



## Atlantic Richfield Company (a BP affiliated company)

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**RECEIVED** 

3:23 pm, Jul 30, 2008

Alameda County Environmental Health

25 July 2008

Re: Second Quarter 2008 Ground-Water Monitoring Report

Former BP Station # 11124

3315 High Street Oakland, California ACEH Case # RO0000239

"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 Manger



# Prepared for

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

## Prepared by

## BROADBENT & ASSOCIATES, INC. ENGINEERING, WATER RESOURCES & ENVIRONMENTAL

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

25 July 2008

Project No. 06-08-652

### **Second Quarter 2008 Ground-Water Monitoring Report**

Former BP Station #11124 3315 High Street Oakland, California



25 July 2008

Project No. 06-08-652

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

Attn.: Mr. Paul Supple

Re: Second Quarter 2008 Ground-Water Monitoring Report, Former BP Station #11124,

3315 High Street, Oakland, California; ACEH Case # RO0000239

Dear Mr. Supple:

Attached is the *Second Quarter 2008 Ground-Water Monitoring Report* for Former BP Station #11124 located at 3315 High Street, Oakland California (Site). This report presents a summary of results from ground-water monitoring and sampling conducted at the Site during the Second Quarter of 2008.

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.

Thomas A. Venus, P.E.

Senior Engineer

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

Enclosures

cc: Mr. Paresh Khatri, Alameda County Environmental Health (Submitted via ACEH ftp site)

Ms. Shelby Lathrop, ConocoPhillips, 76 Broadway, Sacramento, California 95818

Electronic copy uploaded to GeoTracker

**ARIZONA** 

CALIFORNIA

NEVADA

**TEXAS** 

ROBERT H MILLER

No. 4893

#### STATION #11124 QUARTERLY GROUND-WATER MONITORING REPORT

Facility: #11124 Address: 3315 High Street, Oakland, California
Environmental Business Manager: Mr. Paul Supple

Consulting Co./Contact Persons:

Broadbent & Associates, Inc.(BAI)/Rob Miller & Tom Venus

(530) 566-1400

Primary Agency/Regulatory ID No.: Alameda County Environmental Health (ACEH)

ACEH Case # RO0000239

Consultant Project No.: 06-08-652
Facility Permits/Permitting Agency: None

#### **WORK PERFORMED THIS QUARTER (Second Quarter 2008):**

1. Submitted First Quarter 2008 Ground-Water Monitoring Report.

- 2. Submitted letter dated 20 May 2008 to ACEH requesting modification to the existing monitoring/sampling program schedule.
- 3. Conducted ground-water monitoring/sampling for Second Quarter 2008. Work performed by Stratus Environmental, Inc. (Stratus) on 23 May 2008.

#### WORK PROPOSED FOR NEXT QUARTER (Third Quarter 2008):

- 1. Prepare and submit Second Quarter 2008 Ground-Water Monitoring Report (contained herein).
- 2. Conduct quarterly ground-water monitoring/sampling for Third Quarter 2008.

#### **QUARTERLY RESULTS SUMMARY:**

Current phase of project: **Ground-Water Monitoring/Sampling** Frequency of ground-water Quarterly: Wells MW-1, MW-2, MW-4, MW-5 and MW-6 monitoring: Frequency of ground-water sampling: Ouarterly: Wells MW-1, MW-2, MW-4, MW-5 and MW-6 Is free product (FP) present on-site: No Current remediation techniques: NA Depth to ground water (below TOC): 9.28 ft (MW-2) to 10.73 ft (MW-1) General ground-water flow direction: Southwest Approximate hydraulic gradient: 0.01 ft/ft

#### **DISCUSSION:**

Second quarter 2008 ground-water monitoring/sampling was conducted at Former BP Station #11124 on 23 May 2008 by Stratus personnel. No irregularities were noted during water level gauging. Depth-to-water level measurements ranged from 9.28 ft at MW-2 to 10.73 ft at MW-1. Resulting ground-water surface elevations ranged from 146.61 ft above mean sea level (msl) at well MW-1 to 144.61 ft above msl at well MW-6. Water level elevations were between historic minimum and maximum ranges for each well, as summarized in Table 1, with the following exception: the water level elevation reached a historic minimum value of 144.61 ft above msl in well MW-6. Water level elevations yielded a potentiometric ground-water flow direction and gradient to the southwest at approximately 0.01 ft/ft, consistent with historical data (see Table 3). Ground-water monitoring field data sheets are provided within Appendix A. Measured depths to ground water and respective ground-water elevations are summarized in Table 1. Potentiometric ground-water elevation contours are presented in Drawing 1.

Consistent with the current ground-water sampling schedule, water samples were collected from wells MW-1, MW-2, MW-4, MW-5, and MW-6. No irregularities were reported during sampling. Samples were submitted to Calscience Environmental Laboratories, Inc. (Garden Grove, California) under chain-of-custody protocol for laboratory analysis of Gasoline Range Organics (GRO, C6-C12) by EPA Method 8015B; Diesel Range Organics (DRO, C10-C28) by EPA Method 8015B; Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTEX) by EPA Method 8260B; and Methyl tert-butyl ether (MTBE), Ethyl tert-butyl ether (ETBE), Ethanol, 1,2-Dichloroethane (1,2-DCA), 1,2-Dibromomethane (EDB), Di-isopropyl ether (DIPE), tert-Butyl alcohol (TBA), and tert-Amyl methyl ether (TAME) by EPA Method 8260B. No significant irregularities were encountered during laboratory analysis of the samples. Ground-water sampling field data sheets and the laboratory analytical report, including chain-of-custody documentation, are provided in Appendix A.

MTBE was detected above the laboratory reporting limit in three of the five wells sampled at concentrations up to 1,200  $\mu$ g/L in well MW-5. DRO and the remaining fuel additives and oxygenates were not detected above their respective laboratory reporting limits in the five wells sampled this quarter. Detected analyte concentrations were within the historic minimum and maximum ranges recorded for each well with the following exception: the MTBE concentration for the sample collected from well MW-6 reached a historic maximum value of 150  $\mu$ g/L. Historic laboratory analytical results are summarized in Table 1 and Table 2. The most recent GRO, Benzene, and MTBE concentrations are also presented in Drawing 1. A copy of the laboratory analytical report, including chain-of-custody documentation, is provided in Appendix A. Ground-water monitoring data (GEO\_WELL) and laboratory analytical results (EDF) were uploaded to the GeoTracker AB2886 database. Upload confirmation pages are provided in Appendix B.

Within the First Quarter 2008 Ground-Water Monitoring Report, BAI proposed for ACEH consideration and approval a modification to the future monitoring and sampling schedule. A letter dated 20 May 2008 was sent to Mr. Paresh Khatri of ACEH via email and GeoTracker describing the modified monitoring and sampling schedule. This letter was followed by a telephone conversation between Mr. Tom Venus of BAI and Mr. Paresh Khatri of ACEH on 27 June 2008. BAI is currently awaiting comments or approval from ACEH regarding the modified schedule.

#### **CLOSURE:**

The findings presented in this report are based upon: observations of Stratus field personnel (see Appendix A), the points investigated, and results of laboratory tests performed by Calscience Environmental Laboratories, Inc. (Garden Grove, California). Our services were performed in accordance with the generally accepted standard of practice at the time this report was written. No other warranty, expressed or implied was made. This report has been prepared for the exclusive use of Atlantic Richfield Company. 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 Contours and Analytical Summary Map, 23 May 2008, Former BP Service Station #11124, 3315 High Street, Oakland, California
- Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses, Station #11124, 3315 High St., Oakland, California

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- Table 2. Summary of Fuel Additives Analytical Data, Station #11124, 3315 High St., Oakland, California
- Table 3. Historical Ground-Water Flow Direction and Gradient, Station #11124, 3315 High St., Oakland, California
- Appendix A. Stratus Ground-Water Sampling Data Package (Includes Field Data Sheets, Laboratory Analytical Report with Chain-of-Custody Documentation, and Field Procedures)
- Appendix B. GeoTracker Upload Confirmations

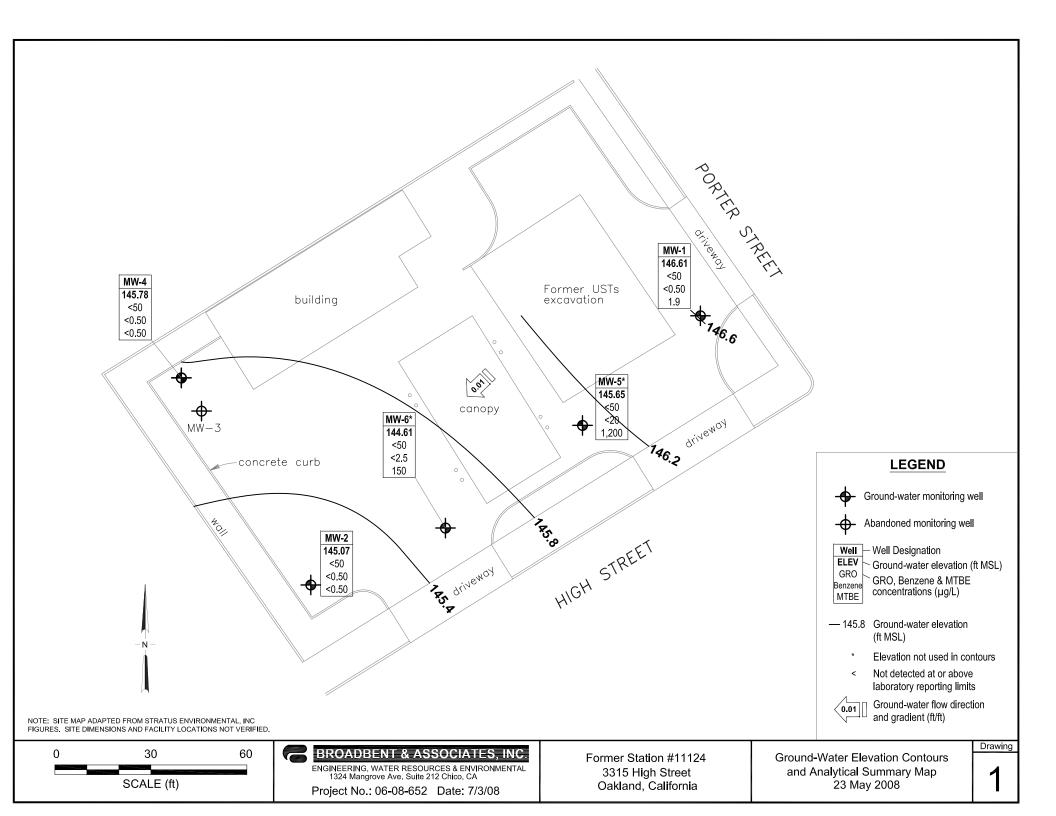


Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses
Station #11124, 3315 High St., Oakland, CA

			TOC		Product   Water Level   Concentrations in (µg/L)											DRO/	
Well and			Elevation	DTW	Thickness	Elevation	GRO/			Ethyl-	Total		DO			TPHd	TOG
Sample Date	P/NP	Footnote	(feet msl)	(feet bgs)	(feet)	(feet msl)	TPHg	Benzene	Toluene	Benzene	Xylenes	MtBE	(mg/L)	Lab	pН	$(\mu g/L)$	(µg/L)
MW-1																	
10/19/2004	P		154.99	10.50		144.49	< 50	< 0.50	< 0.50	< 0.50	< 0.50	14	0.96	SEQM	6.9		
01/13/2005	P		154.99	9.00		145.99	< 50	< 0.50	< 0.50	< 0.50	< 0.50	33	2.5	SEQM	6.4		
02/24/2006	P	c	154.99	10.42		144.57	55	< 0.50	< 0.50	< 0.50	< 0.50	51		SEQM	6.8		
5/30/2006	P		154.99	10.94		144.05	50	< 0.50	< 0.50	< 0.50	< 0.50	58		SEQM	6.6		
8/28/2006	P		154.99	10.61		144.38	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		TAMC	7.0		
11/2/2006	P		154.99	10.83		144.16	< 50	< 0.50	< 0.50	< 0.50	< 0.50	9.8	1.40	TAMC	6.99		
2/6/2007	P	d	157.34	9.88		147.46	< 50	< 0.50	< 0.50	< 0.50	< 0.50	1.1	2.76	TAMC	7.10		
3/13/2007	P		157.34	9.62		147.72							2.63	TAMC	7.30	<48	
5/8/2007	P		157.34	9.62		147.72	< 50	< 0.50	< 0.50	< 0.50	< 0.50	19	2.65	TAMC	7.01	<49	
8/7/2007	P		157.34	10.82		146.52	< 50	< 0.50	< 0.50	< 0.50	< 0.50	5.0	3.15	TAMC	7.33	<49	
11/13/2007			157.34	10.52		146.82							4.79	TAMC	6.58	<48	
12/20/2007	NP	e	157.34	10.47		146.87	< 50	< 0.50	< 0.50	< 0.50	< 0.50	10	1.14	TAMC	6.97		
2/29/2008	P		157.34	9.32		148.02	< 50	< 0.50	< 0.50	< 0.50	< 0.50	7.4	3.14	CEL	7.64	< 50	
5/23/2008	P		157.34	10.73		146.61	< 50	< 0.50	< 0.50	< 0.50	<0.50	1.9	1.76	CEL	6.83	< 50	
MW-2																	
10/19/2004		b	152.02	9.45		142.57											
01/13/2005	P		152.02	6.43		145.59	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	1.47	SEQM	6.4		
02/24/2006	P		152.02	7.88		144.14	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		SEQM	6.7		
5/30/2006	P		152.02	7.98		144.04	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		SEQM	6.7		
8/28/2006	P		152.02	9.38		142.64	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		TAMC	6.7		
11/2/2006			152.02	9.85		142.17											
2/6/2007	P	d	154.35	8.40		145.95	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	5.10	TAMC	7.02		
3/13/2007	P		154.35	7.55		146.80							4.83	TAMC	7.17	52	
5/8/2007	P		154.35	7.70		146.65	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	2.40	TAMC	7.12	<48	
8/7/2007	P		154.35	9.77		144.58	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	2.47	TAMC	7.19	<47	
11/13/2007			154.35	9.30		145.05							4.90	TAMC	7.02	<48	
12/20/2007	NP	e	154.35	9.34		145.01	<50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	1.62	TAMC	7.44		
2/29/2008	P	f	154.35	7.35		147.00	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	4.39	CEL	7.76	64	
5/23/2008	P		154.35	9.28		145.07	<50	<0.50	< 0.50	<0.50	<0.50	<0.50	0.93	CEL	7.07	<50	

Table 1. Summary of Ground-Water Monitoring Data: Relative Water Elevations and Laboratory Analyses
Station #11124, 3315 High St., Oakland, CA

Well and			TOC	DTW	Product	Water Level	GRO/	C	oncentrati	ons in (µg/	L) Total		DO			DRO/ TPHd	TOG
Sample Date	P/NP	Footnote	Elevation (feet msl)	(feet bgs)	Thickness (feet)	Elevation (feet msl)	TPHg	Benzene	Toluene	Ethyl- Benzene	Xvlenes	MtBE	(mg/L)	Lab	рH	1Fπα (μg/L)	μg/L)
	1/111	Toothote	(Teet Hist)	(Teet bgs)	(Icct)	(Icet msi)	II IIg	Bellzene	Totache	Denzene	zyrenes	WILDE	(mg/L)	Lab	pii	(µg/L)	(μg/L)
MW-4																	
10/19/2004	P		152.77	9.55		143.22	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.82	SEQM	7.0		
01/13/2005		a	152.77														
02/24/2006	P		152.77	7.86		144.91	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		SEQM	7.1		
5/30/2006	P		152.77	8.04		144.73	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		SEQM	6.9		
8/28/2006	P		152.77	9.36		143.41	< 50	< 0.50	< 0.50	< 0.50	< 0.50	16		TAMC	6.5		
11/2/2006	P		152.77	9.92		142.85	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	2.23	TAMC	6.79		
2/6/2007	P	d	155.10	8.40		146.70	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	1.43	TAMC	7.10		
3/13/2007	P		155.10	7.56		147.54							2.53	TAMC	7.18	<49	
5/8/2007	P		155.10	7.68		147.42	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	2.78	TAMC	7.28	<48	
8/7/2007	P		155.10	9.83		145.27	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	3.70	TAMC	7.13	<48	
11/13/2007			155.10	9.28		145.82							5.71	TAMC	7.11	<48	
12/20/2007	NP	e	155.10	9.23		145.87	< 50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	1.13	TAMC	7.16		
2/29/2008	P		155.10	7.27		147.83	< 50	< 0.50	< 0.50	< 0.50	< 0.50	1.5	4.26	CEL	8.03	< 50	
5/23/2008	P		155.10	9.32		145.78	< 50	<0.50	<0.50	< 0.50	<0.50	<0.50	1.43	CEL	7.11	< 50	
MW-5																	
3/13/2007	P	d	155.45	8.72		146.73	880	< 0.50	< 0.50	< 0.50	< 0.50	1,400	1.84	TAMC	7.36	<48	
5/8/2007	P	с	155.45	8.42		147.03	920	< 5.0	< 5.0	< 5.0	< 5.0	1,300	3.26	TAMC	7.50	<48	
8/7/2007	P	c	155.45	9.88		145.57	1,300	<10	<10	<10	<10	1,600	3.54	TAMC	7.34	<48	
11/13/2007	P	с	155.45	9.68		145.77	950	<10	<10	<10	<10	1,400	4.68	TAMC	6.99	<48	
2/29/2008	P		155.45	8.15		147.30	< 50	< 0.50	< 0.50	< 0.50	< 0.50	1,100	4.84	CEL	7.93	< 50	
5/23/2008	P		155.45	9.80		145.65	< 50	<20	<20	<20	<20	1,200	0.49	CEL	6.89	<50	
MW-6																	
3/13/2007	P	d	154.59	7.82		146.77	86	< 0.50	< 0.50	< 0.50	< 0.50	88	1.92	TAMC	7.21	<48	
5/8/2007	P	С	154.59	7.92		146.67	88	< 0.50	< 0.50	< 0.50	< 0.50	120	1.87	TAMC	7.50	<48	
8/7/2007	P	С	154.59	9.85		144.74	67	< 0.50	< 0.50	< 0.50	< 0.50	85	3.60	TAMC	7.25	<47	
11/13/2007	P	с	154.59	9.71		144.88	67	<1.0	<1.0	<1.0	<1.0	98	4.44	TAMC	7.16	<48	
2/29/2008	P		154.59	8.86		145.73	< 50	< 0.50	< 0.50	< 0.50	< 0.50	130	4.35	CEL	7.82	< 50	
5/23/2008	P		154.59	9.98		144.61	<50	<2.5	<2.5	<2.5	<2.5	150	0.62	CEL	7.12	<50	

#### ABBREVIATIONS AND SYMBOLS:

- --- = Not analyzed/measured/applicable
- < = Not detected at or above laboratory reporting limit

DO = Dissolved oxygen

ft bgs = Feet below ground surface

ft MSL = Feet above mean sea level

DTW = Depth to water in ft bgs

GRO = Gasoline range organics

GWE = Groundwater elevation in ft MSL

mg/L = Milligrams per liter

MTBE = Methyl tert-butyl ether

NP = Well not purged prior to sampling

P = Well purged prior to sampling

TOC = Top of casing in ft MSL

TPH-g = Total petroleum hydrocarbons as gasoline

 $\mu g/L = Micrograms per liter$ 

SEQM = Sequoia Analytical Morgan Hill (Laboratory)

#### FOOTNOTES:

- a = Well inaccessible.
- b = Well is dry.
- c = Hydrocarbon result for GRO partly due to individual peak(s) in quantitative range.
- d = Well survey by Morrow Surveying on 12/27/2006.
- e = Well re-sampled due to insufficient laboratory analysis of previous sampling event on 11/13/2007. The depth to water and resulting water level elevation from 11/13/2007 will be used for reporting purposes for Fourth Quarter 2007.
- f = The hydrocarbon pattern for DRO in the sample does not match that of the diesel standard used to calculate results.

#### NOTES:

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

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

Values for DO and pH were obtained through field measurements.

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

Table 2. Summary of Fuel Additives Analytical Data Station #11124, 3315 High St., Oakland, CA

Well and				Concentrati	ons in (µg/L)				
Sample Date	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	Comments
MW-1									
10/19/2004	<100	<20	14	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
01/13/2005	<100	<20	33	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
02/24/2006	<300	<20	51	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
5/30/2006	<300	<20	58	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
8/28/2006	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
11/2/2006	<300	<20	9.8	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
2/6/2007	<300	<20	1.1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
5/8/2007	<300	<20	19	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
8/7/2007	<300	<20	5.0	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
12/20/2007	<300	<20	10	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
2/29/2008	<300	<10	7.4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
5/23/2008	<300	<10	1.9	< 0.50	<0.50	< 0.50	<0.50	< 0.50	
MW-2									
01/13/2005	<100	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
02/24/2006	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
5/30/2006	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
8/28/2006	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
2/6/2007	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
5/8/2007	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
8/7/2007	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
12/20/2007	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
2/29/2008	<300	<10	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
5/23/2008	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	< 0.50	
MW-4									
10/19/2004	<100	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
02/24/2006	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
5/30/2006	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
8/28/2006	<300	<20	16	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
11/2/2006	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
2/6/2007	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	

Table 2. Summary of Fuel Additives Analytical Data Station #11124, 3315 High St., Oakland, CA

Well and				Concentration	ons in (µg/L)				
Sample Date	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	Comments
MW-4 Cont.									
5/8/2007	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
8/7/2007	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
12/20/2007	<300	<20	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
2/29/2008	<300	<10	1.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
5/23/2008	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
MW-5									
3/13/2007	<3,000	<200	1,400	< 5.0	<5.0	6.5	<5.0	< 5.0	
5/8/2007	<3,000	<200	1,300	< 0.50	< 0.50	7.0	< 0.50	< 0.50	
8/7/2007	<6,000	<400	1,600	<10	<10	<10	<10	<10	
11/13/2007	<6,000	<400	1,400	<10	<10	<10	<10	<10	
2/29/2008	<300	42	1,100	< 0.50	< 0.50	4.9	< 0.50	< 0.50	
5/23/2008	<12,000	<400	1,200	<20	<20	<20	<20	<20	
MW-6									
3/13/2007	<300	<20	88	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
5/8/2007	<300	<20	120	< 0.50	< 0.50	0.61	< 0.50	< 0.50	
8/7/2007	<300	<20	85	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
11/13/2007	<600	<40	98	<1.0	<1.0	<1.0	<1.0	<1.0	
2/29/2008	<300	<10	130	< 0.50	< 0.50	0.71	< 0.50	< 0.50	
5/23/2008	<1,500	< 50	150	<2.5	<2.5	<2.5	<2.5	<2.5	

#### ABBREVIATIONS AND SYMBOLS:

TBA = tert-Butyl alcohol

MTBE = Methyl tert-butyl ether

DIPE = Di-isopropyl ether

ETBE = Ethyl tert-butyl ether

TAME = tert-Amyl methyl ether

1,2-DCA = 1,2-Dichloroethane

EDB = 1,2-Dibromomethane

 $\mu g/L = micrograms per liter$ 

< = Not detected at or above laboratory reporting limit

#### NOTES:

All fuel oxygenate compounds are analyzed using EPA Method 8260B.

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

Table 3. Historical Ground-Water Flow Direction and Gradient Station #11124, 3315 High St., Oakland, CA

Date Sampled	Approximate Flow Direction	Approximate Hydraulic Gradient
11/12/1990		
7/15/1991	Southwest	0.0174
10/15/1991	Southwest	0.0182
1/15/1992	South-Southwest	0.014
4/17/1992	South	0.014
9/30/1992	South-Southwest	0.018
12/17/1992	North	0.01
3/15/1993	South	0.007
10/19/2004	South-Southwest	0.022
1/13/2005		
2/24/2006	Southeast	0.01
5/30/2006	East-Southeast	0.007
8/28/2006	South	0.012
11/2/2006	South	0.013
3/13/2007	Southwest	0.006
5/8/2007	South-Southwest	0.009
8/7/2007	Southwest	0.01
11/13/2007	Southwest	0.01
12/17/2007	Southwest	0.01
2/29/2008	Southwest	0.009
5/23/2008	Southwest	0.01

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

### APPENDIX A

STRATUS GROUND-WATER SAMPLING DATA PACKAGE (INCLUDES FIELD DATA SHEETS, LABORATORY ANALYTICAL REPORT WITH CHAIN-OF-CUSTODY DOCUMENTATION, AND FIELD PROCEDURES)



June 17, 2008

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

Re:

Groundwater Sampling Data Package, ARCO Service Station No. 11124, located at

3315 High Street, Oakland, California

#### **General Information**

Data Submittal Prepared / Reviewed by: Becky Carroll / Jay Johnson

Phone Number: (530) 676-6000

On-Site Supplier Representative: Jerry Gonzales

Sampling Date: May 23, 2008

Arrival: 15:50 Departure: 18:05
Weather Conditions: Partly Cloudy
Unusual Field Conditions: None noted.

Scope of Work Performed: Quarterly monitoring and sampling.

Variations from Work Scope: None noted.

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

Sincerely,

STRATUS ENVIRONMENTAL, INC.

Jay R. Johnson, P.G. Project Manager

#### **Attachments:**

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

Jay R. Johnson

No. 5867

cc: Mr. Paul Supple, BP/ARCO

#### BP Alameda Portfolio HYDROLOGIC DATA SHEET AR 12 -Project Name: 3315 High Street, Oakland Field Technician: 🖒 😅 🔫 ⊱ Project Number: 11124 TOC = Top of Well Casing Elevation DIA = Well Casing Diameter TOS = Depth to Top of Screen ELEV = Groundwater Elevation DTW = Depth to Groundwater Below TOC DUP = Duplicate DTB = Depth to Bottom of Well Casing Below TOC WELL OR PURGE & SHEEN 00 LOCATION TIME SAMPLE CONFIRMATION MEASUREMENT COMMENTS TOC TOS DTW DTB DIA ELEV (w/baller) zo23 |3447 DO1.76 9=5 9.56 0.95 28.80 405 16:15 30/8 21 400 76°7 9.70 29,83 0.49 445 0.62 22.55 Y & Calibration Date pH <u>5/23/</u>07 pH/Conductivity/temperature Meter - YSI Model 63 Conductivity S/23/08 DO Meter - YSI 55 Series (DO is always measured before purge)

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Please refer to groundwater sampling field procedures

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Sample depth to water:		SAMPL.	EINFORMATIO		SAMPLE TURBIL	тү: <u>С</u>	. C. A. L.
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Bladder Pump Centrifugal Pump Submersible Pump Peristalic Pump Other:	Bailer (To	/C) sinless Steel)	Cente Subst Peris	der Pump dfugal Pump ersible Pum talic Pump	Baller p Baller Dodie	(Teflon)	or <u> </u>
WELL INTEGRITY: 5000					LOCK#: Des		

# WELLHEAD OBSERVATION FORM

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Well I.D.	Box in Good Condition?	Lock Missing?	Water in Wellbox?	Water Level Relative to Cap?	Well Cap?	Bolts Missing?	Bolts Stripped?	Bolt Holes Stripped?	Broken Lid?	Cracked or Broken Box?	Grout Level more than Ift below TOC?	Additional Comments  tent, memory, bet, connect receits  regle covert, me what explanels
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## NO. 666723

# NON-HAZARDOUS WASTE DATA FORM

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## **Chain of Custody Record**

Project Name: #P 11124

BP BU/AR Region/Enfos Segment:

BP > Americas > West > Retail > CA > Alexaeda > 11124

State or Lead Regulatory Agency:

Requested Due Date (mm/dd/yy):

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Off-site Time: / & v5	Temp:	7 6
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Address: 7440 Lincoln Way	~~~~					1	BP/AR Facility Ad	dresi	l:	331	15 H	ligh S	tree	et, Oal	klan	d		DOCUMENT OF STREET	31	dres	*********	*****	*****	******		on Park Drive, Su		***************************************
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June 10, 2008

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

Subject:

Calscience Work Order No.:

08-05-2358

Client Reference:

BP 11124

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 5/28/2008 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,

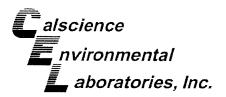
Calscience Environmental

Philip Samelle for

Laboratories, Inc.

Linda Scharpenberg

Project Manager



#### **CASE NARRATIVE - 08-05-2358**

#### **Data Qualifiers - EPA 8260:**

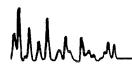
#### 080603S02:

The RPDs for toluene and ethanol were outside criteria in the MS/MSD. The RPD was within criteria in the LCS/LCSD. The MS/MSD has been flagged "4" within the report.

"4" = BA, AY

BA – Relative Percent Difference out of Control

AY = Matrix Interference Suspected





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

Date Received: Work Order No: Preparation: Method:

05/28/08 08-05-2358 EPA 5030B EPA 8015B (M)

Project: BP 11124							Pa	age 1 of 2
Client Sample Number		Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
MW-1		08-05-2358-1-D	05/23/08 16:35	Aqueous	GC 4	05/31/08	06/01/08 05:27	080531B01
<u>Parameter</u>	Result	<u>RL</u>	<u>DF</u>	Qual	<u>Units</u>			
Gasoline Range Organics (C6-C12)	ND	50	1		ug/L			
Surrogates:	REC (%)	Control Limits		Qual				
1,4-Bromofluorobenzene	81	38-134						
MW-2		08-05-2358-2-D	05/23/08 13:29	Aqueous	GC 4	05/31/08	06/01/08 06:00	080531B01
Parameter	Result	<u>RL</u>	<u>DF</u>	Qual	<u>Units</u>			
Gasoline Range Organics (C6-C12)	ND	50	1		ug/L			
Surrogates:	REC (%)	Control Limits		Qual				
1,4-Bromofluorobenzene	87	38-134						
MW-4		08-05-2358-3-D	05/23/08 17:45	Aqueous	GC 4	05/31/08	06/01/08 06:33	080531B01
<u>Parameter</u>	Result	<u>RL</u>	<u>DF</u>	Qual	<u>Units</u>			
Gasoline Range Organics (C6-C12)	ND	50	1		ug/L			
Surrogates:	REC (%)	Control Limits		Qual				
1,4-Bromofluorobenzene	80	38-134						
MW-5		08-05-2358-4-D	05/23/08 16:50	Aqueous	GC 4	05/31/08	06/01/08 07:06	080531B01
<u>Parameter</u>	Result	<u>RL</u>	DF	Qual	<u>Units</u>			
Gasoline Range Organics (C6-C12)	ND	50	1		ug/L			
Surrogates:	REC (%)	Control Limits		Qual				
1,4-Bromofluorobenzene	88	38-134						

RL - Reporting Limit ,

DF - Dilution Factor ,

Qual - Qualifiers



Stratus Environmental, inc. 3330 Cameron Park Drive, Suite 550 Cameron Park, CA 95682-8861 Date Received: Work Order No:

05/28/08 08-05-2358 EPA 5030B

Preparation: Method:

EPA 8015B (M)

Project: BP 11124

Page 2 of 2

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Client Sample Number		Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
MW-6		08-05-2358-5-D	05/23/08 17:10	Aqueous	GC 4	05/31/08	06/01/08 07:39	080531B01
Parameter	<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			
Surrogates:	REC (%)	Control Limits		Qual				
1,4-Bromofluorobenzene	85	38-134						
Method Blank		099-12-695-151	N/A	Aqueous	GC 4	05/31/08	05/31/08 16:15	080531B01
<u>Parameter</u>	Result	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Units</u>			
Gasoline Range Organics (C6-C12)	ND	50	1		ug/L			
Surrogates:	REC (%)	Control Limits		Qual				
1,4-Bromofluorobenzene	86	38-134						



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

Date Received: Work Order No: Preparation: Method: 05/28/08 08-05-2358 EPA 3510C EPA 8015B (M)

Project: BP 11124

Page 1 of 2

Project: BP 11124							Pa	age 1 of 2	
Client Sample Number		Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID	
MW-1		08-05-2358-1-H	05/23/08 16:35	Aqueous	GC 43	05/28/08	05/29/08 09:24	080528B06	
<u>Parameter</u>	Result	<u>RL</u>	<u>DF</u>	Qual	<u>Units</u>				
Diesel Range Organics (C10-C28)	ND	50	1		ug/L				
Surrogates:	REC (%)	Control Limits		Qual					
Decachlorobiphenyl	134	68-140							
MW-2		08-05-2358-2-H	05/23/08 13:29	Aqueous	GC 43	05/28/08	05/29/08 09:32	080528B06	
<u>Parameter</u>	Result	<u>RL</u>	<u>DF</u>	Qual	<u>Units</u>				
Diesel Range Organics (C10-C28)	ND	50	1		ug/L				
Surrogates:	REC (%)	Control Limits		<u>Qual</u>					
Decachlorobiphenyl	120	68-140							
MW-4		08-05-2358-3-H	05/23/08 17:45	Aqueous	GC 43	05/28/08	05/29/08 09:40	080528B06	
Parameter	Result	<u>RL</u>	DF	Qual	<u>Units</u>				
Diesel Range Organics (C10-C28)	ND	50	1		ug/L				
Surrogates:	REC (%)	Control Limits		Qual					
Decachlorobiphenyl	99	68-140							
MW-5		08-05-2358-4-H	05/23/08 16:50	Aqueous	GC 43	05/28/08	05/29/08 09:48	080528B06	
<u>Parameter</u>	Result	<u>RL</u>	DF	Qual	<u>Units</u>				
Diesel Range Organics (C10-C28)	ND	50	1		ug/L				
Surrogates:	REC (%)	Control Limits		Qual					
Decachlorobiphenyl	115	68-140							

RL - Reporting Limit ,

DF - Dilution Factor ,

Qual - Qualifiers



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

Date Received: Work Order No: Preparation:

Method:

05/28/08 08-05-2358 EPA 3510C EPA 8015B (M)

Project: BP 11124

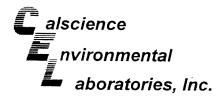
Decachlorobiphenyl

Page 2 of 2

							Pa	ige 2 01 2
Client Sample Number		Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
MW-6	MARKET 11	08-05-2358-5-H	05/23/08 17:10	Aqueous	GC 43	05/28/08	05/29/08 10:11	080528B06
<u>Parameter</u>	Result	<u>RL</u>	<u>DF</u>	Qual	<u>Units</u>		-	
Diesel Range Organics (C10-C28)	ND	50	1		ug/L			
Surrogates:	REC (%)	Control Limits		Qual				
Decachlorobiphenyl	110	68-140						
Method Blank	100 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	099-12-699-50	N/A	Aqueous	GC 43	05/28/08	05/29/08 08:13	080528B06
<u>Parameter</u>	Result	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Units</u>		,	
Diesel Range Organics (C10-C28)	ND	50	1		ug/L			
Surrogates:	REC (%)	Control Limits		Qual				

123

68-140



Stratus Environmental, inc.	Date Received:	05/28/08
3330 Cameron Park Drive, Suite 550	Work Order No:	08-05-2358
Cameron Park, CA 95682-8861	Preparation:	EPA 5030B
	Method:	EPA 8260B
	Units:	ug/L

Project: BP 11124

Page 1 of 2

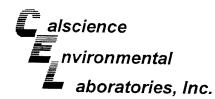
										, u	90 1012
Client Sample Number				Lab Sampl Number	e Date/Time Collected	Matrix	Instrument	Date Prepare		/Time yzed	QC Batch ID
MW-1			08-08	5-2358-1-E	05/23/08 16:35	Aqueous	GC/MS BB	06/03/08		4/08 :52	080603L02
Parameter	Result	RL	DF	Qual	Parameter			Result	RL	DF	Qual
Benzene	ND	0.50	1		Methyl-t-Butyl	Ether (MTR	F)	1.9	0.50	1	
1,2-Dibromoethane	ND	0.50	1		Tert-Butyl Alco		_,	ND	10	1	
1,2-Dichloroethane	ND	0.50	1		Diisopropyl Et			ND .	0.50	1	
Ethylbenzene	ND	0.50	1		Ethyl-t-Butyl E	٠,		ND	0.50	1	
Toluene	ND	0.50	1		Tert-Amyl-Met	,		ND	0.50	1	
Xylenes (total)	ND	0.50	1		Ethanol		((*))	ND	300	1	
Surrogates:	REC (%)	Control Limits	·	Qual	Surrogates:		E	REC (%)	Control Limits	1	Qual
1,2-Dichloroethane-d4	105	73-157			Dibromofluoro	methane		106	82-142		
Toluene-d8	97	82-112			1,4-Bromofluo			88	75-105		
MW-2			08-05	-2358-2-B	05/23/08 13:29	Aqueous	GC/MS BB		06/04		080603L02
Dorometor	0 4				_			*******			
<u>Parameter</u>	Result	RL	<u>DF</u>	<u>Qual</u>	<u>Parameter</u>			Result	<u>RL</u>	DF	Qual
Benzene	ND	0.50	1		Methyl-t-Butyl I		Ξ)	ND	0.50	1	
1,2-Dibromoethane	ND	0.50	1		Tert-Butyl Alco			ND	10	1	
1,2-Dichloroethane	ND	0.50	1		Diisopropyl Eth			ND	0.50	1	
Ethylbenzene	ND	0.50	1		Ethyl-t-Butyl Et	her (ETBE)		ND	0.50	1	
Toluene	ND	0.50	1		Tert-Amyl-Meth	nyl Ether (TA	ME)	ND	0.50	1	
Xylenes (total)	ND	0.50	1		Ethanol			ND	300	1	
Surrogates:	<u>REC (%)</u>	Control Limits		<u>Qual</u>	Surrogates:		<u>R</u>	EC (%)	Control Limits		Qual
1,2-Dichloroethane-d4	99	73-157			Dibromofluoron	nethane		99	82-142		
Foluene-d8	97	82-112			1,4-Bromofluor	obenzene			75-105		
MW-4			08-05-	2358-3-B	05/23/08 17:45	Aqueous	GC/MS BB	06/03/08	06/04 06:5		080603L02
Parameter	Result	<u>RL</u>	<u>DF</u>	Qual	Parameter		[	Result	RL	DF	Qual
Benzene	ND	0.50	1		Methyl-t-Butyl E	ther (MTBF	_	ND	0.50	1	
,2-Dibromoethane	ND	0.50	1		Tert-Butyl Alcoh		,	ND	10	1	
,2-Dichloroethane	ND	0.50	1		Diisopropyl Ethe	` '		ND	0.50	1	
Ethylbenzene	ND	0.50	1		Ethyl-t-Butyl Eth	` ,		ND	0.50	1	
oluene	ND	0.50	1		Tert-Amyl-Meth	,		ND	0.50	1	
(ylenes (total)	ND	0.50	1		Ethanol	, <b>\*</b>	,		300	1	
Surrogates:	REC (%)	Control		Qual	Surrogates:			'	Control	•	Qual
		Limits					7.22	(,0)	Limits		<u>Section</u>
,2-Dichloroethane-d4	118	73-157			Dibromofluorom	ethane	1	13 8	32-142		
oluene-d8	97	82-112			1,4-Bromofluoro	benzene			75-105		
					,				0.100		

RL - Reporting Limit ,

DF - Dilution Factor ,

Qual - Qualifiers





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

Date Received: Work Order No: Preparation: Method: Units:

05/28/08 08-05-2358 EPA 5030B EPA 8260B ug/L

Project: BP 11124

Page 2 of 2

		***								Pa	ge 2 of 2
Client Sample Number	***			Lab Samp Number	le Date/Time Collected	Matrix	Instrument	Date Prepare		e/Time	QC Batch ID
MW-5			08-0	5-2358-4-E	3 05/23/08 16:50	Aqueous	GC/MS BE	06/03/08		04/08 1:29	080603L02
Parameter	Result	<u>RL</u>	DF	Qual	Parameter			Result	RL	DF	Qual
Benzene	ND	20	40		Methyl-t-Butyl	Ether (MTE	SE)	1200	20		
1,2-Dibromoethane	ND	20	40		Tert-Butyl Alc		,_,	ND		4	_
1,2-Dichloroethane	ND	20	40		Diisopropyl Et			ND	400	4	-
Ethylbenzene	ND	20	40		Ethyl-t-Butyl E		1	ND	20	4	
Toluene	ND	20	40		Tert-Amyl-Me			ND	20	41	
Xylenes (total)	ND	20	40		Ethanol	ulyi Eulei (1	AIVIE)		20	40	
Surrogates:	REC (%)	Control	70	Qual	Surrogates:			ND	12000	40	=
		Limits		Quai	Surrogates.		Į.	REC (%)	Control		<u>Qual</u>
1,2-Dichloroethane-d4	123	73-157			Dibromofluoro	methane		114	Limits		
Toluene-d8	102	82-112			1,4-Bromofluo				82-142		
MW-6		02 112			1,4-5101101100	robenzene		88	75-105		
I MAA-O	***************************************		08-05	-2358-5-B	05/23/08 17:10	Aqueous	GC/MS BB	06/03/08	06/0 08:		080603L02
<u>Parameter</u>	Result	RL	DF	Qual	Parameter			Result	RL	DF	Ougl
Benzene	ND	2.5	5	•	Methyl-t-Butyl	Ether (MTR)	=1	150			<u>Qual</u>
1,2-Dibromoethane	ND	2.5	5		Tert-Butyl Alco		=)		2.5	5	
1,2-Dichloroethane	ND	2.5	5		Diisopropyl Eth			ND	50	5	
Ethylbenzene	ND	2.5	5		Ethyl-t-Butyl Et			ND	2.5	5	
Toluene	ND	2.5	5		Tert-Amyl-Meth		\	ND	2.5	5	
(vlenes (total)	ND	2.5	5		Ethanol	iyi cirier (17	AIVIE)	ND	2.5	5	
Surrogates:	REC (%)	Control	э	Ougl			_		1500	5	
33.00	INCO (70)	Limits		<u>Qual</u>	Surrogates:		R	EC (%)	Control		<u>Qual</u>
,2-Dichloroethane-d4	132	73-157			Dibaaaaafi				Limits		
oluene-d8	96	82-112			Dibromofluoron				82-142		
		02-112			1,4-Bromofluor	openzene		84	75-105		
Method Blank			099-12	-703-258	N/A	Aqueous	GC/MS BB	06/03/08	06/04 03:4		080603L02
Parameter	Result	RL	DF	Qual	Parameter			Result	RL	DE	Ougl
Benzene	ND	0.50	1		Methyl-t-Butyl E	thor (MTDE				DF	<u>Qual</u>
,2-Dibromoethane	ND	0.50	1		Tert-Butyl Alcoh		•	ND	0.50	1	
,2-Dichloroethane	ND	0.50	1		Diisopropyl Ethe			ND	10	1	
thylbenzene	ND	0.50	1			` '		ND ND	0.50	1	
oluene	ND	0.50	1		Ethyl-t-Butyl Eth	, ,		ND	0.50	1	
ylenes (total)	ND	0.50	1		Tert-Amyl-Methy Ethanol	yı ⊏tner (TA	,	ND	0.50	1	
urrogates:	REC (%)	Control	ı	Ouel					300	1	
	110 (70)	Limits		Qual	Surrogates:		R		Control		Qual
2-Dichloroethane-d4	124	73-157			Dibramafica	-41	_		<u>Limits</u>		
oluene-d8	97	82-112			Dibromofluorom				2-142		
	31	02-112			1,4-Bromofluoro	penzene	8	33 7	5-105		

RL - Reporting Limit ,

DF - Dilution Factor ,

Qual - Qualifiers



## Quality Control - Spike/Spike Duplicate

Method:

aboratories, Inc.

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

Date Received: Work Order No: Preparation:

05/28/08 08-05-2358 **EPA 5030B** EPA 8015B (M)

Project BP 11124

Gasoline Range Organics (C6-C12)

Quality Control Sample ID	Matrix	Instrument	Date Prepared		Date Analyzed	MS/MSD Batch Number
08-05-2133-1	Aqueous	GC 4	05/31/08		05/31/08	080531S01
<u>Parameter</u>	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers

117

38-134

5

0-25

106



## Quality Control - Spike/Spike Duplicate

aboratories, Inc.

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

Date Received: Work Order No: Preparation: Method:

05/28/08 08-05-2358 EPA 5030B EPA 8260B

#### Project BP 11124

Quality Control Sample ID	Matrix	Instrument	Date Prepared		Date Analyzed	MS/MSD Batch Number
08-06-0103-4	Aqueous	GC/MS BB	06/03/08		06/04/08	080603S02
<u>Parameter</u>	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers

<u>Parameter</u>	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	106	107	86-122	1	0-8	
Carbon Tetrachloride	109	108	78-138	1	0-9	
Chlorobenzene	101	104	90-120	3	0-9	
1,2-Dibromoethane	98	106	70-130	8	0-30	
1,2-Dichlorobenzene	101	100	89-119	1	0-10	
1,1-Dichloroethene	110	96	52-142	13	0-23	
Ethylbenzene	108	107	70-130	0	0-30	
Toluene	103	91	85-127	13	0-12	4
Trichloroethene	97	95	78-126	2	0-10	
Vinyl Chloride	95	87	56-140	8	0-21	
Methyl-t-Butyl Ether (MTBE)	109	95	64-136	14	0-28	
Tert-Butyl Alcohol (TBA)	105	109	27-183	4	0-60	
Diisopropyl Ether (DIPE)	112	96	78-126	15	0-16	
Ethyl-t-Butyl Ether (ETBE)	109	94	67-133	14	0-21	
Tert-Amyl-Methyl Ether (TAME)	103	100	63-141	2	0-21	
Ethanol	45	90	11-167	67	0-64	4



# **Quality Control - LCS/LCS Duplicate**

aboratories, Inc.

Stratus Environmental, inc.

3330 Cameron Park Drive, Suite 550 Cameron Park, CA 95682-8861

Date Received:

Work Order No: Preparation:

78-120

Method:

N/A

08-05-2358 **EPA 5030B** 

EPA 8015B (M)

0-20

Project: BP 11124

Quality Control Sample ID	Matrix	Instrur	ment	Date Prepare		Date nalyzed	LCS/LCSD Bate Number	ch
099-12-695-151	Aqueous	GC .	4	05/31/0	)8 05	/31/08	080531B01	
<u>Parameter</u>	LCS %	6REC	LCSD %R	<u>EC</u>	%REC CL	RPD	RPD CL	Qualifiers
Gasoline Range Organics (C6-C12)	97		99		78-120	2	0-20	



# **Quality Control - LCS/LCS Duplicate**

aboratories, Inc.

Stratus Environmental, inc. 3330 Cameron Park Drive, Suite 550

Cameron Park, CA 95682-8861

Date Received:

Work Order No: Preparation:

Method:

N/A

08-05-2358 EPA 3510C

EPA 8015B (M)

Project: BP 11124

Quality Control Sample ID	Matrix	Instrum	_	ate oared	Da Anal	ite yzed	LCS/LCSD Bate Number	:h
099-12-699-50	Aqueous	GC 43	05/2	8/08	05/29	9/08	080528B06	
Parameter	LCS %	6REC L	CSD %REC	<u>%RI</u>	EC CL	RPD	RPD CL	Qualifiers
Diesel Range Organics (C10-C28)	98		92	75	5-117	6	0-20	



### Quality Control - LCS/LCS Duplicate

aboratories, Inc.

Stratus Environmental, inc. 3330 Cameron Park Drive, Suite 550

Cameron Park, CA 95682-8861

Date Received: Work Order No: Preparation:

Method:

N/A 08-05-2358 **EPA 5030B EPA 8260B** 

Project: BP 11124

Quality Control Sample ID	Matrix	Instrument	Date Prepared		ate lyzed	LCS/LCSD Bate Number	ch
099-12-703-258	Aqueous	GC/MS BB	06/03/08	06/0	4/08	080603L02	
<u>Parameter</u>	LCS %R	EC LCSD 9	<u>6REC</u> %	REC CL	RPD	RPD CL	Qualifiers
Benzene	100	100		87-117	0	0-7	
Carbon Tetrachloride	107	108		78-132	0	0-8	
Chlorobenzene	98	99		88-118	0	0-8	
1,2-Dibromoethane	102	102		80-120	0	0-20	
1,2-Dichlorobenzene	98	102		88-118	3	0-8	
1,1-Dichloroethene	105	104		71-131	1	0-14	
Ethylbenzene	102	105		80-120	3	0-20	
Toluene	100	97		85-127	3	0-7	
Trichloroethene	108	110		85-121	2	0-11	
Vinyl Chloride	95	94		64-136	0	0-10	
Methyl-t-Butyl Ether (MTBE)	110	103		67-133	6	0-16	
Tert-Butyl Alcohol (TBA)	95	107	;	34-154	11	0-19	
Diisopropyl Ether (DIPE)	111	105	;	80-122	6	0-8	
Ethyl-t-Butyl Ether (ETBE)	109	105	<del>.</del>	73-127	3	0-11	
Tert-Amyl-Methyl Ether (TAME)	103	98	(	39-135	5	0-12	
Ethanol	82	83	:	34-124	2	0-44	



## **Glossary of Terms and Qualifiers**

Work Order Number: 08-05-2358

***************************************	
Qualifier	<u>Definition</u>
*	See applicable analysis comment.
1	Surrogate compound recovery was out of control due to a required sample dilution, therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
4	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD was in control and, therefore, the sample data was reported without further clarification.
5	The PDS/PDSD associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS/LCSD was in control and, hence, the associated sample data was reported with no further corrective action required.
Α	Result is the average of all dilutions, as defined by the method.
В	Analyte was present in the associated method blank.
С	Analyte presence was not confirmed on primary column.
Ε	Concentration exceeds the calibration range.
Н	Sample received and/or analyzed past the recommended holding time.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
N	Nontarget Analyte.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
U	Undetected at the laboratory method detection limit.
Χ	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

# Atlantic Richfield Company

A BP affiliated company

# **Chain of Custody Record**

Project Name:

BP 11124

BP BU/AR Region/Enfos Segment:

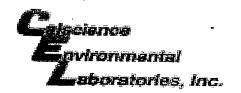
BP > Americas > West > Retail > CA > Alameda>11124

State or Lead Regulatory Agency:

Requested Due Date (mm/dd/yy):

	PageIotI
On-site Time: /550	Temp: 5 5
Off-site Time: / 805	Temp: 7 6
Sky Conditions: PerTy Cloud	
Meteorological Events: 🗥	
Wind Speed: //C	Direction: NW

Lab Name: Calscience						BP/AR Facility No	).;	1	1124									T <sub>C</sub>	neul	ant/	, , ,	not-			Charles D.		
Address: 7440 Lincoln Way						BP/AR Facility Address: 3315 High Street, Oakland						Consultant/Contractor: Stratus Environmental, Inc. Address: 3330 Cameron Park Drive, Suite 550															
Garden Grove, CA 92841						Site Lat/Long:							╬	ui es:	s		30 (	cam	Do:	on Park Drive, Su k, CA 95682	iite 550						
Lab PM: Linda Scharpenberg						California Global ID #: T06001001919							- -		on+/C												
Tele/Fax: 714-895-5494 714-895-7501(fax)					Enfos Project No.:				-0022									nsult									
BP/AR PM Contact: Paul Supple					Provision or RCO	e (ci	_				visio	n					7	le/Fa						Jay Joh			
Address: 2010 Crow Canyon Place, Suite 150					Phase/WBS:				nitorir		11010	·11							-					000 / (530) 676-6			
San Ramon, CA						C 1 P1								Report Type & QC Level: Level 1 with EDF E-mail EDD To: shayes@stratusinc.net													
Tele/Fax: 925-275-3506						Cost Element:				tracto		OF	•					Inv	man i	טעב	10:	SI tia D	laye	<u> 35(C</u>	<u>wstratusinc.net</u> f Co.		
Lab Bottle Order No:				Ma	trix		T	T		Prese	-	-		<u> </u>			Req					ne R	Jeni	iela Tr	I Co.		
Item No. Sample Description	Time	Date	Soil/Solid	Water/Liquid	Air	Laboratory No.	No. of Containers	Unpreserved				Methanol		BTEX/Oxy*by 8260	1,2 DCA	ЕОВ	Ethanol by 8260	Π	Τ	T	340				*Oxy = MTBD, T	aments	_
1 MW-1	16.35	5/23/8		x			8	-	+=	ΤĒ	<del></del>	<del>                                     </del>	十一		1	<del>T</del>		+	+	+-	┿	┿	+	╬			
2 MW-2	17:27	<del></del>	╫╴	X	-	1	8		╁	╁	X	-	_	<u>X</u> _	X	X	X	1	X	_	↓_	<u> </u>		╬			
3 MW-4		<b>√</b>	╢		_	<u> </u>	JL	<u> </u>	_	┼	X	<del> </del> _		<u>X</u>	X	X	X	X	X	L							
	17 45		╢	X		1	8	11.	$oldsymbol{\perp}$		X		$oxed{oxed}$	x	x	X	X	x	X					$\neg \Gamma$		<del></del>	
4 MW-5	1650		_	Х			8	<i>!</i> !			X			X	X	x	х	х	X		1	1	†	╁			
5 MW-6	1710			$ _{X} $			8				Х		1		X	<del>                                     </del>	<del> </del>	1-	+	$\vdash$	╁	+	╁╌	╬	***************************************		
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7	┨	<del>                                     </del>	╟			<b> </b>	F	₽-	+	╀	X	<u> </u>	1	X_	X	X	X	X	X	<u> </u>				F	HOLD		
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Custody Seals In Place: Yes /	No	Tem	o Bla	ink:	Yes/1	No Cooler	rem:	0.00	Res	alnt.		Or	7/C		- Arr	/ <del></del>	i. •		<del>- , _</del>								
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WORK ORDER #: **08** - 0 5 - 2 3 5 8

Cooler \_\_\_\_ of \_\_\_

# SAMPLE RECEIPT FORM

CLIENT: Stratus	DATE:	5/28/08
TEMPERATURE - SAMPLES RECEIVED BY:		
CALSCIENCE COURIER:  Chilled, cooler with temperature blank provided. Chilled, cooler without temperature blank. Chilled and placed in cooler with wet ice. Ambient and placed in cooler with wet ice. Ambient temperature.  C Temperature blank.	LABORATORY (Other  C Temperature  C IR thermomet  Ambient tempera	ter.
CUSTODY SEAL INTACT:		
Sample(s): Cooler: No (Not In	itact) :N	ot Present:
SAMPLE CONDITION:		
Chain-Of-Custody document(s) received with samples		
COMMENTS:		

#### **ATTACHMENT**

# FIELD PROCEDURES FOR GROUNDWATER SAMPLING

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

#### Equipment Calibration

Standard groundwater sampling equipment – pH/Conductivity/Temperature meter, and dissolved oxygen (DO) meters are calibrated prior to all field work. All calibration is conducted in accordance with equipment manufacturer's recommended procedure and buffer solutions. MSDS for all buffer solutions are maintained in Stratus vehicles. Calibration is completed everyday prior to field work and also once a week. The pH probe is calibrated for a pH of 7.0 daily and for 4.0, 7.0 and 10.0 weekly. The conductivity probe is calibrated for 1413 µs daily and 1413 µs and 447 µs weekly. The temperature probe is calibrated weekly with a NIST-traceable thermometer. The DO probe is calibrated for 100% oxygen daily and 0% and 100% oxygen weekly. All calibration logs are maintained in the Stratus office.

# 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 CONFIRMATIONS

# **Electronic Submittal Information**

Main Menu | View/Add Facilities | Upload EDD | Check EDD

#### UPLOADING A GEO\_WELL FILE

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

Submittal Title: 2Q08 GEO\_WELL 11124

Facility Global ID: T0600100919
Facility Name: BP #11124

Submittal Date/Time: 6/30/2008 2:50:42 PM

**Confirmation Number: 6847031116** 

**Back to Main Menu** 

Logged in as BROADBENT-C (CONTRACTOR)

CONTACT SITE ADMINISTRATOR.

## **Electronic Submittal Information**

Main Menu | View/Add Facilities | Upload EDD | Check EDD

Your EDF file has been successfully uploaded!

Confirmation Number: 3935756087

**Date/Time of Submittal:** 6/30/2008 2:52:56 PM

Facility Global ID: T0600100919 Facility Name: BP #11124

**Submittal Title:** 2Q08 GW Monitoring **Submittal Type:** GW Monitoring Report

Click here to view the detections report for this upload.

**BP #11124** Regional Board - Case #: 01-0996

SAN FRANCISCO BAY RWQCB (REGION 2) 3315 HIGH OAKLAND, CA 94619 Local Agency (lead agency) - Case #: RO0000239

ALAMEDA COUNTY LOP - (PK)

CONF# TITLE **QUARTER** 3935756087 2Q08 GW Monitoring Q2 2008

SUBMITTED BY **SUBMIT DATE STATUS** 

Broadbent & Associates, Inc. 6/30/2008 PENDING REVIEW

#### SAMPLE DETECTIONS REPORT

# FIELD POINTS SAMPLED # FIELD POINTS WITH DETECTIONS 3 # FIELD POINTS WITH WATER SAMPLE DETECTIONS ABOVE MCL 2 SAMPLE MATRIX TYPES WATER

#### METHOD QA/QC REPORT

TECHNICAL HOLDING TIME VIOLATIONS

METHODS USED M8015,SW8260B TESTED FOR REQUIRED ANALYTES? LAB NOTE DATA QUALIFIERS Υ

0

0

#### **QA/QC FOR 8021/8260 SERIES SAMPLES**

METHOD HOLDING TIME VIOLATIONS LAB BLANK DETECTIONS ABOVE REPORTING DETECTION LIMIT 0 LAB BLANK DETECTIONS 0 DO ALL BATCHES WITH THE 8021/8260 SERIES INCLUDE THE FOLLOWING? - LAB METHOD BLANK - MATRIX SPIKE Υ - MATRIX SPIKE DUPLICATE Υ - BLANK SPIKE Υ - SURROGATE SPIKE

#### WATER SAMPLES FOR 8021/8260 SERIES

MATRIX SPIKE / MATRIX SPIKE DUPLICATE(S) % RECOVERY BETWEEN 65-135% MATRIX SPIKE / MATRIX SPIKE DUPLICATE(S) RPD LESS THAN 30% SURROGATE SPIKES % RECOVERY BETWEEN 85-115% BLANK SPIKE / BLANK SPIKE DUPLICATES % RECOVERY BETWEEN 70-130%

#### SOIL SAMPLES FOR 8021/8260 SERIES

MATRIX SPIKE / MATRIX SPIKE DUPLICATE(S) % RECOVERY BETWEEN 65-135% n/a MATRIX SPIKE / MATRIX SPIKE DUPLICATE(S) RPD LESS THAN 30% n/a

SURROGATE SPIKES % RECOVERY BETWEEN 70-125% n/a									
BLANK SPIKE / BLANK SPIKE DUPLICATES % RECOVERY BETWEEN 70-130% n/a									
FIELD OC SAMDLES									
FIELD QC SAMPLES									
<u>SAMPLE</u>	COLLECTED	<u>DETECTIONS</u>	> REPDL						
QCTB SAMPLES	N	N 0							
QCEB SAMPLES	N	0							
QCAB SAMPLES	N	0							
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Logged in as BROADBENT-C (CONTRACTOR)

CONTACT SITE  $\underline{\text{ADMINISTRATOR}}$ .