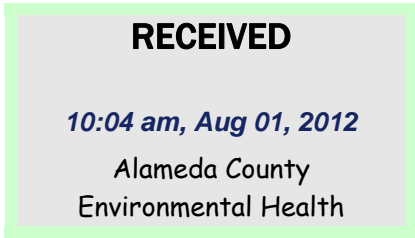


Atlantic Richfield Company

Shannon Couch
Project Manager

PO Box 1257
San Ramon, CA 94583
Phone: (925) 275-3804
Fax: (925) 275-3815
E-Mail: shannon.couch@bp.com



July 30, 2012

Re: Second Quarter 2012 Semi-Annual Groundwater Monitoring Report
Atlantic Richfield Company Service Station #498
286 South Livermore Avenue, Livermore, California
ACEH Case No. RO0002873

"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,

A handwritten signature in black ink, consisting of a large, stylized 'S' followed by a horizontal line and a large loop.

Shannon Couch
Project Manager

Attachment



**SECOND QUARTER 2012 SEMI-ANNUAL
GROUNDWATER MONITORING REPORT
Atlantic Richfield Company Station #498
286 South Livermore Ave.
Livermore, Alameda County, California**

Prepared for:

Ms. Shannon Couch
Atlantic Richfield Company
P.O. Box 1257
San Ramon, CA 94583

Prepared by:

Broadbent & Associates, Inc.
1324 Mangrove Avenue, Suite 212
Chico, California 95926
(530) 566-1400

July 30, 2012

No. 08-82-603



1324 Mangrove Ave., Suite 212, Chico, CA 95926
[T] 530-566-1400 [F] 530-566-1401
broadbentinc.com

Creating Solutions. Building Trust.

July 30, 2012

Project No. 08-82-603

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

Attn.: Ms. Shannon Couch

Re: Second Quarter 2012 Semi-Annual Groundwater Monitoring Report, Atlantic Richfield Company Station #498, 286 South Livermore Avenue, Livermore, California; ACEH Case #RO0002873

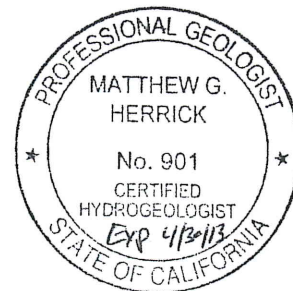
Dear Ms. Couch:

Attached is the Second Quarter 2012 Semi-Annual Groundwater Monitoring Report for Atlantic Richfield Company Station #498 located at 286 South Livermore Avenue, Livermore, California. Should you have questions regarding the work performed or results obtained, please do not hesitate to contact us at (530) 566-1400.

Sincerely,
BROADBENT & ASSOCIATES, INC.

Jason Duda
Project Scientist

Matthew G. Herrick, P.G., C.HG
Senior Hydrogeologist



Enclosure

cc: Mr. Jerry Wickham, Alameda County Environmental Health, 1131 Harbor Bay Parkway, Suite 250, Alameda, CA 84502 (Submitted via ACEH ftp Site)
Electronic copy uploaded to GeoTracker

**SECOND QUARTER 2012
SEMI-ANNUAL GROUNDWATER MONITORING REPORT
STATION #498, LIVERMORE, CALIFORNIA**

Broadbent & Associates, Inc. (Broadbent) is pleased to present this *Second Quarter 2012 Semi-Annual Groundwater Monitoring Report* on behalf of Atlantic Richfield Company (a BP affiliated company) for Station #498 located in Livermore, Alameda County, California. Reporting is being submitted to Alameda County Environmental Health consistent with the requirements under the legal authority of the California Regional Water Quality Control Board, as codified by the California Code of Regulations Title 23, Section 2652(d). Details of work performed, discussion of results, and recommendations are provided below.

Facility Name / Address:	<u>ARCO Station #498 / 286 South Livermore Avenue</u>
Client Project Manager / Title:	<u>Ms. Shannon Couch / Project Manager</u>
Broadbent Contact:	<u>Jason Duda, (530) 566-1400</u>
Broadbent Project No.:	<u>08-82-603</u>
Primary Regulatory Agency / ID No.:	<u>ACEH, Case #RO0002873</u>
Current phase of project:	<u>Monitoring and Assessment</u>
List of Acronyms / Abbreviations:	<u>See end of report text for list of acronyms/abbreviations used in report.</u>

WORK PERFORMED THIS QUARTER (Second Quarter 2012):

1. Prepared and submitted *First Quarter 2012 Status Report* (Broadbent, 4/13/2012).
2. Conducted groundwater monitoring/sampling for Second Quarter 2012 on April 10, 2012.

WORK SCHEDULED FOR NEXT QUARTER (Third Quarter 2012):

1. Prepare and submit *Second Quarter 2012 Semi-Annual Groundwater Monitoring Report* (contained herein).
2. Conduct off-site soil and groundwater investigation activities upon acquisition of off-site property access agreement.

GROUNDWATER MONITORING PLAN SUMMARY:

Groundwater level gauging:	<u>MW-1 through MW-4</u>	(2Q and 4Q)
Groundwater sample collection:	<u>MW-1 through MW-4</u>	(2Q and 4Q)
Biodegradation indicator parameter monitoring:	<u>NA</u>	

QUARTERLY RESULTS SUMMARY:

LNAPL

LNAPL observed this quarter:	<u>No</u>	(yes/no)
LNAPL recovered this quarter:	<u>None</u>	(gal)
Cumulative LNAPL recovered:	<u>None</u>	(gal)

Groundwater Elevation and Gradient:

Depth to groundwater:	<u>30.35 (MW-1) to 39.25 (MW-2)</u>	(ft below TOC)
Gradient direction:	<u>West-Northwest</u>	(compass direction)
Gradient magnitude:	<u>0.01</u>	(ft/ft)
Average change in elevation:	<u>-4.51</u>	(ft since last measurement)

Laboratory Analytical Data

Summary:	<u>GRO were detected in two of the four wells sampled at a maximum concentration of 3,000 µg/L in well MW-3. Benzene was detected in two of the four wells sampled at a maximum concentration of 440 µg/L in well MW-3. MTBE was detected in each of the four wells sampled at a maximum concentration of 46 µg/L in well MW-3.</u>
----------	---

ACTIVITIES CONDUCTED & RESULTS:

Second Quarter 2012 groundwater monitoring was conducted on April 10, 2012 by Broadbent personnel in accordance with the monitoring plan summary detailed above. No irregularities were noted during water level gauging. Light, Non-Aqueous Phase Liquid (LNAPL, or free product) was not noted to be present in the wells monitored during this event. Depth to water measurements ranged from 30.35 ft at MW-1 to 39.25 ft at MW-2. Resulting groundwater surface elevations ranged from 456.10 ft at MW-2 to 466.37 ft at MW-1. Groundwater elevations are summarized in Table 1. Water level elevations yielded a groundwater gradient to the west-northwest at approximately 0.01 ft/ft. Field methods used during groundwater monitoring are provided in Appendix A. Field data sheets are included in Appendix B. A Site Location Map is presented as Drawing 1. Potentiometric groundwater elevation contours are presented in Drawing 2.

Groundwater samples were collected on April 10, 2012 from wells MW-1 through MW-4, consistent with the current monitoring schedule. No irregularities were reported during sampling. Samples were submitted under chain-of-custody protocol to Calscience Environmental Laboratories, Inc. (Garden Grove, California) for analysis of Gasoline-Range Organics (GRO, C6-C12) by EPA Method 8015M; for Benzene, Toluene, Ethylbenzene, Total Xylenes (BTEX), Methyl Tertiary Butyl Ether (MTBE), Ethyl Tertiary Butyl Ether (ETBE), Tert-Amyl Methyl Ether (TAME), Di-Isopropyl Ether (DIPE), 1,2-Dibromomethane (EDB), 1,2-Dichloroethane (1,2-DCA), Tert-Butyl Alcohol (TBA) and Ethanol by EPA Method 8260. The GRO concentrations detected in the samples collected from wells MW-1 and MW-3 were “quantitated against gasoline.” No other significant irregularities were encountered during analysis of the samples. The laboratory analytical report, including chain-of-custody documentation, is provided in Appendix C.

Hydrocarbons in the GRO range were detected above the laboratory reporting limit in two of the four wells sampled at concentrations up to 3,000 micrograms per liter ($\mu\text{g/L}$) in well MW-3. Benzene was detected above the laboratory reporting limit in two of the four wells sampled at concentrations up to 440 $\mu\text{g/L}$ in well MW-3. Toluene was detected above the laboratory reporting limit in well MW-1 at a concentration of 2.0 $\mu\text{g/L}$. Ethylbenzene was detected above the laboratory reporting limit in two of the four wells sampled at concentrations up to 69 $\mu\text{g/L}$ in well MW-3. Total Xylenes were detected above the laboratory reporting limit in two of the four wells sampled at concentrations up to 10 $\mu\text{g/L}$ in well MW-3. MTBE was detected above the laboratory reporting limit in each of the four wells sampled at concentrations up to 46 $\mu\text{g/L}$ in well MW-3. TBA was detected above the laboratory reporting limit in MW-1 at a concentration of 49 $\mu\text{g/L}$. The remaining analytes were not detected above their laboratory reporting limits in the wells sampled this monitoring event. Groundwater monitoring laboratory analytical results are summarized in Table 1 and Table 2. The most recent GRO, Benzene, and MTBE concentrations are also presented in Drawing 2. Groundwater monitoring data (GEO_WELL) and laboratory analytical results (EDF) were uploaded to the GeoTracker AB2886 database. Upload confirmation receipts are provided in Appendix D.

DISCUSSION:

Groundwater levels were between historic minimum and maximum elevations for each well gauged this quarter. Groundwater elevations yielded a groundwater gradient to the west-northwest at approximately 0.01 ft/ft, generally consistent with the historic gradient data presented in Table 3.

This event’s detected analytical concentrations were within the historic minimum and maximum ranges recorded for each well with the following exceptions: Ethylbenzene and Total Xylenes reached historic minimum concentrations in well MW-3 and MTBE reached historic minimum concentrations in wells MW-2 and MW-4. Recent and historic laboratory analytical results are summarized in Table 1 and Table 2. The

next semi-annual groundwater monitoring and sampling event is scheduled to be conducted during the Fourth Quarter 2012.

RECOMMENDATIONS:

In their letter dated August 12, 2010, ACEH approved the *Soil and Ground-Water Investigation Work Plan Addendum* submitted by Broadbent on April 12, 2010. Off-site property access is required in order to complete the scope of work detailed in the Work Plan. Contact with the owner of the property located immediately northwest of the Site has been made. However, the property owner has been reluctant to allow property access in order to complete the off-site investigation. Contact with the owner of the property further northwest of the Site was made during Second Quarter 2012. Unfortunately, the request for property access was denied. It is requested that ACEH assist in acquiring off-site property access to facilitate completion of additional characterization activities needed to delineate plume extent. In email correspondence dated November 4, 2010, ACEH approved a request to postpone the previous deadline of November 10, 2010 established for submittal of the Soil and Water Investigation Report until official property access is obtained.

LIMITATIONS:

The findings presented in this report are based upon observations of field personnel, 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 the Atlantic Richfield Company. It is possible that variations in soil or groundwater 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:

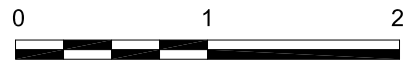
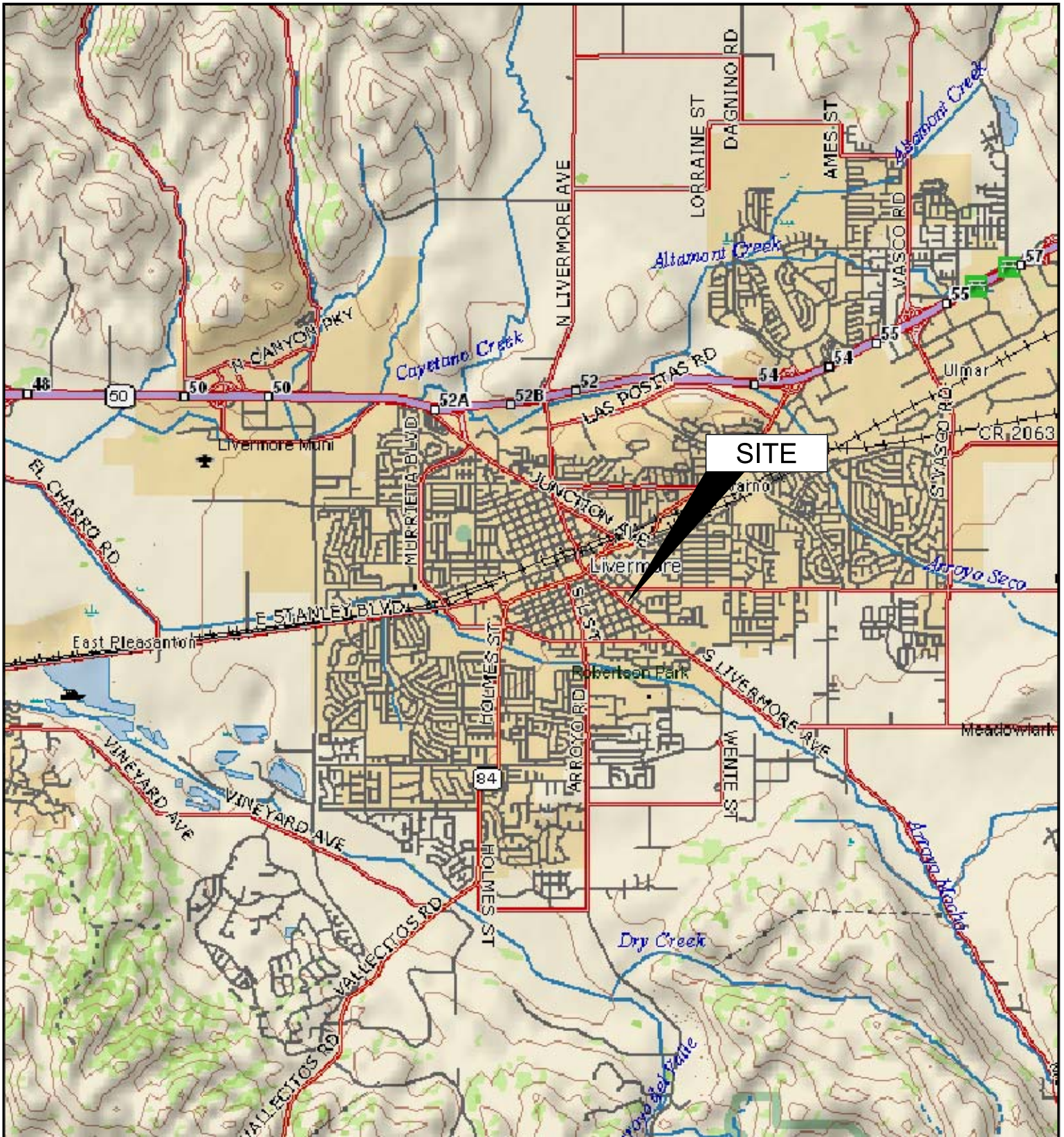
- Drawing 1: Site Location Map
- Drawing 2: Groundwater Elevation Contours and Analytical Summary Map, April 10, 2012

- Table 1: Summary of Groundwater Monitoring Data: Relative Water Elevations and Laboratory Analyses
- Table 2: Summary of Fuel Additives Analytical Data
- Table 3: Historic Groundwater Gradient – Direction and Magnitude

- Appendix A: Field Methods
- Appendix B: Field Data Sheets and Non-Hazardous Waste Data Form
- Appendix C: Laboratory Report and Chain-of-Custody Documentation
- Appendix D: GeoTracker Upload Confirmation Receipts

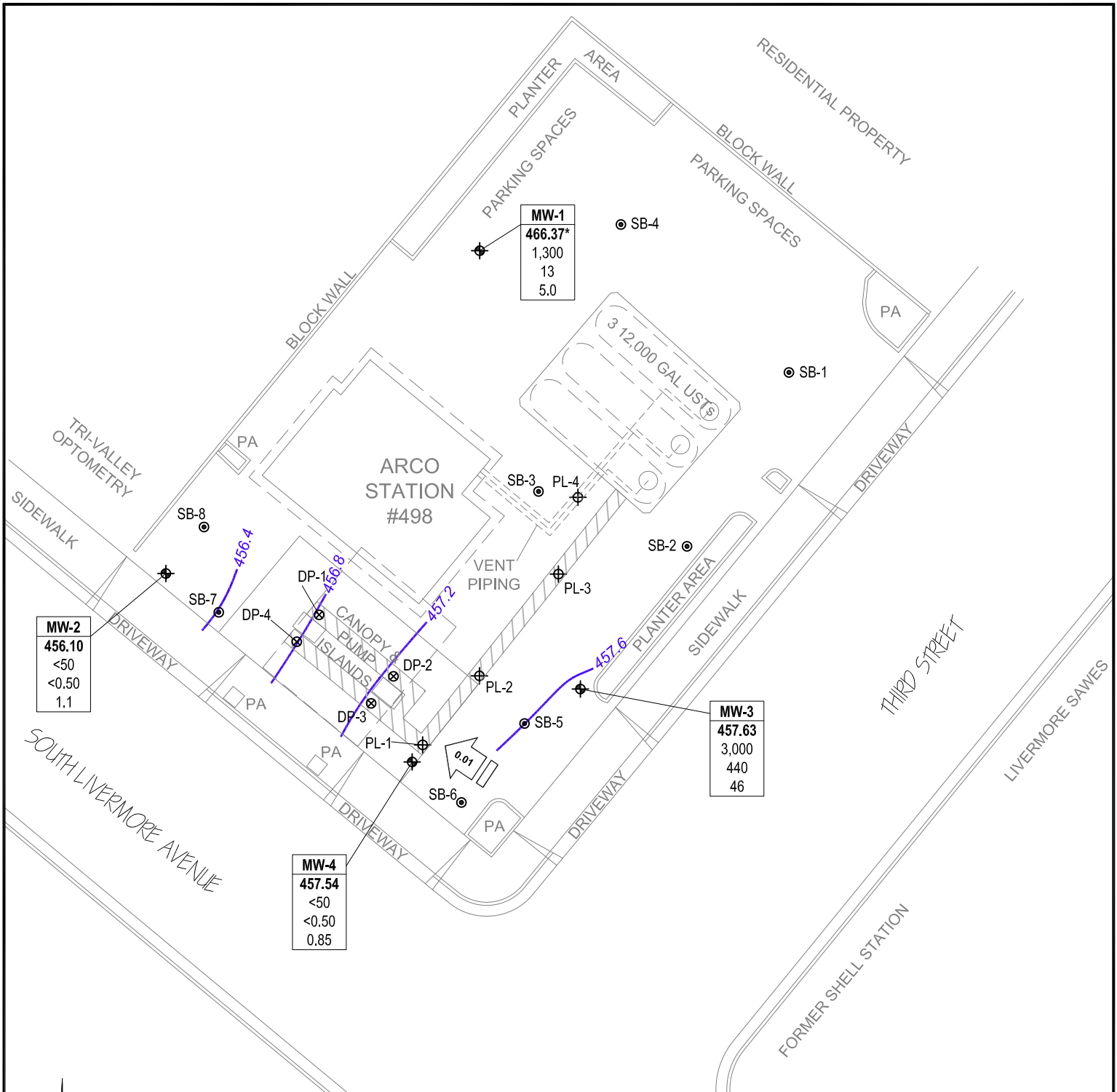
LIST OF COMMONLY USED ACCRONYMS/ABBREVIATIONS:

ACEH:	Alameda County Environmental Health	gal:	Gallons
BTEX:	Benzene, Toluene, Ethylbenzene, Total Xylenes	GRO:	Gasoline-Range Organics
1,2-DCA:	1,2-Dichloroethane	LNAPL:	Light Non-Aqueous Phase Liquid
DIPE:	Di-Isopropyl Ether	MTBE:	Methyl Tertiary Butyl Ether
DO:	Dissolved Oxygen	NO ₃ :	Nitrate as Nitrogen
DRO:	Diesel-Range Organics	ppb:	parts per billion
EDB:	1,2-Dibromomethane	SO ₄ :	Sulfate
Eh:	Oxidation Reduction Potential	TAME:	Tert-Amyl Methyl Ether
EPA:	Environmental Protection Agency	TBA:	Tertiary Butyl Ether
ETBE:	Ethyl Tertiary Butyl Ether	TOC:	Top of Casing
Fe ²⁺ :	Ferrous Iron	µg/L:	micrograms per liter
ft/ft:	feet per foot		



APPROXIMATE SCALE (mi)

IMAGE SOURCE: DELORME



MW-2
456.10
<50
<0.50
1.1

MW-4
457.54
<50
<0.50
0.85

MW-1
466.37*
1,300
13
5.0

MW-3
457.63
3,000
440
46

LEGEND	
	Monitoring well
	Soil Boring (URS 2005)
	Product Line Soil Sample (Delta 2001)
	Dispenser Pump Soil Sample (Delta 2001)
	Well designation
	Ground-water elevation
	Concentration of GRO, Benzene, MTBE and DRO in ground water (µg/L)
	< Not detected at or above laboratory reporting limits
	NS Not sampled
	* Not used in contour interval
	Product Line Excavation Trench
	Groundwater Elevation Contour (Feet Above Site Datum)
	Groundwater Gradient (ft/ft)

NOTES: SITE MAP ADAPTED FROM WATSON WEST, DELTA ENVIRONMENTAL AND WOOD RODGERS FIGURES. WOOD RODGERS SURVEY COMPLETED DECEMBER 2, 2008.

Table 1. Summary of Groundwater Monitoring Data: Relative Water Elevations and Laboratory Analyses

ARCO Service Station #498, 286 South Livermore Avenue, Livermore, CA

Well ID and Date Monitored	P/NP	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Product Thickness (feet)	Water Level Elevation (feet)	Concentrations in µg/L						DO (mg/L)	pH	Footnote
								GRO/TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE			
MW-1																
12/29/2008	P	496.72	20.00	40.00	28.81	0.00	467.91	1,100	38	1.2	4.0	3.3	17	2.72	6.83	
3/20/2009	P		20.00	40.00	28.95	0.00	467.77	640	9.1	<0.50	4.1	<0.50	21	0.35	7.28	
6/2/2009	P		20.00	40.00	30.90	0.00	465.82	600	1.6	<0.50	<0.50	<0.50	32	0.59	7.17	
9/2/2009	P		20.00	40.00	32.00	0.00	464.72	570	<0.50	<0.50	<0.50	<0.50	5.3	1.02	7.38	
11/9/2009	P		20.00	40.00	31.82	0.00	464.90	1,000	130	12	35	39	140	1.39	7.02	
5/20/2010	P		20.00	40.00	28.94	0.00	467.78	1,000	4.4	<0.50	0.76	0.73	22	0.59	6.6	
11/2/2010	P		20.00	40.00	32.03	0.00	464.69	1,300	83	20	40	61	39	0.72	6.0	b (GRO), c
5/25/2011	P		20.00	40.00	26.69	0.00	470.03	2,900	32	3.1	20	2.9	<0.50	0.68	7.0	1w (GRO)
10/25/2011	P		20.00	40.00	30.11	0.00	466.61	1,100	20	3.7	<0.50	5.4	21	0.78	7.4	1w (GRO)
4/10/2012	P		20.00	40.00	30.35	0.00	466.37	1,300	13	2.0	7.0	7.1	5.0	0.20	6.71	1w (GRO)
MW-2																
12/29/2008	P	495.35	37.00	57.00	48.76	0.00	446.59	110	7.1	<0.50	<0.50	0.76	16	1.04	7.67	
3/20/2009	P		37.00	57.00	38.78	0.00	456.57	200	3.9	<1.0	<1.0	<1.0	56	0.41	7.51	
6/2/2009	P		37.00	57.00	43.98	0.00	451.37	110	5.1	<1.0	<1.0	<1.0	44	1.87	7.42	
9/2/2009	P		37.00	57.00	50.25	0.00	445.10	88	0.79	<0.50	<0.50	<0.50	12	1.55	6.91	
11/9/2009	P		37.00	57.00	43.79	0.00	451.56	58	2.0	<0.50	<0.50	<0.50	13	0.86	7.14	
5/20/2010	P		37.00	57.00	32.07	0.00	463.28	<50	<0.50	<0.50	<0.50	<0.50	27	0.61	6.8	
11/2/2010	P		37.00	57.00	39.23	0.00	456.12	<50	<0.50	<0.50	<0.50	<0.50	57	1.34	6.8	
5/25/2011	P		37.00	57.00	28.19	0.00	467.16	<50	<0.50	<0.50	<0.50	<0.50	15	3.74	7.1	
10/25/2011	P		37.00	57.00	33.33	0.00	462.02	<50	<0.50	<0.50	<0.50	<0.50	5.7	1.28	7.8	
4/10/2012	P		37.00	57.00	39.25	0.00	456.10	<50	<0.50	<0.50	<0.50	<0.50	1.1	1.04	7.13	
MW-3																
12/29/2008	P	496.32	37.00	57.00	48.21	0.00	448.11	28,000	310	200	840	6,200	71	1.95	7.39	
3/20/2009	P		37.00	57.00	38.48	0.00	457.84	11,000	360	84	600	1,500	71	0.56	7.25	
6/2/2009	P		37.00	57.00	43.33	0.00	452.99	5,100	310	14	180	310	66	2.06	7.18	a
9/2/2009	P		37.00	57.00	49.60	0.00	446.72	25,000	380	150	930	2,900	75	1.35	6.93	
11/9/2009	P		37.00	57.00	43.25	0.00	453.07	6,900	390	27	480	680	69	0.54	6.9	
5/20/2010	P		37.00	57.00	31.56	0.00	464.76	9,400	690	<10	300	83	77	0.36	6.8	
11/2/2010	P		37.00	57.00	38.68	0.00	457.64	4,400	420	<10	110	33	70	0.59	6.8	b (GRO)

Table 1. Summary of Groundwater Monitoring Data: Relative Water Elevations and Laboratory Analyses
ARCO Service Station #498, 286 South Livermore Avenue, Livermore, CA

Well ID and Date Monitored	P/NP	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Product Thickness (feet)	Water Level Elevation (feet)	Concentrations in µg/L						DO (mg/L)	pH	Footnote
								GRO/TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE			
MW-3 Cont.																
5/25/2011	P	496.32	37.00	57.00	27.56	0.00	468.76	4,500	560	<10	210	22	74	0.70	9.8	lw (GRO)
10/25/2011	P		37.00	57.00	32.77	0.00	463.55	2,700	190	<4.0	82	51	33	0.69	7.6	
4/10/2012	P		37.00	57.00	38.69	0.00	457.63	3,000	440	<4.0	69	10	46	0.28	6.57	lw (GRO)
MW-4																
12/29/2008	--	496.01	20.00	40.00	--	--	--	--	--	--	--	--	--	--	--	Dry
3/20/2009	P		20.00	40.00	37.82	0.00	458.19	410	0.78	<0.50	<0.50	0.64	16	0.52	7.16	
6/2/2009	--		20.00	40.00	--	--	--	--	--	--	--	--	--	--	--	Dry
9/2/2009	--		20.00	40.00	--	--	--	--	--	--	--	--	--	--	--	Dry
11/9/2009	--		20.00	40.00	--	--	--	--	--	--	--	--	--	--	--	Dry
5/20/2010	P		20.00	40.00	31.29	0.00	464.72	290	<2.0	<2.0	<2.0	<2.0	10	0.82	6.6	
11/2/2010	NP		20.00	40.00	38.42	0.00	457.59	51	<2.0	<2.0	<2.0	<2.0	5.1	1.12	6.4	b (GRO), c
5/25/2011	P		20.00	40.00	27.58	0.00	468.43	94	<1.0	<1.0	<1.0	<1.0	6.2	0.86	6.9	lw (GRO)
10/25/2011	P		20.00	40.00	32.51	0.00	463.50	73	<0.50	<0.50	<0.50	<0.50	4.3	0.49	7.4	lw (GRO)
4/10/2012	--		20.00	40.00	38.47	0.00	457.54	<50	<0.50	<0.50	<0.50	<0.50	0.85	--	7.06	

Symbols & Abbreviations:

-- = Not sampled/analyzed/applicable/measured/ available
< = Not detected at or above specified laboratory reporting limit
DO = Dissolved oxygen
DTW = Depth to water in ft bgs
ft bgs= feet below ground surface
ft MSL= feet above mean sea level
GRO = Gasoline range organics
GWE = Groundwater elevation measured in ft MSL
mg/L = Milligrams per liter
MTBE = Methyl tert-butyl ether
NP = Not purged before sampling
P = Purged before sampling
TOC = Top of casing measured in ft MSL
µg/L = Micrograms per liter

Footnotes:

a = Sample preserved improperly
b = Quantitation of unknown hydrocarbon(s) in sample based on gasoline
c = Hydrocarbon odor
lw = Quantitated against gasoline

Table 2. Summary of Fuel Additives Analytical Data
ARCO Service Station #498, 286 South Livermore Avenue, Livermore, CA

Well ID and Date Monitored	Concentrations in µg/L								Footnote
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
MW-1									
12/29/2008	<300	<10	17	<0.50	<0.50	<0.50	<0.50	<0.50	
3/20/2009	<300	25	21	<0.50	<0.50	<0.50	<0.50	<0.50	
6/2/2009	<300	28	32	<0.50	<0.50	<0.50	<0.50	<0.50	
9/2/2009	<300	17	5.3	<0.50	<0.50	<0.50	<0.50	<0.50	
11/9/2009	<300	47	140	<0.50	<0.50	3.1	<0.50	<0.50	
5/20/2010	<300	75	22	<0.50	<0.50	<0.50	<0.50	<0.50	
11/2/2010	<300	50	39	<0.50	<0.50	<0.50	<0.50	<0.50	
5/25/2011	<300	32	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
10/25/2011	<300	78	21	<0.50	<0.50	0.72	<0.50	<0.50	
4/10/2012	<300	49	5.0	<0.50	<0.50	<0.50	<0.50	<0.50	
MW-2									
12/29/2008	<300	22	16	<0.50	<0.50	<0.50	<0.50	<0.50	
3/20/2009	<600	62	56	<1.0	<1.0	<1.0	<1.0	<1.0	
6/2/2009	<600	83	44	<1.0	<1.0	<1.0	<1.0	<1.0	
9/2/2009	<300	37	12	<0.50	<0.50	<0.50	<0.50	<0.50	
11/9/2009	<300	41	13	<0.50	<0.50	<0.50	<0.50	<0.50	
5/20/2010	<300	22	27	<0.50	<0.50	<0.50	<0.50	<0.50	
11/2/2010	<300	26	57	<0.50	<0.50	<0.50	<0.50	<0.50	
5/25/2011	<300	<10	15	<0.50	<0.50	<0.50	<0.50	<0.50	
10/25/2011	<300	<10	5.7	<0.50	<0.50	<0.50	<0.50	<0.50	
4/10/2012	<300	<10	1.1	<0.50	<0.50	<0.50	<0.50	<0.50	
MW-3									
12/29/2008	<30,000	<1,000	71	<50	<50	<50	<50	<50	
3/20/2009	<7,500	<250	71	<12	<12	<12	<12	<12	
6/2/2009	<3,000	100	66	<5.0	<5.0	<5.0	<5.0	<5.0	
9/2/2009	<7,500	<250	75	<12	<12	<12	<12	<12	
11/9/2009	<3,000	<100	69	<5.0	<5.0	<5.0	<5.0	<5.0	
5/20/2010	<6,000	<200	77	<10	<10	<10	<10	<10	
11/2/2010	<6,000	<200	70	<10	<10	<10	<10	<10	
5/25/2011	<6000	<200	74	<10	<10	<10	<10	<10	

Table 2. Summary of Fuel Additives Analytical Data
ARCO Service Station #498, 286 South Livermore Avenue, Livermore, CA

Well ID and Date Monitored	Concentrations in µg/L								Footnote
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
MW-3 Cont.									
10/25/2011	<2,400	<80	33	<4.0	<4.0	<4.0	<4.0	<4.0	
4/10/2012	<2,400	<80	46	<4.0	<4.0	<4.0	<4.0	<4.0	
MW-4									
3/20/2009	<300	2,000	16	<0.50	<0.50	<0.50	<0.50	<0.50	
5/20/2010	<1,200	1,000	10	<2.0	<2.0	<2.0	<2.0	<2.0	
11/2/2010	<1,200	500	5.1	<2.0	<2.0	<2.0	<2.0	<2.0	
5/25/2011	<600	230	6.2	<1.0	<1.0	<1.0	<1.0	<1.0	
10/25/2011	<300	150	4.3	<0.50	<0.50	<0.50	<0.50	<0.50	
4/10/2012	<300	<10	0.85	<0.50	<0.50	<0.50	<0.50	<0.50	

Symbols & Abbreviations:

--/-- = Not sampled/analyzed/applicable/measured/available
< = Not detected at or above specified laboratory reporting limit
1,2-DCA = 1,2-Dichloroethane
DIPE = Diisopropyl 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

Table 3. Historical Groundwater Gradient - Direction and Magnitude
ARCO Service Station #498, 286 South Livermore Avenue, Livermore, CA

Date Measured	Approximate Gradient Direction	Approximate Gradient Magnitude (ft/ft)
12/29/2008	NA	NA
3/20/2009	North-Northwest	0.02
6/2/2009	NA	NA
9/2/2009	NA	NA
11/9/2009	NA	NA
5/20/2010	West-Northwest	0.02
11/2/2010	West-Northwest	0.02
5/25/2011	West-Northwest	0.02
10/25/2011	West-Northwest	0.02
4/10/2012	West-Northwest	0.01

Symbols & Abbreviations:
 NA = Not Available

APPENDIX A
FIELD METHODS



QUALITY ASSURANCE/QUALITY CONTROL FIELD METHODS

Field methods discussed herein were implemented to provide for accuracy and reliability of field activities, data collection, sample collection, and handling. Discussion of these methods is provided below.

1.0 EQUIPMENT CALIBRATION

Equipment calibration was performed per equipment manufacturer specifications before use.

2.0 DEPTH TO GROUNDWATER AND LIGHT NON-AQUEOUS PHASE LIQUID MEASUREMENT

Depth to groundwater was measured in wells identified for gauging in the scope of work using a decontaminated water level indicator. The depth to water measurement was taken from a cut notch or permanent mark at the top of the well casing to which the well head elevation was originally surveyed.

Once depth to water was measured, an oil/water interface meter or a new disposable bailer was utilized to evaluate the presence and, if present, to measure the “apparent” thickness of light non-aqueous phase liquid (LNAPL) in the well. If LNAPL was present in the well, groundwater purging and sampling were not performed, unless sampling procedures in the scope of work specified collection of samples in the presence of LNAPL. Otherwise, time allowing, LNAPL was bailed from the well using either a new disposable bailer, or the disposal bailer previously used for initial LNAPL assessment. Bailing of LNAPL continued until the thickness of LNAPL (or volume) stabilized in each bailer pulled from the well, or LNAPL was no longer present. After LNAPL thickness either stabilized or was eliminated, periodic depth to water and depth to LNAPL measurements were collected as product came back into the well to evaluate product recovery rate and to aid in further assessment of LNAPL in the subsurface. LNAPL thickness measurements were recorded as “apparent.” If a bailer was used for LNAPL thickness measurement, the field sampler noted the bailer entry diameter and chamber diameter to enable correction of thickness measurements. Recovered LNAPL was stored on-site in a labeled steel drum(s) or other appropriate container(s) prior to disposal.

3.0 WELL PURGING AND GROUNDWATER SAMPLE COLLECTION

Well purging and groundwater sampling were performed in wells specified in the scope of work after measuring depth to groundwater and evaluating the presence of LNAPL. Purging and sampling were performed using one of the methods detailed below. The method used was noted in the field records. Purge water was stored on-site in labeled steel drum(s) or other appropriate container(s) prior to disposal or on-site treatment (in cases where treatment using an on-site system is authorized).

3.1 Purging a Predetermined Well Volume

Purging a predetermined well volume is performed per ASTM International (ASTM) D4448-01. This purging method has the objective of removing a predetermined

volume of stagnant water from the well prior to sampling. The volume of stagnant water is defined as either the volume of water contained within the well casing, or the volume within the well casing and sand/gravel in the annulus if natural flow through these is deemed insufficient to keep them flushed out.

This purging method involves removal of a minimum of three stagnant water volumes from the well using a decontaminated pump with new disposable plastic discharge or suction tubing, dedicated well tubing, or using a new disposable or decontaminated reusable bailer. If a new disposable bailer was used for assessment of LNAPL, that bailer may be used for purging. The withdrawal rate used is one that minimizes drawdown while satisfying time constraints.

To evaluate when purging is complete, one or more groundwater stabilization parameters are monitored and recorded during purging activities until stabilization is achieved. Most commonly, stabilization parameters include temperature, conductivity, and pH, but field procedures detailed in the scope of work may also include monitoring of dissolved oxygen concentrations, oxidation reduction potential, and/or turbidity¹. Parameters are considered stable when two (2) consecutive readings recorded three (3) minutes apart fall within ranges provided below in Table 1. In the event that the parameters have not stabilized and five (5) well casing volumes have been removed, purging activities will cease and be considered complete. Once the well is purged, a groundwater sample(s) is collected from the well using a new disposable bailer. If a new disposable bailer was used for purging, that bailer may be used to collect the sample(s). A sample is not collected if the well is inadvertently purged dry.

Table 1. Criteria for Defining Stabilization of Water-Quality Indicator Parameters

Parameter	Stabilization Criterion
Temperature	± 0.2°C (± 0.36°F)
pH	± 0.1 standard units
Conductivity	± 3%
Dissolved oxygen	± 10%
Oxidation reduction potential	± 10 mV
Turbidity ¹	± 10% or 1.0 NTU (whichever is greater)

3.2 Low-Flow Purging and Sampling

“Low-Flow”, “Minimal Drawdown”, or “Low-Stress” purging is performed per ASTM D6771-02. It is a method of groundwater removal from within a well’s screened interval that is intended to minimize drawdown and mixing of the water column in the well casing. This is accomplished by pumping the well using a decontaminated pump with new disposable plastic discharge or suction tubing or dedicated well tubing at a low flow rate while evaluating the groundwater elevation during pumping.

The low flow pumping rate is well specific and is generally established at a volume that is less than or equal to the natural recovery rate of the well. A pump with adjustable flow rate control is positioned with the intake at or near the mid-point of the

¹ As stated in ASTM D6771-02, turbidity is not a chemical parameter and not indicative of when formation-quality water is being purged; however, turbidity may be helpful in evaluating stress on the formation during purging. Turbidity measurements are taken at the same time that stabilization parameter measurements are made, or, at a minimum, once when purging is initiated and again just prior to sample collection, after stabilization parameters have stabilized. To avoid artifacts in sample analysis, turbidity should be as low as possible when samples are collected. If turbidity values are persistently high, the withdrawal rate is lowered until turbidity decreases. If high turbidity persists even after lowering the withdrawal rate, the purging is stopped for a period of time until turbidity settles, and the purging process is then restarted. If this fails to solve the problem, the purging/sampling process for the well is ceased, and well maintenance or redevelopment is considered.

submerged well screen. The pumping rate used during low-flow purging is low enough to minimize mobilization of particulate matter and drawdown (stress) of the water column. Low-flow purging rates will vary based on the individual well characteristics; however, the purge rate should not exceed 1.0 Liter per minute (L/min) or 0.25 gallon per minute (gal/min). Low-flow purging should begin at a rate of approximately 0.1 L/min (0.03 gal/min)², or the lowest rate possible, and be adjusted based on an evaluation of drawdown. Water level measurements should be recorded at approximate one (1) to two (2) minute intervals until the low-flow rate has been established, and drawdown is minimized. As a general rule, drawdown should not exceed 25% of the distance between the top of the water column and the pump in-take.

To evaluate when purging is complete, one or more groundwater stabilization parameters are monitored and recorded during purging activities until stabilization is achieved. Most commonly, stabilization parameters include temperature, conductivity, and pH, but field procedures detailed in the scope of work may also include monitoring of dissolved oxygen concentrations, oxidation reduction potential, and/or turbidity¹. The frequency between measurements will be at an interval of one (1) to three (3) minutes; however, if a flow cell is used, the frequency will be determined based on the time required to evacuate one cell volume. Stabilization is defined as three (3) consecutive readings recorded several minutes apart falling within ranges provided in Table 1. Samples will be collected by filling appropriate containers from the pump discharge tubing at a rate not to exceed the established pumping rate.

3.3 Minimal Purge, Discrete Depth, and Passive Sampling

In accordance with ASTM D4448-01, sampling techniques that do not rely on purging, or require only minimal purging, may be used if a particular zone within a screened interval is to be sampled or if a well is not capable of yielding sufficient groundwater for purging. To properly use these sampling techniques, a water sample is collected within the screened interval with little or no mixing of the water column within the casing. These techniques include minimal purge sampling which uses a dedicated sampling pump capable of pumping rates of less than 0.1 L/min (0.03 gal/min)², discrete depth sampling using a bailer that allows groundwater entry at a controlled depth (e.g. differential pressure bailer), or passive (diffusion) sampling. These techniques are based on certain studies referenced in ASTM D4448-01 that indicate that under certain conditions, natural groundwater flow is laminar and horizontal with little or no mixing within the well screen.

4.0 DECONTAMINATION

Reusable groundwater sampling equipment were cleaned using a solution of Alconox or other acceptable detergent, rinsed with tap water, and finally rinsed with distilled water prior to use in each well. Decontamination water was stored on-site in labeled steel drum(s) or other appropriate container(s) prior to disposal.

² According to ASTM D4448-01, studies have indicated that at flow rates of 0.1 L/min, low-density polyethylene (LDPE) and plasticized polypropylene tubing materials are prone to sorption. Therefore, TFE-fluorocarbon or other appropriate tubing material is used, particularly when tubing lengths of 50 feet or longer are used.

5.0 SAMPLE CONTAINERS, LABELING, AND STORAGE

Samples were collected in laboratory prepared containers with appropriate preservative (if preservative was required). Samples were labeled (site name, sample I.D., sampler initials, date, and time of collection) and stored chilled (refrigerator or ice chest with ice) until delivery to a certified laboratory, under chain of custody procedures.

6.0 CHAIN OF CUSTODY RECORD AND PROCEDURE

The field sampler was personally responsible for care and custody of the samples collected until they were properly transferred to another party. To document custody and transfer of samples, a Chain of Custody Record was prepared. The Chain of Custody Record provided identification of the samples corresponding to sample labels and specified analyses to be performed by the laboratory. The original Chain of Custody Record accompanied the shipment, and a copy of the record was stored in the project file. When the samples were transferred, the individuals relinquishing and receiving them signed, dated, and noted the time of transfer on the record.

7.0 FIELD RECORDS

Daily Report and data forms were completed by staff personnel to provide daily record of significant events, observations, and measurements. Field records were signed, dated, and stored in the project file.

APPENDIX B

FIELD DATA SHEETS AND NON-HAZARDOUS WASTE DATA FORM



DAILY REPORT

Page 1 of 1

Project: BP 498 Project No.: 08-82-603

Field Representative(s): J. Ramos / K. Martinez Day: Tuesday Date: 4/10/12

Time Onsite: From: 1255 To: 1715 ; From: To: ; From: To:

- Checked items: 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) rain gear

Weather: Rainy

Equipment In Use: Compressor, bladder pump, YSI, Flow cell

Visitors: None

TIME:

WORK DESCRIPTION:

Table with 2 columns: TIME and WORK DESCRIPTION. Rows include: 1255 Arrived onsite and conducted health/safety tailgate; 1355 Set up @ MW-1; 1505 Set up @ MW-3; 1550 Set up @ MW-4; 1615 Set up @ MW-2; 1715 cleaned up/completed monitoring/offsite.

Signature: James R.



GROUNDWATER MONITORING SITE SHEET

Project: BP 498 Project No.: OB-82-603 Date: 4/10/12
 Field Representative: J. Ramos/A. Martinez Elevation: _____
 Formation recharge rate is historically: High Low (*circle one*)
 W. L. Indicator ID #: _____ Oil/Water Interface ID #: _____ (*List #s of all equip used.*)

WELL ID RECORD					WELL GAUGING RECORD					LAB ANALYSES			
Well ID	Well Sampling Order	As-Built Well Diameter (inches)	As-Built Well Screen Interval (ft)	Previous Depth to Water (ft)	Time (24:00)	Depth to LNAPL (ft)	Apparent LNAPL Thickness (ft)*	Depth to Water (ft)	Well Total Depth (ft)				
MW-1					1917			30.35					
MW-2					1621			37.25					
MW-3					1503			38.69					
MW-4					1553			38.47					

* Device used to measure LNAPL thickness: Bailer Oil/Water Interface Meter (*circle one*)
 If bailer used, note bailer dimensions (inches): Entry Diameter _____ Chamber Diameter _____

Signature: James Ram



GROUNDWATER SAMPLING DATA SHEET

Project: BP 498 Project No.: 08-82-603 Date: 4/10/12

Field Representative: J. Ramos/A. Martinez

Well ID: MW-1 Start Time: 1355 End Time: 1450 Total Time (minutes): 55

PURGE EQUIPMENT: [X] Disp. Tubing, [] Disp. Bailer, [] 120V Pump, [X] Flow Cell, [] 12V Pump, [X] Peristaltic Pump, Other/ID#:

WELL HEAD INTEGRITY (cap, lock, vault, etc.) Comments: Good Improvement Needed (circle one)

PURGING/SAMPLING METHOD: Predetermined Well Volume (Low-Flow circled), Other: (circle one). Includes diagrams 'a' and 'b' and calculation tables for Well Volume and Low-Flow parameters.

GROUNDWATER STABILIZATION PARAMETER RECORD table with columns: Time (24:00), Cumulative Volume (gal), Temperature (°C), pH, Conductivity (µS), Other DO, and NOTES. Includes handwritten data for 1430, 1435, 1436, and 1439.

PURGE COMPLETION RECORD: [X] Low Flow & Parameters Stable, [] 3 Casing Volumes & Parameters Stable, [] 5 Casing Volumes. Other:

SAMPLE COLLECTION RECORD and GEOCHEMICAL PARAMETERS. Includes fields for Depth to Water, Sample Collection Time (1444), and parameters like DO (0.20), Ferrous Iron, and Redox Potential (-51).

Signature: [Handwritten Signature]



GROUNDWATER SAMPLING DATA SHEET

Page 2 of 4

Project: BP 498 Project No.: 08-82-603 Date: 4/10/12
 Field Representative: J. Ramos/A. Martinez
 Well ID: MW-2 Start Time: 1615 End Time: 1650 Total Time (minutes): 35

PURGE EQUIPMENT		<input type="checkbox"/> Disp. Bailer	<input type="checkbox"/> 120V Pump	<input checked="" type="checkbox"/> Flow Cell
<input checked="" type="checkbox"/> Disp. Tubing	<input type="checkbox"/> 12V Pump	<input checked="" type="checkbox"/> Peristaltic Pump	Other/ID#:	
WELL HEAD INTEGRITY (cap, lock, vault, etc.)		Comments:		
<input type="checkbox"/> Good	<input type="checkbox"/> Improvement Needed	(circle one)		
PURGING/SAMPLING METHOD		<input checked="" type="checkbox"/> Predetermined Well Volume	<input checked="" type="checkbox"/> Low-Flow	Other: <u>Bladder pump</u> (circle one)
PREDETERMINED WELL VOLUME		LOW-FLOW		
Casing Diameter Unit Volume (gal/ft) (circle one)		Previous Low-Flow Purge Rate: _____ (gpm)		
1" (0.04) 1.25" (0.08) <u>2" (0.17)</u> 3" (0.38) Other: _____		Total Well Depth (a): _____ (ft)		
4" (0.66) 6" (1.50) 8" (2.60) 12" (5.81) _____		Initial Depth to Water (b): _____ (ft)		
Total Well Depth (a): <u>58.00</u> (ft)		Pump In-take Depth = b + (a-b)/2: _____ (ft)		
Initial Depth to Water (b): <u>38.25</u> (ft)		Maximum Allowable Drawdown = (a-b)/8: _____ (ft)		
Water Column Height (WCH) = (a - b): <u>18.75</u> (ft)		Low-Flow Purge Rate: _____ (gpm)*		
Water Column Volume (WCV) = WCH x Unit Volume: <u>3.18</u> (gal)		Comments: _____		
Three Casing Volumes = WCV x 3: _____ (gal)				
Five Casing Volumes = WCV x 5: _____ (gal)				
Pump Depth (if pump used): _____ (ft)				

*Low-flow purge rate should be within range of instruments used but should not exceed 0.25 gpm. Drawdown should not exceed Maximum Allowable Drawdown.

GROUNDWATER STABILIZATION PARAMETER RECORD

Time (24:00)	Cumulative Volume (gal)	Temperature (°C)	pH	Conductivity (µS)	Other DO	NOTES
1638	0.0	18.04	7.00	1200	2.83	JRP Odor, color, sheen, turbidity, or other
1641	0.5	18.67	7.13	1223	1.24	170
1644	1.0	18.87	7.15	1230	1.10	59.3
1647	1.5	19.00	7.13	1230	1.04	46.3
						37.7
						Slight odor

PURGE COMPLETION RECORD Low Flow & Parameters Stable 3 Casing Volumes & Parameters Stable 5 Casing Volumes
 Other: Bladder pump stable parameters

SAMPLE COLLECTION RECORD		GEOCHEMICAL PARAMETERS	
Depth to Water at Sampling: _____ (ft)	Parameter	Time	Measurement
Sample Collected Via: <input type="checkbox"/> Disp. Bailer <input type="checkbox"/> Dedicated Pump Tubing	DO (mg/L)	1647	1.04
<input checked="" type="checkbox"/> Disp. Pump Tubing Other: _____	Ferrous Iron (mg/L)		
Sample ID: <u>MW-2</u> Sample Collection Time: <u>1650</u> (24:00)	Redox Potential (mV)	1647	37.7
Containers (#): <u>6</u> VOA (<input checked="" type="checkbox"/> preserved or <input type="checkbox"/> unpreserved) _____ Liter Amber	Alkalinity (mg/L)		
Other: _____ Other: _____	Other:		
Other: _____ Other: _____	Other:		

Signature:



GROUNDWATER SAMPLING DATA SHEET

Project: BP 499 Project No.: 08-82-603 Date: 4/10/12

Field Representative: J. Ramos/A. Martinez

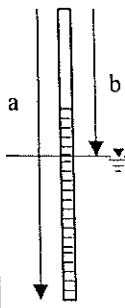
Well ID: MW-3 Start Time: 1500 End Time: 1535 Total Time (minutes): 35

PURGE EQUIPMENT Disp. Bailer 120V Pump Flow Cell
 Disp. Tubing 12V Pump Peristaltic Pump Other/ID#:

WELL HEAD INTEGRITY (cap, lock, vault, etc.) Comments: _____
 Good Improvement Needed (circle one)

PURGING/SAMPLING METHOD Predetermined Well Volume Low-Flow Other: Bladder pump (circle one)

PREDETERMINED WELL VOLUME				LOW-FLOW			
Casing Diameter Unit Volume (gal/ft) (circle one)				Previous Low-Flow Purge Rate: _____ (gpm)			
1" (0.04)	1.25" (0.08)	<u>2" (0.17)</u>	3" (0.38)	Total Well Depth (a): _____ (ft)			
4" (0.66)	6" (1.50)	8" (2.60)	12" (5.81)	Initial Depth to Water (b): _____ (ft)			
Total Well Depth (a): <u>57.08</u> (ft)				Pump In-take Depth = b + (a-b)/2: _____ (ft)			
Initial Depth to Water (b): <u>38.69</u> (ft)				Maximum Allowable Drawdown = (a-b)/8: _____ (ft)			
Water Column Height (WCH) = (a - b): <u>18.31</u> (ft)				Low-Flow Purge Rate: _____ (gpm)*			
Water Column Volume (WCV) = WCH x Unit Volume: <u>3.11</u> (gal)				Comments: _____			
Three Casing Volumes = WCV x 3: _____ (gal)				*Low-flow purge rate should be within range of instruments used but should not exceed 0.25 gpm. Drawdown should not exceed Maximum Allowable Drawdown.			
Five Casing Volumes = WCV x 5: _____ (gal)							
Pump Depth (if pump used): _____ (ft)							



GROUNDWATER STABILIZATION PARAMETER RECORD

Time (24:00)	Cumulative Volume (gal)	Temperature (°C)	pH	Conductivity (µS)	Other DO	NOTES Odor, color, sheen, turbidity, or other
<u>1520</u>	<u>0.0</u>	<u>19.42</u>	<u>6.59</u>	<u>991</u>	<u>1.35</u>	<u>0.28</u> 4.3
<u>1523</u>	<u>0.5</u>	<u>19.51</u>	<u>6.59</u>	<u>1070</u>	<u>0.57</u>	-28.3
<u>1526</u>	<u>1.0</u>	<u>19.55</u>	<u>6.59</u>	<u>1120</u>	<u>0.34</u>	-29.4
<u>1529</u>	<u>1.5</u>	<u>19.55</u>	<u>6.57</u>	<u>1138</u>	<u>0.28</u>	-31.6

Previous Stabilized Parameters _____

PURGE COMPLETION RECORD Low Flow & Parameters Stable 3 Casing Volumes & Parameters Stable 5 Casing Volumes

Other: Bladder & stable parameters

SAMPLE COLLECTION RECORD

GEOCHEMICAL PARAMETERS

Depth to Water at Sampling: _____ (ft)	Parameter	Time	Measurement
Sample Collected Via: <input type="checkbox"/> Disp. Bailer <input type="checkbox"/> Dedicated Pump Tubing	DO (mg/L)	<u>1529</u>	<u>0.28</u>
<input checked="" type="checkbox"/> Disp. Pump Tubing Other:	Ferrous Iron (mg/L)		
Sample ID: <u>MW-3</u> Sample Collection Time: <u>1533</u> (24:00)	Redox Potential (mV)	<u>1529</u>	<u>-31.0</u>
Containers (#): <u>6</u> VOA (<input checked="" type="checkbox"/> preserved or <input type="checkbox"/> unpreserved) <input type="checkbox"/> Liter Amber	Alkalinity (mg/L)		
Other: _____ Other: _____	Other:		
Other: _____ Other: _____	Other:		

Signature: _____



GROUNDWATER SAMPLING DATA SHEET

Page 4 of 4

Project: BP 498 Project No.: 08-82-603 Date: 4/10/12
 Field Representative: J. Ramos/A. Martinez
 Well ID: MW-4 Start Time: 1550 End Time: 1605 Total Time (minutes): 15

PURGE EQUIPMENT Disp. Bailer 120V Pump Flow Cell
 Disp. Tubing 12V Pump Peristaltic Pump Other/ID#:

WELL HEAD INTEGRITY (cap, lock, vault, etc.) Comments:
 Good Improvement Needed (circle one)

PURGING/SAMPLING METHOD Predetermined Well Volume Low-Flow Other: (circle one)

PREDETERMINED WELL VOLUME						LOW-FLOW				
Casing Diameter Unit Volume (gal/ft) (circle one)							Previous Low-Flow Purge Rate: _____ (gpm)			
1" (0.04)	1.25" (0.08)	2" (0.17)	3" (0.38)	Other:		Total Well Depth (a): _____ (ft)				
4" (0.66)	6" (1.50)	8" (2.60)	12" (5.81)	" ()		Initial Depth to Water (b): _____ (ft)				
Total Well Depth (a): _____ (ft)						Pump In-take Depth = b + (a-b)/2: _____ (ft)				
Initial Depth to Water (b): _____ (ft)						Maximum Allowable Drawdown = (a-b)/8: _____ (ft)				
Water Column Height (WCH) = (a - b): _____ (ft)						Low-Flow Purge Rate: _____ (gpm)*				
Water Column Volume (WCV) = WCH x Unit Volume: _____ (gal)						Comments: _____				
Three Casing Volumes = WCV x 3: _____ (gal)						*Low-flow purge rate should be within range of instruments used but should not exceed 0.25 gpm. Drawdown should not exceed Maximum Allowable Drawdown.				
Five Casing Volumes = WCV x 5: _____ (gal)										
Pump Depth (if pump used): _____ (ft)										

GROUNDWATER STABILIZATION PARAMETER RECORD						
Time (24:00)	Cumulative Volume (gal)	Temperature (°C)	pH	Conductivity (µS)	Other	NOTES
1600	-	17.7	7.06	1386	ORP 222	Odor, color, sheen, turbidity, or other
						*Only one parameter was measured due to a small water column (1.5 ft). Used a bailer and collected a grab sample.
						DTW = 35.47
						Total depth = 40.00
Previous Stabilized Parameters						

PURGE COMPLETION RECORD Low Flow & Parameters Stable 3 Casing Volumes & Parameters Stable 5 Casing Volumes
 Other: None

SAMPLE COLLECTION RECORD		GEOCHEMICAL PARAMETERS		
Depth to Water at Sampling: _____ (ft)		Parameter	Time	Measurement
Sample Collected Via: <input checked="" type="checkbox"/> Disp. Bailer <input type="checkbox"/> Dedicated Pump Tubing		DO (mg/L)	1600	-
<input type="checkbox"/> Disp. Pump Tubing Other:		Ferrous Iron (mg/L)		
Sample ID: <u>MW-4</u> Sample Collection Time: <u>1600</u> (24:00)		Redox Potential (mV)	1600	222
Containers (#): <u>6</u> VOA (<input checked="" type="checkbox"/> preserved or <input type="checkbox"/> unpreserved) <input type="checkbox"/> Liter Amber		Alkalinity (mg/L)		
Other: _____ Other: _____		Other:		
Other: _____ Other: _____		Other:		

Signature:

NO. 689954

NON-HAZARDOUS WASTE DATA FORM

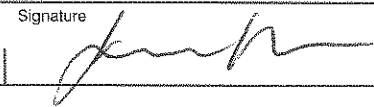
BESI # _____

GENERATOR	Generator's Name and Mailing Address BP WEST COAST PRODUCTS, LLC P.O. BOX 80249 RANCHO SANTA MARGARITA, CA 92688		Generator's Site Address (if different than mailing address) BP 498 286 South Livermore Ave. Livermore, CA	
	Generator's Phone: 949-460-5200			
	Container type removed from site: <input type="checkbox"/> Drums <input type="checkbox"/> Vacuum Truck <input type="checkbox"/> Roll-off Truck <input type="checkbox"/> Dump Truck <input type="checkbox"/> Other _____		Container type transported to receiving facility: <input type="checkbox"/> Drums <input type="checkbox"/> Vacuum Truck <input type="checkbox"/> Roll-off Truck <input type="checkbox"/> Dump Truck <input type="checkbox"/> Other _____	
	Quantity <u>4.5 gallons</u>		Quantity _____ Volume _____	
	WASTE DESCRIPTION <u>NON-HAZARDOUS WATER</u>		GENERATING PROCESS <u>WELL PURGING / DECON WATER</u>	


COMPONENTS OF WASTE	PPM	%	COMPONENTS OF WASTE	PPM	%
1. WATER		99-100%	3. _____		
2. TPH.		<1%	4. _____		

Waste Profile _____ PROPERTIES: pH 7-10 SOLID LIQUID SLUDGE SLURRY OTHER _____

HANDLING INSTRUCTIONS: WEAR ALL APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT.

Generator Printed/Typed Name <u>James Ramos</u>	Signature 	Month Day Year <u>5</u> <u>7</u> <u>12</u>
--	---	---

The Generator certifies that the waste as described is 100% non-hazardous

TRANSPORTER	Transporter 1 Company Name BROADBENT & ASSOCIATES, INC>		Phone# 530-566-1400	
	Transporter 1 Printed/Typed Name <u>Alex Martinez</u>		Signature 	
	Month Day Year <u>5</u> <u>7</u> <u>12</u>			
	Transporter 2 Company Name		Phone#	
	Transporter 2 Printed/Typed Name		Signature	

RECEIVING FACILITY	Designated Facility Name and Site Address INSTRAT, INC. 1105 AIRPORT RD. RIO VISTA, CA 94571		Phone# 530-753-1829	
	Printed/Typed Name		Signature	
	Month Day Year			

Designated Facility Owner or Operator: Certification of receipt of materials covered by this data form.

APPENDIX C

**LABORATORY REPORT
AND CHAIN-OF-CUSTODY DOCUMENTATION**



CALSCIENCE

WORK ORDER NUMBER: 12-04-0857

The difference is service



AIR | SOIL | WATER | MARINE CHEMISTRY

Analytical Report For

Client: Broadbent & Associates, Inc.

Client Project Name: BP 498

Attention: Jason Duda
1324 Mangrove Ave, Ste 212
Chico, CA 95926-2642

Approved for release on 04/25/2012 by:
Richard Villafania
Project Manager

ResultLink ▶

Email your PM ▶



Calscience Environmental Laboratories, Inc. (Calscience) certifies that the test results provided in this report meet all NELAC requirements for parameters for which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The original report of subcontracted analyses, if any, is attached to this report. The results in this report are limited to the sample(s) tested and any reproduction thereof must be made in its entirety. The client or recipient of this report is specifically prohibited from making material changes to said report and, to the extent that such changes are made, Calscience is not responsible, legally or otherwise. The client or recipient agrees to indemnify Calscience for any litigation which may arise.





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Client Project Name: BP 498
Work Order Number: 12-04-0857

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Analytical Report



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

Date Received: 04/13/12
Work Order No: 12-04-0857
Preparation: EPA 5030C
Method: EPA 8015B (M)

Project: BP 498

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	12-04-0857-1-E	04/10/12 14:44	Aqueous	GC 42	04/14/12	04/14/12 23:40	120414B01

Comment(s): -LW Quantitated against Gasoline.

Parameter	Result	RL	DF	Qual	Units
Gasoline Range Organics (C6-C12)	1300	50	1		ug/L

Surrogates:	REC (%)	Control Limits	Qual
1,4-Bromofluorobenzene	96	38-134	

MW-2	12-04-0857-2-E	04/10/12 16:51	Aqueous	GC 42	04/14/12	04/15/12 00:16	120414B01
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Parameter	Result	RL	DF	Qual	Units
Gasoline Range Organics (C6-C12)	ND	50	1		ug/L

Surrogates:	REC (%)	Control Limits	Qual
1,4-Bromofluorobenzene	82	38-134	

MW-3	12-04-0857-3-E	04/10/12 15:33	Aqueous	GC 42	04/14/12	04/15/12 00:52	120414B01
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Comment(s): -LW Quantitated against Gasoline.

Parameter	Result	RL	DF	Qual	Units
Gasoline Range Organics (C6-C12)	3000	100	2		ug/L

Surrogates:	REC (%)	Control Limits	Qual
1,4-Bromofluorobenzene	96	38-134	

MW-4	12-04-0857-4-E	04/10/12 16:00	Aqueous	GC 42	04/14/12	04/15/12 01:28	120414B01
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Parameter	Result	RL	DF	Qual	Units
Gasoline Range Organics (C6-C12)	ND	50	1		ug/L

Surrogates:	REC (%)	Control Limits	Qual
1,4-Bromofluorobenzene	81	38-134	

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

Return to Contents

Analytical Report



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

Date Received: 04/13/12
Work Order No: 12-04-0857
Preparation: EPA 5030C
Method: EPA 8015B (M)

Project: BP 498

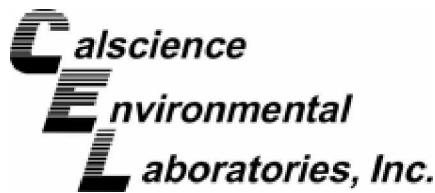
Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	099-12-695-1,308	N/A	Aqueous	GC 42	04/14/12	04/14/12 10:27	120414B01

<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	82	38-134			

Return to Contents

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



Analytical Report



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

Date Received: 04/13/12
Work Order No: 12-04-0857
Preparation: EPA 5030C
Method: EPA 8260B
Units: ug/L

Project: BP 498

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	12-04-0857-1-A	04/10/12 14:44	Aqueous	GC/MS T	04/19/12	04/19/12 22:44	120419L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	13	0.50	1		Methyl-t-Butyl Ether (MTBE)	5.0	0.50	1	
1,2-Dibromoethane	ND	0.50	1		Tert-Butyl Alcohol (TBA)	49	10	1	
1,2-Dichloroethane	ND	0.50	1		Diisopropyl Ether (DIPE)	ND	0.50	1	
Ethylbenzene	7.0	0.50	1		Ethyl-t-Butyl Ether (ETBE)	ND	0.50	1	
Toluene	2.0	0.50	1		Tert-Amyl-Methyl Ether (TAME)	ND	0.50	1	
Xylenes (total)	7.1	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>	
1,4-Bromofluorobenzene	103	68-120			Dibromofluoromethane	107	80-127		
1,2-Dichloroethane-d4	114	80-128			Toluene-d8	104	80-120		

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
MW-2	12-04-0857-2-A	04/10/12 16:51	Aqueous	GC/MS T	04/19/12	04/19/12 20:51	120419L01

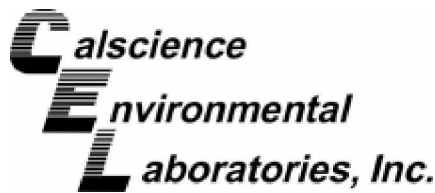
Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	ND	0.50	1		Methyl-t-Butyl Ether (MTBE)	1.1	0.50	1	
1,2-Dibromoethane	ND	0.50	1		Tert-Butyl Alcohol (TBA)	ND	10	1	
1,2-Dichloroethane	ND	0.50	1		Diisopropyl Ether (DIPE)	ND	0.50	1	
Ethylbenzene	ND	0.50	1		Ethyl-t-Butyl Ether (ETBE)	ND	0.50	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>	
1,4-Bromofluorobenzene	90	68-120			Dibromofluoromethane	95	80-127		
1,2-Dichloroethane-d4	112	80-128			Toluene-d8	86	80-120		

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
MW-3	12-04-0857-3-A	04/10/12 15:33	Aqueous	GC/MS T	04/19/12	04/19/12 23:12	120419L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	440	10	20		Methyl-t-Butyl Ether (MTBE)	46	4.0	8	
1,2-Dibromoethane	ND	4.0	8		Tert-Butyl Alcohol (TBA)	ND	80	8	
1,2-Dichloroethane	ND	4.0	8		Diisopropyl Ether (DIPE)	ND	4.0	8	
Ethylbenzene	69	4.0	8		Ethyl-t-Butyl Ether (ETBE)	ND	4.0	8	
Toluene	ND	4.0	8		Tert-Amyl-Methyl Ether (TAME)	ND	4.0	8	
Xylenes (total)	10	4.0	8		Ethanol	ND	2400	8	
<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>	
1,4-Bromofluorobenzene	100	68-120			Dibromofluoromethane	99	80-127		
1,2-Dichloroethane-d4	109	80-128			Toluene-d8	90	80-120		

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

Return to Contents



Analytical Report



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

Date Received: 04/13/12
Work Order No: 12-04-0857
Preparation: EPA 5030C
Method: EPA 8260B
Units: ug/L

Project: BP 498

Page 2 of 2

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
MW-4	12-04-0857-4-A	04/10/12 16:00	Aqueous	GC/MS T	04/19/12	04/19/12 23:40	120419L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	ND	0.50	1		Methyl-t-Butyl Ether (MTBE)	0.85	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>	
1,4-Bromofluorobenzene	97	68-120			Dibromofluoromethane	102	80-127		
1,2-Dichloroethane-d4	103	80-128			Toluene-d8	93	80-120		

Method Blank	099-12-703-2,098	N/A	Aqueous	GC/MS T	04/19/12	04/19/12 19:54	120419L01
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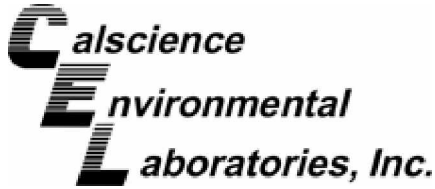
Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	ND	0.50	1		Methyl-t-Butyl Ether (MTBE)	ND	0.50	1	
1,2-Dibromoethane	ND	0.50	1		Tert-Butyl Alcohol (TBA)	ND	10	1	
1,2-Dichloroethane	ND	0.50	1		Diisopropyl Ether (DIPE)	ND	0.50	1	
Ethylbenzene	ND	0.50	1		Ethyl-t-Butyl Ether (ETBE)	ND	0.50	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>	
1,4-Bromofluorobenzene	93	68-120			Dibromofluoromethane	100	80-127		
1,2-Dichloroethane-d4	105	80-128			Toluene-d8	95	80-120		

Method Blank	099-12-703-2,100	N/A	Aqueous	GC/MS T	04/20/12	04/20/12 15:37	120420L01
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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>	
1,4-Bromofluorobenzene	91	68-120			Dibromofluoromethane	100	80-127		
1,2-Dichloroethane-d4	107	80-128			Toluene-d8	95	80-120		

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

Return to Contents



Quality Control - Spike/Spike Duplicate



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

Date Received: 04/13/12
 Work Order No: 12-04-0857
 Preparation: EPA 5030C
 Method: EPA 8015B (M)

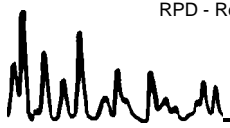
Project BP 498

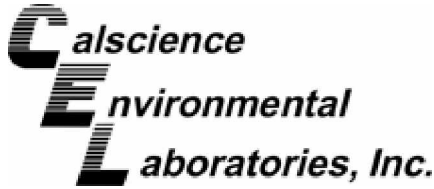
Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
12-04-0654-1	Aqueous	GC 42	04/14/12	04/14/12	120414S01

Parameter	SPIKE ADDED	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Gasoline Range Organics (C6-C12)	2000	86	101	38-134	15	0-25	

Return to Contents

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: 04/13/12
 Work Order No: 12-04-0857
 Preparation: EPA 5030C
 Method: EPA 8260B

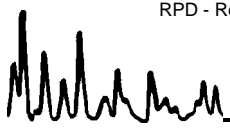
Project BP 498

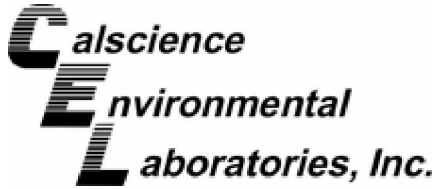
Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
MW-2	Aqueous	GC/MS T	04/19/12	04/19/12	120419S01

Parameter	SPIKE ADDED	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	10.00	107	103	76-124	3	0-20	
Carbon Tetrachloride	10.00	113	109	74-134	4	0-20	
Chlorobenzene	10.00	100	97	80-120	3	0-20	
1,2-Dibromoethane	10.00	103	98	80-120	5	0-20	
1,2-Dichlorobenzene	10.00	95	91	80-120	5	0-20	
1,2-Dichloroethane	10.00	101	99	80-120	2	0-20	
Ethylbenzene	10.00	108	105	78-126	4	0-20	
Toluene	10.00	106	93	80-120	13	0-20	
Trichloroethene	10.00	112	104	77-120	7	0-20	
Methyl-t-Butyl Ether (MTBE)	10.00	113	110	67-121	2	0-49	
Tert-Butyl Alcohol (TBA)	50.00	462	312	36-162	39	0-30	LM,BA,AY
Diisopropyl Ether (DIPE)	10.00	114	109	60-138	5	0-45	
Ethyl-t-Butyl Ether (ETBE)	10.00	118	115	69-123	3	0-30	
Tert-Amyl-Methyl Ether (TAME)	10.00	105	105	65-120	0	0-20	
Ethanol	100.0	99	97	30-180	2	0-72	

Return to Contents

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: 04/13/12
 Work Order No: 12-04-0857
 Preparation: EPA 5030C
 Method: EPA 8260B

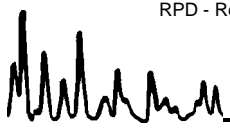
Project BP 498

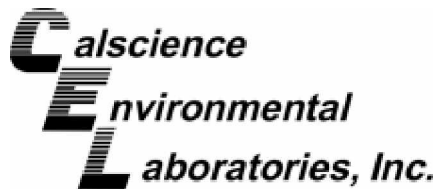
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12-04-1095-6	Aqueous	GC/MS T	04/20/12	04/20/12	120420S01

Parameter	SPIKE ADDED	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	10.00	98	108	76-124	10	0-20	
Carbon Tetrachloride	10.00	103	109	74-134	5	0-20	
Chlorobenzene	10.00	94	99	80-120	5	0-20	
1,2-Dibromoethane	10.00	98	105	80-120	7	0-20	
1,2-Dichlorobenzene	10.00	92	101	80-120	9	0-20	
1,2-Dichloroethane	10.00	90	99	80-120	9	0-20	
Ethylbenzene	10.00	101	111	78-126	9	0-20	
Toluene	10.00	99	111	80-120	11	0-20	
Trichloroethene	10.00	102	105	77-120	3	0-20	
Methyl-t-Butyl Ether (MTBE)	10.00	107	111	67-121	4	0-49	
Tert-Butyl Alcohol (TBA)	50.00	326	123	36-162	90	0-30	LM,BA,AY
Diisopropyl Ether (DIPE)	10.00	106	110	60-138	3	0-45	
Ethyl-t-Butyl Ether (ETBE)	10.00	113	118	69-123	4	0-30	
Tert-Amyl-Methyl Ether (TAME)	10.00	94	103	65-120	9	0-20	
Ethanol	100.0	113	112	30-180	1	0-72	

Return to Contents

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: 12-04-0857
 Preparation: EPA 5030C
 Method: EPA 8015B (M)

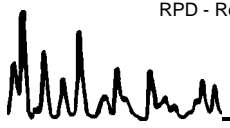
Project: BP 498

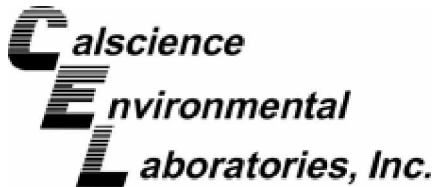
Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-695-1,308	Aqueous	GC 42	04/14/12	04/14/12	120414B01

Parameter	SPIKE ADDED	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Gasoline Range Organics (C6-C12)	2000	100	107	78-120	7	0-20	

Return to Contents

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: 12-04-0857
 Preparation: EPA 5030C
 Method: EPA 8260B

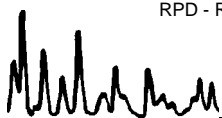
Project: BP 498

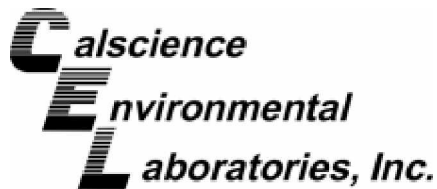
Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number			
099-12-703-2,098	Aqueous	GC/MS T	04/19/12	04/19/12	120419L01			
Parameter	SPIKE ADDED	LCS %REC	LCSD %REC	%REC CL	ME CL	RPD	RPD CL	Qualifiers
Benzene	10.00	102	86	80-120	73-127	17	0-20	
Carbon Tetrachloride	10.00	99	99	74-134	64-144	0	0-20	
Chlorobenzene	10.00	92	84	80-120	73-127	10	0-20	
1,2-Dibromoethane	10.00	97	88	79-121	72-128	10	0-20	
1,2-Dichlorobenzene	10.00	92	88	80-120	73-127	5	0-20	
1,2-Dichloroethane	10.00	102	84	80-120	73-127	19	0-20	
Ethylbenzene	10.00	100	91	80-120	73-127	9	0-20	
Toluene	10.00	104	84	80-120	73-127	21	0-20	RB
Trichloroethene	10.00	100	91	79-127	71-135	9	0-20	
Methyl-t-Butyl Ether (MTBE)	10.00	96	93	69-123	60-132	3	0-20	
Tert-Butyl Alcohol (TBA)	50.00	109	103	63-123	53-133	6	0-20	
Diisopropyl Ether (DIPE)	10.00	97	94	59-137	46-150	3	0-37	
Ethyl-t-Butyl Ether (ETBE)	10.00	99	96	69-123	60-132	3	0-20	
Tert-Amyl-Methyl Ether (TAME)	10.00	100	85	70-120	62-128	16	0-20	
Ethanol	100.0	104	106	28-160	6-182	2	0-57	

Total number of LCS compounds : 15
 Total number of ME compounds : 0
 Total number of ME compounds allowed : 1
 LCS ME CL validation result : Pass

Return to Contents

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: 12-04-0857
 Preparation: EPA 5030C
 Method: EPA 8260B

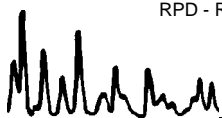
Project: BP 498

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number			
099-12-703-2,100	Aqueous	GC/MS T	04/20/12	04/20/12	120420L01			
Parameter	SPIKE ADDED	LCS %REC	LCSD %REC	%REC CL	ME CL	RPD	RPD CL	Qualifiers
Benzene	10.00	98	95	80-120	73-127	3	0-20	
Carbon Tetrachloride	10.00	107	103	74-134	64-144	4	0-20	
Chlorobenzene	10.00	97	94	80-120	73-127	3	0-20	
1,2-Dibromoethane	10.00	96	97	79-121	72-128	1	0-20	
1,2-Dichlorobenzene	10.00	90	92	80-120	73-127	2	0-20	
1,2-Dichloroethane	10.00	97	92	80-120	73-127	6	0-20	
Ethylbenzene	10.00	102	101	80-120	73-127	1	0-20	
Toluene	10.00	104	96	80-120	73-127	9	0-20	
Trichloroethene	10.00	104	99	79-127	71-135	5	0-20	
Methyl-t-Butyl Ether (MTBE)	10.00	107	102	69-123	60-132	4	0-20	
Tert-Butyl Alcohol (TBA)	50.00	104	102	63-123	53-133	2	0-20	
Diisopropyl Ether (DIPE)	10.00	109	103	59-137	46-150	5	0-37	
Ethyl-t-Butyl Ether (ETBE)	10.00	112	110	69-123	60-132	2	0-20	
Tert-Amyl-Methyl Ether (TAME)	10.00	99	94	70-120	62-128	4	0-20	
Ethanol	100.0	97	105	28-160	6-182	8	0-57	

Total number of LCS compounds : 15
 Total number of ME compounds : 0
 Total number of ME compounds allowed : 1
 LCS ME CL validation result : Pass

Return to Contents

RPD - Relative Percent Difference , CL - Control Limit



Work Order Number: 12-04-0857

<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.
ET	Sample was extracted past end of recommended maximum 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 abovelimit; 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.
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.
ME	LCS/LCSD Recovery Percentage is within Marginal Exceedance (ME) Control Limit range.
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.



Qualifier

Definition

Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture. All QC results are reported on a wet weight basis.
MPN - Most Probable Number


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Laboratory Management Program LaMP Chain of Custody Record

BP/ARC Project Name: BP 498
 BP/ARC Facility No: 498

Req Due Date (mm/dd/yy): 12-04-0857
 Rush TAT: Yes No x
 Lab Work Order Number: 12-04-0857

Lab Name: Cal Science	BP/ARC Facility Address: 286 South Livermore Ave.	Consultant/Contractor: Broadbent
Lab Address: 7440 Lincoln Way	City, State, ZIP Code: Livermore, CA 94550	Consultant/Contractor Project No: 08-82-603
Lab PM: Richard Villafania	Lead Regulatory Agency: ACEH	Address: 1324 Mangrove Ave., Ste. 212, Chico, CA 95926
Lab Phone: 714-895-5494 / 714-894-7501 (fax)	California Global ID No.: T0600124081	Consultant/Contractor PM: Jason Duda
Lab Shipping Acct: 9255	Enfos Proposal No: 0056X-0002 WR 245438	Phone: 530-566-1400 / 530-566-1401 (fax)
Lab Bottle Order No:	Accounting Mode: Provision <u>X</u> OOC-BU <u> </u> OOC-RM <u> </u>	Email EDD To: <u>jduda@broadbentinc.com</u>
Other Info:	Stage: Execute (4) Activity: GWM (401)	Invoice To: BP/ARC <u> x </u> Contractor <u> </u>

BP/ARC EBM: Shannon Couch				Matrix			No. Containers / Preservative						Requested Analyses						Report Type & QC Level		
EBM Phone: 925-275-3804				Soil / Solid	Water / Liquid	Air / Vapor	Total Number of Containers	Unpreserved	H ₂ SO ₄	HNO ₃	HCl	Methanol	GRO (8015M)	BTEX (8260B)	5-Oxys (8260B)	EDB (8260B)	Ethanol (8260B)	1,2-DCA (8260B)	Standard <u> X </u>		
EBM Email: <u>shannon.couch@bp.com</u>																			Full Data Package <u> </u>		
Lab No.	Sample Description	Date	Time																	Comments	
1	MW-1	4/10/12	1444		x		6				x	x	x	x	x	x					
2	MW-2	↓	1651		x		6			x		x	x	x	x	x					
3	MW-3		1533		x		6			x		x	x	x	x	x					
4	MW-4		1600		x		6			x		x	x	x	x	x					Grab Sample
5	TB-498-04102012		---		x		1			x											ON HOLD

Sampler's Name: <u>Alex Martinez</u>	Relinquished By / Affiliation		Date	Time	Accepted By / Affiliation		Date	Time
Sampler's Company: <u>Broadbent</u>	<u>Alex Martinez / Broadbent</u>		<u>4/12/12</u>	<u>1230</u>	<u>[Signature]</u>		<u>4/13/12</u>	<u>1030</u>
Shipment Method: <u>GSO</u> Ship Date: <u>4/12/12</u>								
Shipment Tracking No: <u>107327994</u>								

Special Instructions: Please cc results to bpedf@broadbentinc.com

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

0857

1	DATE	4/12/12	SHIPPERS GSO ACCOUNT NO.	9255
	COMPANY	Broadbent & Associates		
	ADDRESS	875 Cotting Ln.		
	ADDRESS	STE/ROOM	6	
	CITY	ZIP CODE	95688	
	SENDER'S NAME	PHONE NUMBER	707-455-7290	
2	COMPANY	Calscience		
	NAME	PHONE NUMBER		
	ADDRESS	7490 Lincoln Way		
	ADDRESS	STE/ROOM		
	CITY	ZIP CODE	92841	



1-800-322-5555

www.gso.com

SHIPPING AIR BILL

4 PACKAGE INFORMATION

LETTER (MAX 8 OZ)

PACKAGE (WT) ~ 7 lbs

DECLARED VALUE \$ _____

COD AMOUNT \$ _____ (CASH NOT ACCEPTED)

GSO COPY

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 #

107327994



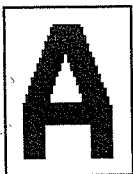
9 GSO TRACKING NUMBER

107327994

JRC



PDS



DEN GROVE

2841

8 lb

1/ZOX

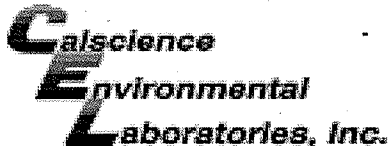
D92841A



1204122049

CSL-06

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WORK ORDER #: 12-04-0857

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: Broadbent

DATE: 04/13/12

TEMPERATURE: Thermometer ID: SC2 (Criteria: 0.0°C – 6.0°C, not frozen)

Temperature 3.1 °C - 0.3°C (CF) = 2.8 °C 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 Initial: [Signature]

CUSTODY SEALS INTACT:

Cooler _____ No (Not Intact) Not Present N/A Initial: [Signature]

Sample _____ No (Not Intact) Not Present Initial: [Signature]

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC document(s) received complete.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
<input type="checkbox"/> No analysis requested. <input type="checkbox"/> Not relinquished. <input type="checkbox"/> No date/time relinquished.			
Sampler's name indicated on COC.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container label(s) consistent with COC.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container(s) intact and good condition.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper containers and sufficient volume for analyses requested.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Analyses received within holding time.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
pH / Res. Chlorine / Diss. Sulfide / Diss. Oxygen received within 24 hours...	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Proper preservation noted on COC or sample container.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tedlar bag(s) free of condensation.....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

CONTAINER TYPE:

Solid: 4ozCGJ 8ozCGJ 16ozCGJ Sleeve (____) EnCores® TerraCores® _____

Water: VOA VOA_h VOAn₂ 125AGB 125AGB_h 125AGB_p 1AGB 1AGBna₂ 1AGBs

500AGB 500AGJ 500AGJs 250AGB 250CGB 250CGBs 1PB 1PBna 500PB

250PB 250PBn 125PB 125PBz_{na} 100PJ 100PJna₂ _____ _____ _____

Air: Tedlar® Summa® Other: _____ Trip Blank Lot#: 120329A Labeled/Checked by: [Signature]

Container: C: Clear A: Amber P: Plastic G: Glass J: Jar B: Bottle Z: Ziploc/Resealable Bag E: Envelope Reviewed by: [Signature]

Preservative: h: HCL n: HNO₃ na₂: Na₂S₂O₃ na: NaOH p: H₃PO₄ s: H₂SO₄ u: Ultra-pure z_{na}: ZnAc₂+NaOH f: Filtered Scanned by: [Signature]

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APPENDIX D

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>	2Q12 GEO_WELL 498
<u>Facility Global ID:</u>	T0600124081
<u>Facility Name:</u>	ARCO #0498
<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>	5/3/2012 12:15:11 PM
<u>Confirmation Number:</u>	9617970287

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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!**

<u>Submittal Type:</u>	EDF - Monitoring Report - Semi-Annually
<u>Submittal Title:</u>	2Q12 GW Monitoring
<u>Facility Global ID:</u>	T0600124081
<u>Facility Name:</u>	ARCO #0498
<u>File Name:</u>	12040857.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>	5/3/2012 12:05:18 PM
<u>Confirmation Number:</u>	7975102245

[VIEW QC REPORT](#)

[VIEW DETECTIONS REPORT](#)

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