultant/Contractor PM: Tom Venus
Lab Shipping Acct: 9225	Enfos Proposal No: 000QV-0003	Phone: 530-566-1400
Lab Bottle Order No:	Accounting Mode: Provision <input checked="" type="checkbox"/> OOC-BU <input type="checkbox"/> OOC-RM <input type="checkbox"/>	Email EDD To: tvenus@broadbentinc.com
Other Info:	Stage: Operate (5) Activity: Monitoring/MNA (22)	Invoice To: BP/ARC <input checked="" type="checkbox"/> Contractor <input type="checkbox"/>

BP/ARC EBM: Chuck Carmel				Matrix			No. Containers / Preservative						Requested Analyses						Report Type & QC Level	
EBM Phone:				Soil / Solid	Water / Liquid	Air / Vapor	Total Number of Containers	Unpreserved	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	HCl	Methanol	GRO (8015)	BTEX (8260)	5 Oxys (8260)	EDB (8260)	1,2-DCA (8260)	Ethanol (8260)	Standard <input checked="" type="checkbox"/>	
EBM Email:																			Full Data Package <input type="checkbox"/>	
Lab No.	Sample Description	Date	Time																Comments	
1	MW-1	11/6/09	0850	X							X	X	X	X	X	X				
2	MW-2	↓	0905	X							X	X	X	X	X	X				
3	MW-3	↓	0925	X							X	X	X	X	X	X				
4	Trip blank																		Hold Trip Blank	

Sampler's Name: <u>Eric Farrar</u>	Relinquished By / Affiliation: <u>Eric Farrar / BAT</u>	Date: <u>11/09/09</u>	Time: <u>0702</u>	Accepted By / Affiliation: <u>[Signature]</u>	Date: <u>11/10/09</u>	Time: <u>1000</u>
Sampler's Company: <u>BAT</u>						
Shipment Method: <u>GSON</u>	Ship Date: <u>11/09/09</u>					
Shipment Tracking No: <u>106462453</u>						

Special Instructions:

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No    Temp Blank: Yes / No    Cooler Temp on Receipt: \_\_\_\_\_ °F/C    Trip Blank: Yes / No    MS/MSD Sample Submitted: Yes / No



WORK ORDER #: 09-11-0742

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: Broadbent

DATE: 11/10/09

TEMPERATURE: (Criteria: 0.0°C - 6.0°C, not frozen)

Temperature 5.5°C - 0.8°C (CF) = 4.7°C [X] Blank [ ] Sample

- [ ] Sample(s) outside temperature criteria (PM/APM contacted by: \_\_\_\_\_).
[ ] Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.
[ ] Received at ambient temperature, placed on ice for transport by Courier.

Ambient Temperature: [ ] Air [ ] Filter [ ] Metals Only [ ] PCBs Only Initial: JP

CUSTODY SEALS INTACT:

[X] Cooler [ ] \_\_\_\_\_ [ ] No (Not Intact) [ ] Not Present [ ] N/A Initial: JP
[ ] Sample [ ] \_\_\_\_\_ [ ] No (Not Intact) [X] Not Present Initial: JP

SAMPLE CONDITION:

Table with columns: Yes, No, N/A. Rows include Chain-Of-Custody (COC) document(s) received with samples, COC document(s) received complete, Collection date/time, matrix, and/or # of containers logged in based on sample labels, Sampler's name indicated on COC, Sample container label(s) consistent with COC, Sample container(s) intact and good condition, Correct containers and volume for analyses requested, Analyses received within holding time, Proper preservation noted on COC or sample container, Volatile analysis container(s) free of headspace, Tedlar bag(s) free of condensation.

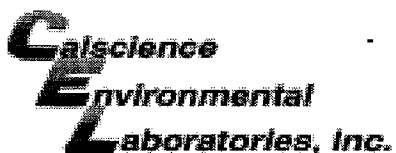
CONTAINER TYPE:

Solid: [ ] 4ozCGJ [ ] 8ozCGJ [ ] 16ozCGJ [ ] Sleeve [ ] EnCores® [ ] TerraCores® [ ] \_\_\_\_\_
Water: [ ] VOA [X] VOA<sup>h</sup> [ ] VOAna<sub>2</sub> [ ] 125AGB [ ] 125AGBh [ ] 125AGBp [ ] 1AGB [ ] 1AGBna<sub>2</sub> [ ] 1AGBs
[ ] 500AGB [ ] 500AGJ [ ] 500AGJs [ ] 250AGB [ ] 250CGB [ ] 250CGBs [ ] 1PB [ ] 500PB [ ] 500PBna
[ ] 250PB [ ] 250PBn [ ] 125PB [ ] 125PBz<sub>nna</sub> [ ] 100PJ [ ] 100PJna<sub>2</sub> [ ] \_\_\_\_\_ [ ] \_\_\_\_\_ [ ] \_\_\_\_\_

Air: [ ] Tedlar® [ ] Summa® Other: [ ] \_\_\_\_\_ Trip Blank Lot#: \_\_\_\_\_ Checked by: JP

Container: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E: Envelop Reviewed by: JP

Preservative: h: HCL n: HNO3 na<sub>2</sub>:Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> Na: NaOH p: H<sub>3</sub>PO<sub>4</sub> s: H<sub>2</sub>SO<sub>4</sub> z<sub>nna</sub>: ZnAc<sub>2</sub>+NaOH f: Field-filtered Scanned by: JP



WORK ORDER #: 09-11-0742

# SAMPLE ANOMALY FORM

**SAMPLES - CONTAINERS & LABELS:**

**Comments:**

- Samples NOT RECEIVED but listed on COC
- Samples received but NOT LISTED on COC
- Holding time expired – list sample ID(s) and test
- Insufficient quantities for analysis – list test
- Improper container(s)/preservative used – list test
- No preservative noted on COC or label – list test & notify lab
- Sample labels illegible – note test/container type
- Sample labels do not match COC – Note in comments
  - Sample ID
  - Date and/or Time Collected
  - Project Information
  - # of Containers
  - Analysis
- Sample containers compromised – Note in comments
  - Leaking
  - Broken
  - Without Labels
- Air sample containers compromised – Note in comments
  - Flat
  - Very low in volume
  - Leaking (Not transferred - duplicate bag submitted)
  - Leaking (transferred into Calscience Tedlar® Bag\*)
  - Leaking (transferred into Client's Tedlar® Bag\*)
- Other: \_\_\_\_\_

(-4) TRIP BLANK NOT RECEIVED.

(-1) MW-1 COLLECTED ON 11/05 @ 8:50 PER SAMPLE -

**HEADSPACE – Containers with Bubble > 6mm or ¼ inch:**

Sample #	Container ID(s)	# of Vials Received	Sample #	Container ID(s)	# of Vials Received	Sample #	Container ID(s)	# of Cont. received	Analysis

Comments: \_\_\_\_\_

\*Transferred at Client's request.

Initial / Date: ju 11/10/09

**APPENDIX B**

**GEOTRACKER UPLOAD CONFIRMATION RECEIPTS**

---

STATE WATER RESOURCES CONTROL BOARD  
**GEOTRACKER ESI**

UPLOADING A GEO\_WELL FILE

**SUCCESS**

Processing is complete. No errors were found!  
Your file has been successfully submitted!

<u>Submittal Type:</u>	GEO_WELL
<u>Submittal Title:</u>	4Q09 GEO_WELL 4977
<u>Facility Global ID:</u>	T0600100089
<u>Facility Name:</u>	ARCO #4977
<u>File Name:</u>	GEO_WELL.zip
<u>Organization Name:</u>	Broadbent & Associates, Inc.
<u>Username:</u>	BROADBENT-C
<u>IP Address:</u>	67.118.40.90
<u>Submittal Date/Time:</u>	12/8/2009 2:43:19 PM
<u>Confirmation Number:</u>	<b>1483071744</b>

---

STATE WATER RESOURCES CONTROL BOARD  
**GEOTRACKER ESI**

UPLOADING A EDF FILE

**SUCCESS**

Processing is complete. No errors were found!  
Your file has been successfully submitted!

<b><u>Submittal Type:</u></b>	EDF - Monitoring Report - Quarterly
<b><u>Submittal Title:</u></b>	4Q09 GW Monitoring
<b><u>Facility Global ID:</u></b>	T0600100089
<b><u>Facility Name:</u></b>	ARCO #4977
<b><u>File Name:</u></b>	09110742.zip
<b><u>Organization Name:</u></b>	Broadbent & Associates, Inc.
<b><u>Username:</u></b>	BROADBENT-C
<b><u>IP Address:</u></b>	67.118.40.90
<b><u>Submittal Date/Time:</u></b>	12/8/2009 2:44:03 PM
<b><u>Confirmation Number:</u></b>	<b>7582353889</b>

[VIEW QC REPORT](#)

[VIEW DETECTIONS REPORT](#)