



Atlantic Richfield Company  
(a BP affiliated company)

P.O. Box 1257  
San Ramon, CA 94583  
Phone: (925) 275-3801  
Fax: (925) 275-3815

April 27, 2009

Re: First Quarter, 2009 Ground-Water Monitoring Report  
Atlantic Richfield Company Station #498  
286 South Livermore Avenue  
Livermore, CA  
ACWD Case No. RO0002873

**RECEIVED**

11:04 am, May 01, 2009

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:

Paul Supple  
Environmental Business Manager

**First Quarter, 2009 Ground-Water Monitoring Report**

Atlantic Richfield Company Station #498

286 Livermore Avenue

Livermore, California

Prepared for

Mr. Paul Supple

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*

April, 2009

Project No. 08-82-603

April 27, 2009

Project No. 08-82-603

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

Attn.: Mr. Paul Supple

Re: First Quarter, 2009 Ground-Water Monitoring Report, Atlantic Richfield Company (a BP affiliated company) Station #498, 286 South Livermore Avenue, Livermore, California. ACWD Case No. RO0002873.

Dear Mr. Supple:

Provided herein is the *First Quarter, 2009 Ground-Water Monitoring Report* for Atlantic Richfield Company Station #498 (herein referred to as Station #498) located at 286 South Livermore Avenue, Livermore, California (Property). This report presents a summary of First Quarter, 2009 ground-water monitoring results.


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

Sincerely,

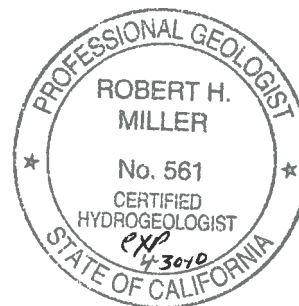
BROADBENT & ASSOCIATES, INC.



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



Robert H. Miller, P.G., C.HG.  
Principal Hydrogeologist



Enclosures

cc: Mr. Paresh Khatri, Alameda County Environmental Health, 1131 Harbor Bay Parkway, Suite 250, Alameda, CA 84502 (Submitted via ACEH ftp Site)  
GeoTracker

## STATION #498 QUARTERLY GROUND-WATER MONITORING REPORT

Facility: #498	Address: 286 South Livermore Avenue, Livermore, CA
Station #498 Environmental Business Manager:	Mr. Paul Supple
Consulting Co./Contact Persons:	Broadbent & Associates, Inc. (BAI) / Rob Miller & Matt Herrick
Primary Agency/Regulatory ID No.:	Alameda County Environmental Health (ACEH)/ ACEH Case No. RO0002873
Consultant Project No.:	08-82-603
Facility Permits/Permitting Agency.:	NA

### WORK PERFORMED THIS QUARTER (First Quarter, 2009):

1. Submitted Soil and Ground-Water Investigation and Fourth Quarter, 2008 Quarterly Monitoring Report. Report completed by BAI.
2. Conducted ground-water monitoring/sampling for First Quarter, 2009. Work performed by Stratus Environmental, Inc. (Stratus).

### WORK PROPOSED FOR NEXT QUARTER (Second Quarter, 2009):

1. Submit First Quarter, 2009 Ground-Water Monitoring Report (contained herein).
2. Conduct ground-water monitoring/sampling for Second Quarter, 2009.

### QUARTERLY RESULTS SUMMARY:

Current phase of project:	<b>Ground-water monitoring/sampling/Assessment</b>
Frequency of ground-water sampling:	<b>Wells MW-1, MW-2, MW-3, and MW-4: Quarterly</b>
Frequency of ground-water monitoring:	<b>Quarterly</b>
Is free product (FP) present on-site:	<b>No</b>
Current remediation techniques:	<b>NA</b>
Depth to ground water (below TOC):	<b>28.95 (MW-1) to 38.78 (MW-2) feet</b>
General ground-water flow direction:	<b>North-Northwest</b>
Approximate hydraulic gradient:	<b>0.02 feet per foot</b>

### DISCUSSION:

Gasoline range organics (GRO) were detected in all four wells sampled during First Quarter, 2009 (MW-1, MW-2, MW-3, and MW-4) with concentrations ranging from 200 micrograms per liter ( $\mu\text{g/L}$ ) in MW-2 to 11,000  $\mu\text{g/L}$  in MW-3. Benzene was detected in wells MW-1, MW-2, MW-3, and MW-4 at concentrations ranging from 0.78  $\mu\text{g/L}$  in well MW-4 to 360  $\mu\text{g/L}$  in well MW-3. Toluene was detected in MW-3 at a concentration of 84  $\mu\text{g/L}$ . Ethylbenzene was detected in wells MW-1 and MW-3 at concentrations of 4.1  $\mu\text{g/L}$  and 600  $\mu\text{g/L}$ , respectively. Xylenes (total) were detected in MW-3 and MW-4 at concentrations of 1,500  $\mu\text{g/L}$  and 0.64  $\mu\text{g/L}$ , respectively. Methyl tert-butyl ether was detected in wells MW-1, MW-2, MW-3, and MW-4 at concentrations ranging from 16  $\mu\text{g/L}$  (MW-4) to 71  $\mu\text{g/L}$  (MW-3). Tert-butyl alcohol (TBA) was detected in MW-1, MW-2, and MW-4 at concentrations of 25  $\mu\text{g/L}$ , 62  $\mu\text{g/L}$ , and 2,000  $\mu\text{g/L}$ , respectively. No other analytes were detected from ground-water samples collected during First Quarter, 2009.

Drawing 1 depicts the ground-water elevation contour and analytical summary map for the First Quarter, 2009. Table 1 includes a summary of ground-water monitoring data including relative water elevations and laboratory analyses. Table 2 provides a summary of fuel additives analytical data.

The February 6, 2009 *Soil and Ground-Water Investigation and Fourth Quarter, 2008 Quarterly Monitoring Report* recommended that two additional quarters of ground-water monitoring/sampling (First and Second Quarter, 2009) be completed before recommendations are provided for additional investigation work activities. The two additional quarters of ground-water monitoring/sampling were recommended to further the understanding of the hydrogeology at the site which should assist in placement of sample locations for future ground-water investigation work activities. The March 16, 2009 ACEH letter approved these recommendations and requested that a Soil and Ground-Water investigation work plan be completed and submitted by August 28, 2009.

A summary of water elevations monitored during First Quarter, 2009 important to understanding the hydrogeology at the site are as follows:

- The Ground-water elevation in MW-1 remained relatively unchanged (decrease of 0.14 feet) with respect to Fourth Quarter, 2008.
- The Ground-water elevations in both wells MW-2 and MW-3 increased approximately 10 feet with respect to Fourth Quarter, 2008.
- Ground-water was observed in MW-4 for the first time at an elevation consistent with wells MW-2 and MW-3.
- A ground-water elevation contour map was generated for the first time utilizing data from wells MW-2, MW-3, and MW-4.

The Second Quarter, 2009 monitoring/sampling event should provide additional data that will further the understanding of the hydrogeology. A discussion and possible explanation of discrepancies in ground-water elevations will be provided in future reports.

#### **CLOSURE:**

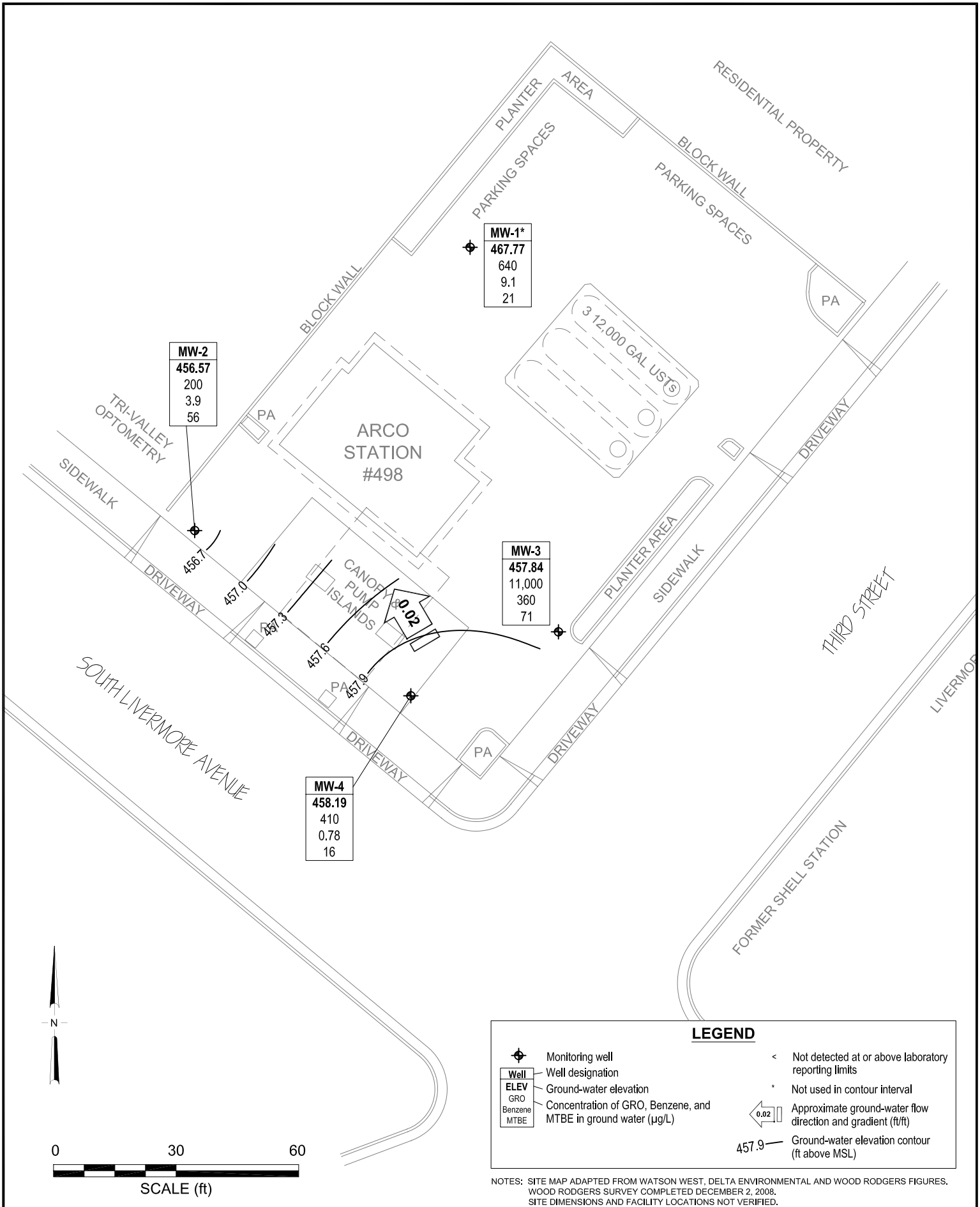
The findings presented in this report are based upon: observations of Stratus Environmental, Inc. and/or their subcontractor(s) field personnel (see Appendix A), the points investigated, and results of laboratory tests performed by Calscience Environmental Laboratories, Inc. Our services were performed 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. 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. Ground-Water Elevation Contour and Analytical Summary Map, Station #498, Livermore, CA
- Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses, Station #498, Livermore, CA
- Table 2. Summary of Fuel Additives Analytical Data, Station #498, Livermore, CA
- Table 3. Historical Ground-Water Flow Direction and Gradient, Station #498, Livermore, CA

Appendix A. Stratus Environmental, Inc. Ground-Water Sampling Data Package (Includes Field Data Sheets, Non-Hazardous Waste Data Form, Chain of Custody Documentation, Certified Analytical Results, and Field Procedures for Ground-Water Sampling)

Appendix B. GeoTracker Upload Confirmation



<b>MW-2</b>
456.57
200
3.9
56

<b>MW-1*</b>
467.77
640
9.1
21

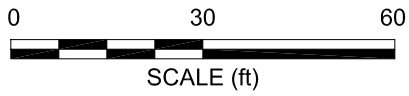
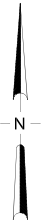
<b>MW-3</b>
457.84
11,000
360
71

<b>MW-4</b>
458.19
410
0.78
16

**LEGEND**

- Monitoring well
- Well designation
- Ground-water elevation
- Concentration of GRO, Benzene, and MTBE in ground water (µg/L)
- < Not detected at or above laboratory reporting limits
- \* Not used in contour interval
- Approximate ground-water flow direction and gradient (ft/ft)
- 457.9 Ground-water elevation contour (ft above MSL)

NOTES: SITE MAP ADAPTED FROM WATSON WEST, DELTA ENVIRONMENTAL AND WOOD RODGERS FIGURES. WOOD RODGERS SURVEY COMPLETED DECEMBER 2, 2008. SITE DIMENSIONS AND FACILITY LOCATIONS NOT VERIFIED.



**Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses  
Station #498, 286 South Livermore Avenue, Livermore, CA**

Well and Sample Date	P/NP	Comments	TOC (feet msl)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet bgs)	Product Thickness (feet)	Water Level Elevation (feet msl)	Concentrations in (µg/L)						DO (mg/L)	pH
									GRO/TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MtBE		
<b>MW-1</b>																
12/29/2008	P		496.72	20	40	28.81	--	467.91	1,100	38	1.2	4.0	3.3	17	2.72	6.83
3/20/2009	P		<b>496.72</b>	<b>20</b>	<b>40</b>	<b>28.95</b>	--	<b>467.77</b>	<b>640</b>	<b>9.1</b>	<b>&lt;0.50</b>	<b>4.1</b>	<b>&lt;0.50</b>	<b>21</b>	<b>0.35</b>	<b>7.28</b>
<b>MW-2</b>																
12/29/2008	P		495.35	37	57	48.76	--	446.59	110	7.1	<0.50	<0.50	0.76	16	1.04	7.67
3/20/2009	P		<b>495.35</b>	<b>37</b>	<b>57</b>	<b>38.78</b>	--	<b>456.57</b>	<b>200</b>	<b>3.9</b>	<b>&lt;1.0</b>	<b>&lt;1.0</b>	<b>&lt;1.0</b>	<b>56</b>	<b>0.41</b>	<b>7.51</b>
<b>MW-3</b>																
12/29/2008	P		496.32	37	57	48.21	--	448.11	28,000	310	200	840	6,200	71	1.95	7.39
3/20/2009	P		<b>496.32</b>	<b>37</b>	<b>57</b>	<b>38.48</b>	--	<b>457.84</b>	<b>11,000</b>	<b>360</b>	<b>84</b>	<b>600</b>	<b>1,500</b>	<b>71</b>	<b>0.56</b>	<b>7.25</b>
<b>MW-4</b>																
12/29/2008	--	Dry	496.01	20	40	--	--	--	--	--	--	--	--	--	--	--
3/20/2009	P		<b>496.01</b>	<b>20</b>	<b>40</b>	<b>37.82</b>	--	<b>458.19</b>	<b>410</b>	<b>0.78</b>	<b>&lt;0.50</b>	<b>&lt;0.50</b>	<b>0.64</b>	<b>16</b>	<b>0.52</b>	<b>7.16</b>



SYMBOLS AND 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

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

Well and Sample Date	Concentrations in (µg/L)								Comments
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
<b>MW-1</b>									
12/29/2008	<300	<10	17	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>3/20/2009</b>	<b>&lt;300</b>	<b>25</b>	<b>21</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>									
12/29/2008	<300	22	16	<0.50	<0.50	<0.50	<0.50	<0.50	
<b>3/20/2009</b>	<b>&lt;600</b>	<b>62</b>	<b>56</b>	<b>&lt;1.0</b>	<b>&lt;1.0</b>	<b>&lt;1.0</b>	<b>&lt;1.0</b>	<b>&lt;1.0</b>	
<b>MW-3</b>									
12/29/2008	<30,000	<1,000	71	<50	<50	<50	<50	<50	
<b>3/20/2009</b>	<b>&lt;7,500</b>	<b>&lt;250</b>	<b>71</b>	<b>&lt;12</b>	<b>&lt;12</b>	<b>&lt;12</b>	<b>&lt;12</b>	<b>&lt;12</b>	
<b>MW-4</b>									
<b>3/20/2009</b>	<b>&lt;300</b>	<b>2,000</b>	<b>16</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 sampled/analyzed/applicable/measured/available

< = 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

**Table 3. Historical Ground-Water Flow Direction and Gradient  
Station #498, 286 South Livermore Avenue, Livermore, CA**

Date Sampled	Approximate Flow Direction	Approximate Hydraulic Gradient
3/20/2009	North-Northwest	0.02

## **APPENDIX A**

**STRATUS ENVIRONMENTAL, INC. GROUND-WATER SAMPLING DATA PACKAGE  
(INCLUDES FIELD DATA SHEETS, NON-HAZARDOUS WASTE DATA FORM, CHAIN  
OF CUSTODY DOCUMENTATION, CERTIFIED ANALYTICAL RESULTS, AND FIELD  
PROCEDURES FOR GROUND-WATER SAMPLING)**



3330 Cameron Park Drive, Ste 550  
Cameron Park, California 95682  
(530) 676-6004 ~ Fax: (530) 676-6005

April 6, 2009

Mr. Rob Miller  
Broadbent & Associates, Inc.  
2000 Kirman Avenue  
Reno, NV 89502

Re: Groundwater Sampling Data Package, ARCO Service Station No.498, located at  
286 Livermore Ave. Livermore, California.

### **General Information**

*Data Submittal Prepared / Reviewed by:* Carol Huff / Jay Johnson

*Phone Number:* (530) 676-6000

*On-Site Supplier Representative:* Vince Zalutka

*Sampling Date:* March 20, 2009

*Unusual Field Conditions:* None

*Scope of Work Performed:* Quarterly groundwater monitoring and sampling

*Variations from Work Scope:* Well MW-4 Purged dry before three casing volumes were removed.

This submittal presents the data collected in association with routine groundwater monitoring. The attachments include field data sheets, non-hazardous waste data form, chain of custody documentation, certified analytical results and field procedures for groundwater sampling documentation. The information is being provided to BP-ARCO's Scoping Supplier for use in preparing a report for regulatory submittal. This submittal is limited to presentation of collected data and does not include data interpretation or conclusions or recommendations.

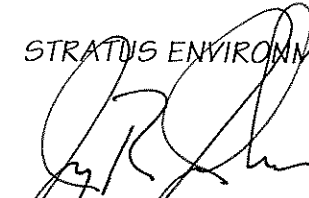
Mr. Rob Miller, Broadbent & Associates, Inc.  
Groundwater Sampling Data Package  
ARCO Service Station 498, Livermore, CA  
Page 2

April 6, 2009

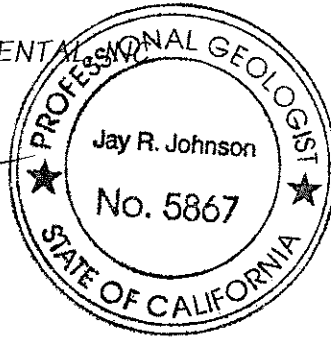
Any questions concerning this submittal should be addressed to the Preparer/Reviewer identified above.

Sincerely,

STRATUS ENVIRONMENTAL



Jay R. Johnson, P.G.  
Project Manager



**Attachments:**

- Field Data Sheets
- Non-Hazardous Waste Data Form
- Chain of Custody Documentation
- Certified Analytical Results
- Field Procedures for Groundwater Sampling

cc: Mr. Paul Supple, BP/ARCO



Site Address 286 S. Livermore  
 City Livermore  
 Sampled by: Vince Z  
 Signature Vince Zambello

Site Number ARCO 498  
 Project Number \_\_\_\_\_  
 Project PM \_\_\_\_\_  
 DATE 3-20-09

ORIGINAL

Water Level Data					Purge Volume Calculations					Purge Method				Sample Record			Field Data
Well ID	Time	Depth to Product (feet)	Depth to Water (feet)	Total Depth (feet)	Water column (feet)	Diameter (inches)	Multiplier	3 casing volumes (gallons)	Actual water purged (gallons)	No Purge	Bailer	Pump	other	DTW at sample time (feet)	Sample I.D.	Sample Time	DO (mg/L)
MW-1	0528		28.95	40.10	11.15	2	.5	5.57	5.5		X			34.72	MW-1	0800	.35
MW-2	0503		38.78	57.0	18.22	2	.5	9.11	9.0		X			38.78	MW-2	0611	.41
MW-3	0520		38.48	55.20	16.72	2	.5	8.36	8.0		X			40.10	MW-3	0651	.56
MW-4	0513		37.82	40.0	2.18	2	.5	1.09	.5		X			39.19	MW-4	0707	.52
TB	498	0320	2009														.801
Not much water in MW-4 sampled with what was there																	

Multiplier  
 2" = 0.5 3" = 1.0 4" = 2.0 6" = 4.4

Please refer to groundwater sampling field procedures  
 pH/Conductivity/temperature Meter - Oakton Model PC-10  
 DO Meter - Oakton 300 Series (DO is always measured before purge)

CALIBRATION DATE \_\_\_\_\_  
 pH \_\_\_\_\_  
 Conductivity \_\_\_\_\_  
 DO \_\_\_\_\_



# STRATUS

ENVIRONMENTAL, INC.

Site Address 286 Livermore Site Number 498  
 City Livermore Project No. \_\_\_\_\_  
 Site Sampled by Vince Z Project PM \_\_\_\_\_  
V. Zolotnikov Date Sampled 3-20-09

Well ID <u>MW-1 0800</u>					Well ID <u>MW-2 0611</u>				
purge start time <u>Bailer NO odor</u>					purge start time <u>Bailer odor</u>				
	Temp C	pH	cond	gallons		Temp C	pH	cond	gallons
time	<u>20.0</u>	<u>7.13</u>	<u>783</u>	<u>0</u>	time	<u>19.5</u>	<u>7.28</u>	<u>1065</u>	<u>0</u>
time	<u>20.4</u>	<u>7.20</u>	<u>772</u>	<u>2.5</u>	time	<u>19.7</u>	<u>7.32</u>	<u>1031</u>	<u>4.5</u>
time	<u>20.0</u>	<u>7.28</u>	<u>769</u>	<u>5.5</u>	time	<u>19.0</u>	<u>7.51</u>	<u>975</u>	<u>9</u>
time					time				
purge stop time <u>ORP -77</u>					purge stop time <u>ORP -79</u>				
Well ID <u>MW-3 0651</u>					Well ID <u>MW-4 0707</u>				
purge start time <u>Bailer odor</u>					purge start time <u>Bailer odor</u>				
	Temp C	pH	cond	gallons		Temp C	pH	cond	gallons
time	<u>21.1</u>	<u>7.39</u>	<u>647</u>	<u>0</u>	time	<u>20.1</u>	<u>7.02</u>	<u>1632</u>	<u>0</u>
time	<u>19.5</u>	<u>7.33</u>	<u>992</u>	<u>4</u>	time	<u>dry @ .5 gal</u>			
time	<u>18.9</u>	<u>7.25</u>	<u>932</u>	<u>8</u>	time	<u>18.6</u>	<u>7.16</u>	<u>1606</u>	<u>0.5</u>
time					time				
purge stop time <u>ORP -92</u>					purge stop time <u>ORP N/A</u>				
Well ID					Well ID				
purge start time					purge start time				
	Temp C	pH	cond	gallons		Temp C	pH	cond	gallons
time					time				
time					time				
time					time				
time					time				
purge stop time					purge stop time				
Well ID					Well ID				
purge start time					purge start time				
	Temp C	pH	cond	gallons		Temp C	pH	cond	gallons
time					time				
time					time				
time					time				
time					time				
purge stop time					purge stop time				

ORIGINAL

# WELLHEAD OBSERVATION FORM



Site Name/Number: 498<sup>n</sup>

Date: 3-20-09 Technician: VINCE

Well I.D.	Box in Good Condition? <small>X = Yes Blank = No</small>	Lock Missing? <small>X = Yes (replaced) Blank = No</small>	Water in Wellbox? <small>X = Yes Blank = No</small>	Water Level Relative to Cap? <small>A = Above cap B = Below cap L = Level w/cap</small>	Well Cap? <small>I = Intact M = Missing or Compromised (replaced)</small>	Bolts Missing? <small>X = Yes Blank = No</small>	Bolts Stripped? <small>X = Yes Blank = No</small>	Bolt Holes Stripped? <small>X = Yes Blank = No</small>	Cracked or Broken Lid? <small>X = Yes Blank = No</small>	Cracked or Broken Box? <small>X = Yes Blank = No</small>	Grout Level more than 1ft below TOC? <small>X = Yes Blank = No</small>	Additional Comments <small>(such as missing lid, concrete needs replacement, or other - explain)</small>
MW-1	X	X										
S-2	X	X										
S-3	X	X										Replaced lock
S-4	X	X										

**DRUM INVENTORY**

Drums on site? Yes No (circle)  
 Type and # Steel: 5 Plastic: \_\_\_\_\_

Note whether drums are full or empty, solids or liquids:  
Behind Station in locked compound

Drum label info (description, date, contact info):  
 \_\_\_\_\_  
 \_\_\_\_\_

**GENERAL SITE CONDITIONS**

Make notes on housekeeping conditions (such as trash around remediation system enclosure/compound, bent or missing bollards, signs missing from compound fences, graffiti on compound, etc.)  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

(updated 3-28-08, SS)

**Laboratory Management Program LaMP Chain of Custody Record**

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

Req Due Date (mm/dd/yy): \_\_\_\_\_ Rush TAT: Yes \_\_\_ No \_\_\_  
Lab Work Order Number: \_\_\_\_\_

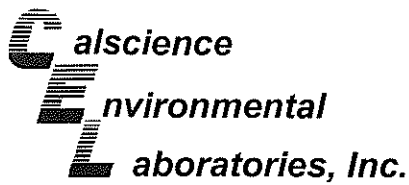
Lab Name: <u>Cal Science</u>	BP/ARC Facility Address: <u>286 S. Livermore Ave.</u>	Consultant/Contractor: <u>Stratus Environmental</u>
Lab Address: <u>7440 Lincoln Way</u>	City, State, ZIP Code: <u>Livermore, CA</u>	Consultant/Contractor Project No: <u>E498-QM</u>
Lab PM: <u>Richard Villafania</u>	Lead Regulatory Agency: <u>Alameda County</u>	Address: <u>3330 Cameron Park Dr., Cameron Park, CA 95682</u>
Lab Phone: <u>714-895-5494 / 714-895-7501 (fax)</u>	California Global ID No.: <u>T06001-24081</u>	Consultant/Contractor PM: <u>Jay Johnson</u>
Lab Shipping Acctn:	Enfos Proposal No: <u>000QX-0002</u>	Phone: <u>530-676-6000 / 530-676-6005 (fax)</u>
Lab Bottle Order No:	Accounting Mode: Provision <input checked="" type="checkbox"/> OOC-BU ___ OOC-RM ___	Email EDD To: <u>chuff@stratusinc.net</u>
Other Info:	Stage: <u>Appraise</u> Activity: <u>Monitor</u>	Invoice To: BP/ARC ___ Contractor ___
BP/ARC EBM: <u>Paul Supple</u>		

Lab No.	Sample Description	Date	Time	Matrix			No. Containers / Preservative					Requested Analyses				Report Type & QC Level		Comments	
				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	GRD	BTEX/SFD+EDB	1,2-DCA	Ethanol	Standard ___		Full Data Package ___
	<u>MW-1</u>	<u>2009</u>	<u>0320</u>		X														
	<u>MW-2</u>		<u>0320</u>		X								X	X	X	X			
	<u>MW-3</u>		<u>0320</u>		X								X	X	X	X			
	<u>MW-4</u>		<u>0320</u>		X								X	X	X	X			
	<u>TB 498 0320 2009</u>	<u>0801</u>			X														<u>HOLD</u>

Sampler's Name: <u>Vince Zalutka</u>	Relinquished By / Affiliation: <u>Vince Zalutka</u>	Date: <u>3-20-09</u>	Time: <u>1330</u>	Accepted By / Affiliation:	Date:	Time:
Sampler's Company: <u>stratus ENVIRONMENTAL</u>						
Shipment Method: <u>G-50</u>	Ship Date: <u>3-20-09</u>					
Shipment Tracking No:						

Special Instructions: Please cc results to rmler@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



April 01, 2009

Jay Johnson  
Stratus Environmental, inc.  
3330 Cameron Park Drive, Suite 550  
Cameron Park, CA 95682-8861

Subject: **CalScience Work Order No.: 09-03-2006**  
**Client Reference: ARCO 498**

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 3/21/2009 and analyzed in accordance with the attached chain-of-custody.

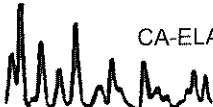
Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Systems Manual, applicable standard operating procedures, and other related documentation. The original report of subcontracted analysis, if any, is provided herein, and follows 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.

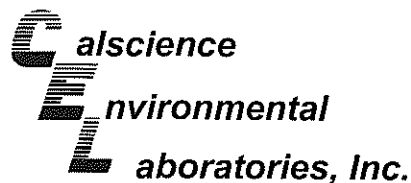
If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Sincerely,

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

CalScience Environmental  
Laboratories, Inc.  
Richard Villafania  
Project Manager





## Analytical Report

Stratus Environmental, inc.  
3330 Cameron Park Drive, Suite 550  
Cameron Park, CA 95682-8861

Date Received: 03/21/09  
Work Order No: 09-03-2006  
Preparation: EPA 5030B  
Method: EPA 8015B (M)

Project: ARCO 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	09-03-2006-1-E	03/20/09 08:00	Aqueous	GC 4	03/26/09	03/27/09 03:11	090326B01

Parameter	Result	RL	DF	Qual	Units
Gasoline Range Organics (C6-C12)	640	250	5		ug/L
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>	
1,4-Bromofluorobenzene	97	38-134			

MW-2	09-03-2006-2-E	03/20/09 06:11	Aqueous	GC 4	03/26/09	03/27/09 03:44	090326B01
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Parameter	Result	RL	DF	Qual	Units
Gasoline Range Organics (C6-C12)	200	50	1		ug/L
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>	
1,4-Bromofluorobenzene	99	38-134			

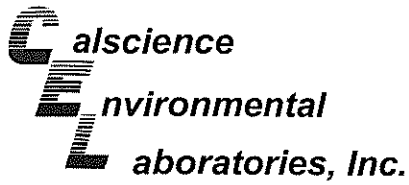
MW-3	09-03-2006-3-E	03/20/09 06:51	Aqueous	GC 4	03/26/09	03/27/09 04:17	090326B01
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Parameter	Result	RL	DF	Qual	Units
Gasoline Range Organics (C6-C12)	11000	1200	25		ug/L
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>	
1,4-Bromofluorobenzene	95	38-134			

MW-4	09-03-2006-4-E	03/20/09 07:07	Aqueous	GC 4	03/26/09	03/27/09 04:51	090326B01
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Parameter	Result	RL	DF	Qual	Units
Gasoline Range Organics (C6-C12)	410	50	1		ug/L
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>	
1,4-Bromofluorobenzene	106	38-134			

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



Analytical Report

03/27/09  
23:20  
090326B01

Stratus Environmental, inc.  
3330 Cameron Park Drive, Suite 550  
Cameron Park, CA 95682-8861

Date Received: 03/21/09  
Work Order No: 09-03-2006  
Preparation: EPA 5030B  
Method: EPA 8015B (M)

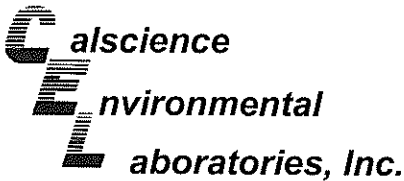
Project: ARCO 498

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	099-12-695-489	N/A	Aqueous	GC 4	03/26/09	03/27/09 23:20	090326B01

Parameter	Result	RL	DF	Qual	Units
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	88	38-134			

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



Analytical Report

090326L01  
03/26/09

Stratus Environmental, inc.  
3330 Cameron Park Drive, Suite 550  
Cameron Park, CA 95682-8861

Date Received: 03/21/09  
Work Order No: 09-03-2006  
Preparation: EPA 5030B  
Method: EPA 8260B  
Units: ug/L

Project: ARCO 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	09-03-2006-1-B	03/20/09 08:00	Aqueous	GC/MS Z	03/26/09	03/26/09 20:27	090326L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	9.1	0.50	1		Methyl-t-Butyl Ether (MTBE)	21	0.50	1	
1,2-Dibromoethane	ND	0.50	1		Tert-Butyl Alcohol (TBA)	25	10	1	
1,2-Dichloroethane	ND	0.50	1		Diisopropyl Ether (DIPE)	ND	0.50	1	
Ethylbenzene	4.1	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	113	73-145			Dibromofluoromethane	117	81-135		
Toluene-d8	111	83-119			1,4-Bromofluorobenzene	94	74-110		

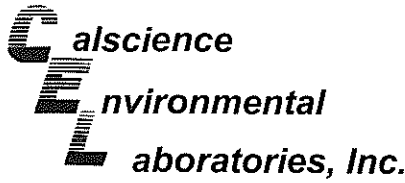
Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
MW-2	09-03-2006-2-B	03/20/09 06:11	Aqueous	GC/MS Z	03/26/09	03/26/09 20:57	090326L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	3.9	1.0	2		Methyl-t-Butyl Ether (MTBE)	56	1.0	2	
1,2-Dibromoethane	ND	1.0	2		Tert-Butyl Alcohol (TBA)	62	20	2	
1,2-Dichloroethane	ND	1.0	2		Diisopropyl Ether (DIPE)	ND	1.0	2	
Ethylbenzene	ND	1.0	2		Ethyl-t-Butyl Ether (ETBE)	ND	1.0	2	
Toluene	ND	1.0	2		Tert-Amyl-Methyl Ether (TAME)	ND	1.0	2	
Xylenes (total)	ND	1.0	2		Ethanol	ND	600	2	
<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	107	73-145			Dibromofluoromethane	98	81-135		
Toluene-d8	99	83-119			1,4-Bromofluorobenzene	82	74-110		

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
MW-3	09-03-2006-3-B	03/20/09 06:51	Aqueous	GC/MS Z	03/26/09	03/26/09 21:28	090326L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	360	12	25		Methyl-t-Butyl Ether (MTBE)	71	12	25	
1,2-Dibromoethane	ND	12	25		Tert-Butyl Alcohol (TBA)	ND	250	25	
1,2-Dichloroethane	ND	12	25		Diisopropyl Ether (DIPE)	ND	12	25	
Ethylbenzene	600	12	25		Ethyl-t-Butyl Ether (ETBE)	ND	12	25	
Toluene	84	12	25		Tert-Amyl-Methyl Ether (TAME)	ND	12	25	
Xylenes (total)	1500	12	25		Ethanol	ND	7500	25	
<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	131	73-145			Dibromofluoromethane	108	81-135		
Toluene-d8	101	83-119			1,4-Bromofluorobenzene	95	74-110		

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



Analytical Report

03/21/09  
09-03-2006  
EPA 5030B  
EPA 8260B  
ug/L

Stratus Environmental, inc.  
3330 Cameron Park Drive, Suite 550  
Cameron Park, CA 95682-8861

Date Received: 03/21/09  
Work Order No: 09-03-2006  
Preparation: EPA 5030B  
Method: EPA 8260B  
Units: ug/L

Project: ARCO 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	09-03-2006-4-A	03/20/09 07:07	Aqueous	GC/MS Z	03/25/09	03/26/09 10:04	090325L02

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	0.78	0.50	1		Methyl-t-Butyl Ether (MTBE)	16	0.50	1	
1,2-Dibromoethane	ND	0.50	1		Tert-Butyl Alcohol (TBA)	2000	200	20	
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)	0.64	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	88	73-145			Dibromofluoromethane	81	81-135		
Toluene-d8	99	83-119			1,4-Bromofluorobenzene	89	74-110		

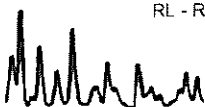
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Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	ND	0.50	1		Methyl-t-Butyl Ether (MTBE)	ND	0.50	1	
1,2-Dibromoethane	ND	0.50	1		Tert-Butyl Alcohol (TBA)	ND	10	1	
1,2-Dichloroethane	ND	0.50	1		Diisopropyl Ether (DIPE)	ND	0.50	1	
Ethylbenzene	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>
1,2-Dichloroethane-d4	111	73-145			Dibromofluoromethane	131	81-135		
Toluene-d8	95	83-119			1,4-Bromofluorobenzene	77	74-110		

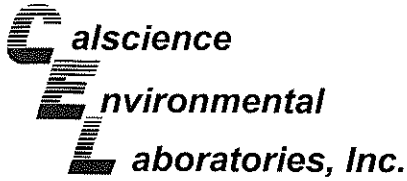
Method Blank	099-12-703-802	N/A	Aqueous	GC/MS Z	03/26/09	03/26/09 15:18	090326L01
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Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Benzene	ND	0.50	1		Methyl-t-Butyl Ether (MTBE)	ND	0.50	1	
1,2-Dibromoethane	ND	0.50	1		Tert-Butyl Alcohol (TBA)	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>
1,2-Dichloroethane-d4	107	73-145			Dibromofluoromethane	96	81-135		
Toluene-d8	96	83-119			1,4-Bromofluorobenzene	78	74-110		

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







**Quality Control - Spike/Spike Duplicate**

*Handwritten notes:*  
 09-03-2004-14  
 net c

Stratus Environmental, inc.  
 3330 Cameron Park Drive, Suite 550  
 Cameron Park, CA 95682-8861

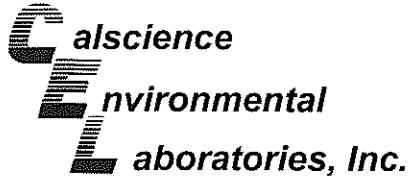
Date Received: 03/21/09  
 Work Order No: 09-03-2006  
 Preparation: EPA 5030B  
 Method: EPA 8015B (M)

Project ARCO 498

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
09-03-2004-14	Aqueous	GC 4	03/26/09	03/27/09	090326S01

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Gasoline Range Organics (C6-C12)	101	100	38-134	0	0-25	

RPD - Relative Percent Difference , CL - Control Limit



## Quality Control - Spike/Spike Duplicate

09-03-2006  
net c

Stratus Environmental, inc.  
3330 Cameron Park Drive, Suite 550  
Cameron Park, CA 95682-8861

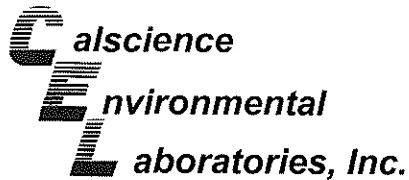
Date Received: 03/21/09  
Work Order No: 09-03-2006  
Preparation: EPA 5030B  
Method: EPA 8260B

Project ARCO 498

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
09-03-2004-10	Aqueous	GC/MS Z	03/25/09	03/26/09	090325S02

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	98	95	86-122	3	0-8	
Carbon Tetrachloride	119	90	78-138	27	0-9	BA,AY
Chlorobenzene	87	87	90-120	1	0-9	LN,AY
1,2-Dibromoethane	96	98	70-130	2	0-30	
1,2-Dichlorobenzene	100	99	89-119	1	0-10	
1,1-Dichloroethene	112	84	52-142	29	0-23	BA,AY
Ethylbenzene	117	113	70-130	2	0-30	
Toluene	99	96	85-127	3	0-12	
Trichloroethene	90	87	78-126	3	0-10	
Vinyl Chloride	123	87	56-140	34	0-21	BA,AY
Methyl-t-Butyl Ether (MTBE)	262	132	64-136	30	0-28	LM,BA,AY
Tert-Butyl Alcohol (TBA)	120	126	27-183	4	0-60	
Diisopropyl Ether (DIPE)	111	85	78-126	27	0-16	BA,AY
Ethyl-t-Butyl Ether (ETBE)	113	86	67-133	27	0-21	BA,AY
Tert-Amyl-Methyl Ether (TAME)	104	103	63-141	1	0-21	
Ethanol	103	109	11-167	6	0-64	

RPD - Relative Percent Difference, CL - Control Limit



## Quality Control - Spike/Spike Duplicate

09-03-2004-9

Stratus Environmental, inc.  
3330 Cameron Park Drive, Suite 550  
Cameron Park, CA 95682-8861

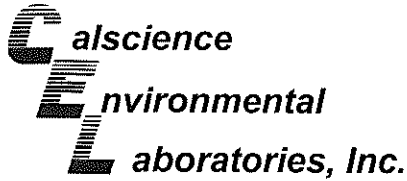
Date Received: 03/21/09  
Work Order No: 09-03-2006  
Preparation: EPA 5030B  
Method: EPA 8260B

Project ARCO 498

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
09-03-2004-9	Aqueous	GC/MS Z	03/26/09	03/26/09	090326S01

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	101	100	86-122	1	0-8	
Carbon Tetrachloride	96	94	78-138	2	0-9	
Chlorobenzene	100	99	90-120	1	0-9	
1,2-Dibromoethane	96	100	70-130	4	0-30	
1,2-Dichlorobenzene	101	102	89-119	1	0-10	
1,1-Dichloroethene	100	99	52-142	1	0-23	
Ethylbenzene	112	110	70-130	1	0-30	
Toluene	103	102	85-127	1	0-12	
Trichloroethene	94	94	78-126	0	0-10	
Vinyl Chloride	103	99	56-140	3	0-21	
Methyl-t-Butyl Ether (MTBE)	88	91	64-136	2	0-28	
Tert-Butyl Alcohol (TBA)	123	111	27-183	4	0-60	
Diisopropyl Ether (DIPE)	111	106	78-126	4	0-16	
Ethyl-t-Butyl Ether (ETBE)	100	99	67-133	1	0-21	
Tert-Amyl-Methyl Ether (TAME)	104	105	63-141	1	0-21	
Ethanol	101	128	11-167	24	0-64	

RPD - Relative Percent Difference, CL - Control Limit



Quality Control - LCS/LCS Duplicate

09-03-2006  
net c

Stratus Environmental, inc.  
3330 Cameron Park Drive, Suite 550  
Cameron Park, CA 95682-8861

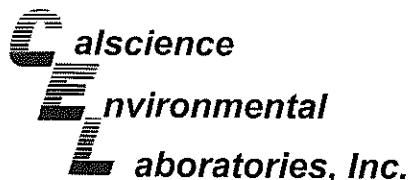
Date Received: N/A  
Work Order No: 09-03-2006  
Preparation: EPA 5030B  
Method: EPA 8015B (M)

Project: ARCO 498

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-695-489	Aqueous	GC 4	03/26/09	03/26/09	090326B01

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Gasoline Range Organics (C6-C12)	104	104	78-120	0	0-20	

RPD - Relative Percent Difference, CL - Control Limit



Quality Control - LCS/LCS Duplicate

net c

Stratus Environmental, inc.  
3330 Cameron Park Drive, Suite 550  
Cameron Park, CA 95682-8861

Date Received: N/A  
Work Order No: 09-03-2006  
Preparation: EPA 5030B  
Method: EPA 8260B

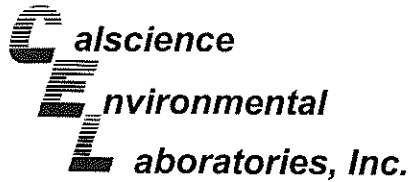
Project: ARCO 498

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number		
099-12-703-799	Aqueous	GC/MS Z	03/25/09	03/25/09	090325L02		
Parameter	LCS %REC	LCSD %REC	%REC CL	ME_CL	RPD	RPD CL	Qualifiers
Benzene	97	96	87-117	82-122	1	0-7	
Carbon Tetrachloride	94	92	78-132	69-141	2	0-8	
Chlorobenzene	97	97	88-118	83-123	0	0-8	
1,2-Dibromoethane	97	96	80-120	73-127	1	0-20	
1,2-Dichlorobenzene	102	101	88-118	83-123	2	0-8	
1,1-Dichloroethene	87	87	71-131	61-141	0	0-14	
Ethylbenzene	106	108	80-120	73-127	2	0-20	
Toluene	98	99	85-127	78-134	1	0-7	
Trichloroethene	107	108	85-121	79-127	2	0-11	
Vinyl Chloride	87	83	64-136	52-148	4	0-10	
Methyl-t-Butyl Ether (MTBE)	90	87	67-133	56-144	4	0-16	
Tert-Butyl Alcohol (TBA)	93	97	34-154	14-174	4	0-19	
Diisopropyl Ether (DIPE)	86	83	80-122	73-129	4	0-8	
Ethyl-t-Butyl Ether (ETBE)	86	86	73-127	64-136	1	0-11	
Tert-Amyl-Methyl Ether (TAME)	98	98	69-135	58-146	0	0-12	
Ethanol	90	98	34-124	19-139	8	0-44	

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

Stratus Environmental, inc.  
3330 Cameron Park Drive, Suite 550  
Cameron Park, CA 95682-8861

Date Received: N/A  
Work Order No: 09-03-2006  
Preparation: EPA 5030B  
Method: EPA 8260B

Project: ARCO 498

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number		
099-12-703-802	Aqueous	GC/MS Z	03/26/09	03/26/09	090326L01		
Parameter	LCS %REC	LCSD %REC	%REC CL	ME CL	RPD	RPD CL	Qualifiers
Benzene	96	97	87-117	82-122	1	0-7	
Carbon Tetrachloride	92	91	78-132	69-141	1	0-8	
Chlorobenzene	96	97	88-118	83-123	2	0-8	
1,2-Dibromoethane	94	96	80-120	73-127	3	0-20	
1,2-Dichlorobenzene	99	100	88-118	83-123	1	0-8	
1,1-Dichloroethene	98	96	71-131	61-141	2	0-14	
Ethylbenzene	106	109	80-120	73-127	3	0-20	
Toluene	97	98	85-127	78-134	1	0-7	
Trichloroethene	91	91	85-121	79-127	0	0-11	
Vinyl Chloride	98	99	64-136	52-148	1	0-10	
Methyl-t-Butyl Ether (MTBE)	91	89	67-133	56-144	3	0-16	
Tert-Butyl Alcohol (TBA)	99	102	34-154	14-174	3	0-19	
Diisopropyl Ether (DIPE)	107	103	80-122	73-129	3	0-8	
Ethyl-t-Butyl Ether (ETBE)	98	96	73-127	64-136	2	0-11	
Tert-Amyl-Methyl Ether (TAME)	101	100	69-135	58-146	0	0-12	
Ethanol	112	118	34-124	19-139	5	0-44	

Total number of LCS compounds : 16

Total number of ME compounds : 0

Total number of ME compounds allowed : 1

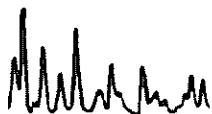
LCS ME CL validation result : Pass

RPD - Relative Percent Difference , CL - Control Limit


 Work Order Number: 09-03-2006
 

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<u>Qualifier</u>	<u>Definition</u>
AX	Sample too dilute to quantify surrogate.
BA	There was no MS/MSD analyzed with this batch due to insufficient sample volume (NR = not reported). See Blank Spike/Blank Spike Duplicate.
BA,AY	Relative percent difference out of control, 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.
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.
ET	Sample was extracted past end of recommended max. holding time.
EY	Result exceeds normal dynamic range; reported as a min est.
GS	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	Surrogate recovery below the acceptance limit.
LH	Surrogate recovery above the acceptance limit.
LM,AY	MS and/or MSD above acceptance limits. See Blank Spike (LCS). Matrix interference suspected.
LN,AY	MS and/or MSD below acceptance limits. See Blank Spike (LCS). Matrix interference suspected.
LQ	LCS recovery above method control limits.
LR	LCS recovery below method control limits.



Work Order Number: 09-03-2006

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<u>Qualifier</u>	<u>Definition</u>
MB	Analyte present in the method blank.
MG	Analyte is a suspected lab contaminate.
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.







# Laboratory Management Program LaMP Chain of Custody Record

2006

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

Req Due Date (mm/dd/yy):  
 Rush TAT: Yes No  
 Lab Work Order Number:

Lab Name: Cal Science	BP/ARC Facility Address: 286 S. Livermore Ave.	Consultant/Contractor: Stratus Environmental
Lab Address: 7440 Lincoln Way	City, State, ZIP Code: Livermore, CA	Consultant/Contractor Project No: E498-QM
Lab PM: Richard Villafania	Lead Regulatory Agency: Alameda County	Address: 3330 Cameron Park Dr., Cameron Park, CA 95682
Lab Phone: 714-895-5494 / 714-895-7501 (fax)	California Global ID No.: T06001-24081	Consultant/Contractor PM: Jay Johnson
Lab Shipping Acct:	Enfos Proposal No: 000QX-0002	Phone: 530-676-6000 / 530-676-6005 (fax)
Lab Bottle Order No:	Accounting Mode: Provision <input checked="" type="checkbox"/> OOC-BU <input type="checkbox"/> OOC-RM <input type="checkbox"/>	Email EDD To: <a href="mailto:chuff@stratusinc.net">chuff@stratusinc.net</a>
Other Info:	Stage: Appraise Activity: Monitor	Invoice To: BP/ARC Contractor

Lab No.	Sample Description	Date	Time	Matrix			No. Containers / Preservative					Requested Analyses				Report Type & QC Level		Comments	
				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	GRD 8015M	BTEX/5FO+EDB	1,2-DCA	Ethanol 8260	Standard		Full Data Package
1	MW-1	2009	0320		X									X	X	X	X		
2	MW-2	2009	0320		X									X	X	X	X		
3	MW-3	2009	0320		Y									X	X	X	X		
4	MW-4	2009	0320		X									X	X	X	X		
5	TB 498 0320 2009	0801		X															HOLD

Sampler's Name: Vince Zalutka	Relinquished By / Affiliation: Vince Zalutka	Date: 3-20-09	Time: 1330	Accepted By / Affiliation:	Date:	Time:
Sampler's Company: Stratus Environmental						
Shipment Method: G-50	Ship Date: 3-20-09					
Shipment Tracking No: 9255162145						

Special Instructions: Please cc results to [rmiller@broadbentinc.com](mailto:rmiller@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

Page 1 of 1

**SAMPLE RECEIPT FORM**

Cooler 1 of 1

CLIENT: Stratus

DATE: 03/21/09

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

Temperature 3.7 °C - 0.2°C (CF) = 3.5 °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  Metals Only  PCBs Only Initial: SO

**CUSTODY SEALS INTACT:**

Cooler  \_\_\_\_\_  No (Not Intact)  Not Present  N/A Initial: SO

Sample  \_\_\_\_\_  No (Not Intact)  Not Present Initial: SO

**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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
<input type="checkbox"/> COC not relinquished. <input type="checkbox"/> No date relinquished. <input type="checkbox"/> No 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 checked="" type="checkbox"/>	<input type="checkbox"/>
Sample container(s) intact and good condition.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Correct containers and 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"/>
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 type="checkbox"/>	<input checked="" 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  VOAh  VOAna<sub>2</sub>  125AGB  125AGBh  125AGBpo<sub>4</sub>  1AGB  1AGBna<sub>2</sub>

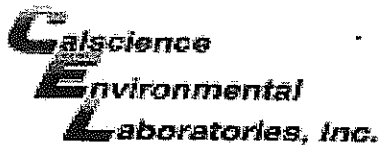
1AGBs  500AGB  500AGBs  250CGB  250CGBs  1PB  500PB  500PBna  250PB

250PBn  125PB  125PBzanna  100PBsterile  100PBna<sub>2</sub>  \_\_\_\_\_  \_\_\_\_\_  \_\_\_\_\_

**Air:**  Tedlar®  Summa®  \_\_\_\_\_ **Sludge/Other:**  \_\_\_\_\_ **Checked/Labeled by:** SO

Container: C:Clear A:Amber P:Poly/Plastic G:Glass J:Jar B:Bottle **Reviewed by:** WEC

Preservative: h:HCL n:HNO<sub>3</sub> na<sub>2</sub>:Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> na:NaOH po<sub>4</sub>:H<sub>3</sub>PO<sub>4</sub> s:H<sub>2</sub>SO<sub>4</sub> zanna:ZnAc<sub>2</sub>+NaOH **Scanned by:** SO



WORK ORDER #: 09-03-2006

# SAMPLE ANOMALY FORM

**CHAIN OF CUSTODY (COC):** **Comments:**

Not relinquished by client – no signature  
 No date/time relinquished  
 COC not received with samples – notify PM  
 Incomplete information regarding samples, tests, etc.

---

**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) 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

Sample containers compromised – Note in comments

- Leaking
- Broken
- Without Labels

Other: \_\_\_\_\_

(-5) collection date  
per label is 3-20-09

**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 RSK or CO <sub>2</sub> or DO or Organic Lead Received
2	F	6						
3	C, F	6						

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

---

Initial / Date SO 3/21/09

## ATTACHMENT

### FIELD PROCEDURES FOR GROUNDWATER SAMPLING

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The sampling procedures for groundwater monitoring events are contained in this appendix.

#### **Groundwater and Liquid-Phase Petroleum Hydrocarbon Depth Assessment**

Prior to measuring the depth to liquid in the well, the well caps are removed and the liquid level allowed to stabilize. A water/hydrocarbon interface probe is used to assess the liquid-phase petroleum hydrocarbon (LPH) thickness, if present, and a water level indicator is used to measure the groundwater depth in monitoring wells that do not contain LPH. Depth to groundwater or LPH is measured from a datum point at the top of each monitoring well casing. The datum point is typically a notch cut in the north side of the casing edge. If a water level indicator is used, the tip is subjectively analyzed for hydrocarbon sheen.

#### **Subjective Analysis of Groundwater**

Prior to purging, a water sample is collected from the monitoring well for subjective assessment. The sample is retrieved by gently lowering a clean, disposable bailer to approximately one-half the bailer length past the air/liquid interface. The bailer is then retrieved, and the sample contained within the bailer is examined for floating LPH and the appearance of a LPH sheen.

#### **Monitoring Well Sampling**

In many cases, determining whether to purge or not to purge wells prior to sample collection is made in the field and is often based on depth to water relative to the screen interval of the well. Site-specific field data sheets present details associated with the purge method and equipment used.

Monitoring wells, when purged, use a pump or bailer until pH, temperature, and conductivity of the purge water has stabilized and a minimum of three well volumes of water has been removed. Field measuring equipment is calibrated and maintained according to the manufacturer's instructions. If three well volumes cannot be removed in one half hour's time the well is allowed to recharge to 80% of original level. After recharging, a groundwater sample is then collected from each of the wells using disposable bailers.

A Teflon bailer, electric submersible or bladder pump will be the only equipment used for well sampling. When samples for volatile organic analysis are being collected, the pump flow will be regulated at approximately 100 milliliters per minute to minimize pump effluent turbulence and aeration. Glass bottles of at least 40-milliliters volume and fitted with Teflon-lined septa will be used in sampling for volatile organics. These

bottles will be filled completely to prevent air accumulation in the bottle. A positive meniscus forms when the bottle is completely full. A convex Teflon septum will be placed over the positive meniscus to eliminate air. After the bottle is capped, it is inverted and tapped to verify that it contains no air bubbles. The sample containers for other parameters will be filled, filtered as required, and capped. Glass and plastic bottles used by Stratus to collect groundwater samples are supplied by the laboratory.

### **Groundwater Sample Labeling and Preservation**

Samples are collected in appropriate containers supplied by the laboratory. All required chemical preservation is added to the bottles prior to delivery to Stratus. Sample label information includes a unique sample identification number, job identification number, date, and time. After labeling, all groundwater samples are placed in a Ziploc<sup>®</sup> type bag and placed in an ice chest cooled to approximately 4° Celsius. Upon arriving at Stratus' office the samples are transferred to a locked refrigerator cooled to approximately 4° Celsius. Chemical preservation is controlled by the required analysis and is noted on the chain-of-custody form. Trip and temperature blanks supplied by the laboratory accompany the groundwater sample containers and groundwater samples.

### **Sample Identification and Chain-of-Custody Procedures**

Sample identification and chain-of-custody procedures document sample possession from the time of collection to ultimate disposal. Each sample container submitted for analysis has a label affixed to identify the job number, sampler, date and time of sample collection, and a sample number unique to that sample. This information, in addition to a description of the sample, field measurements made, sampling methodology, names of on-site personnel, and any other pertinent field observations, is recorded in the field records. The samples are analyzed by a California-certified laboratory.

A chain-of-custody form is used to record possession of the sample from time of collection to its arrival at the laboratory. When the samples are shipped, the person in custody of them relinquishes the samples by signing the chain-of-custody form and noting the time. The sample-control officer at the laboratory verifies sample integrity and confirms that the samples are collected in the proper containers, preserved correctly, and contain adequate volumes for analysis. These conditions are noted on a Laboratory Sample Receipt Checklist that becomes part of the laboratory report upon request.

If these conditions are met, each sample is assigned a unique log number for identification throughout analysis and reporting. The log number is recorded on the chain-of-custody form and in the legally-required log book maintained by the laboratory. The sample description, date received, client's name, and other relevant information is also recorded.

### **Equipment Cleaning**

All reusable sampling equipments are cleaned using phosphate-free detergents and rinsed with de-ionized water.

**APPENDIX B**

**GEOTRACKER UPLOAD CONFIRMATION**

---

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!

<b><u>Submittal Type:</u></b>	<b>GEO_WELL</b>
<b><u>Submittal Title:</u></b>	<b>1Q09 GEO_WELL 498</b>
<b><u>Facility Global ID:</u></b>	<b>T0600124081</b>
<b><u>Facility Name:</u></b>	<b>ARCO #0498</b>
<b><u>File Name:</u></b>	<b>GEO_WELL.zip</b>
<b><u>Organization Name:</u></b>	<b>Broadbent &amp; Associates, Inc.</b>
<b><u>Username:</u></b>	<b>BROADBENT-C</b>
<b><u>IP Address:</u></b>	<b>67.118.40.90</b>
<b><u>Submittal Date/Time:</u></b>	<b>4/23/2009 8:57:08 AM</b>
<b><u>Confirmation Number:</u></b>	<b>7706124424</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>	1Q09 GW Monitoring
<b><u>Facility Global ID:</u></b>	T0600124081
<b><u>Facility Name:</u></b>	ARCO #0498
<b><u>File Name:</u></b>	09032006.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>	4/23/2009 9:02:20 AM
<b><u>Confirmation Number:</u></b>	<b>8738701939</b>

[VIEW QC REPORT](#)

[VIEW DETECTIONS REPORT](#)

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