Atlantic Richfield Company

Chuck Carmel
Remediation Management Project Manager

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

April 30, 2015

RECEIVED
By Alameda County Environmental Health 9:08 am, May 01, 2015

Re: First Quarter 2015 Monitoring Report
Atlantic Richfield Company Station #374
6407 Telegraph Avenue, Oakland, California
ACEH Case #RO0000078

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

Submitted by,

Chuck Carmel
Remediation Management Project Manager

Attachment

BROADBENT
875 Cotting Ln., Suite G, Vacaville, CA 95688
[T] 707-455-7290 [F] 707-455-7295
broadbentinc.com

Creating Solutions. Building Trust.

April 30, 2015 Project No. 06-88-602

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

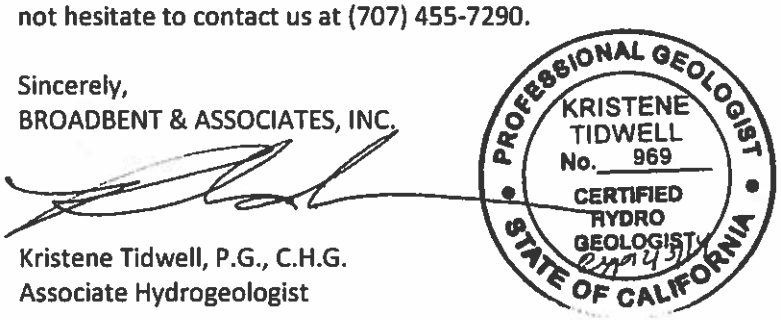
Attn.: Mr. Chuck Carmel

Re: First Quarter 2015 Monitoring Report, Atlantic Richfield Company Station #374, 6407 Telegraph Avenue, Oakland, Alameda County, California
ACEH Case #RO0000078

Dear Mr. Carmel

Attached is the *First Quarter 2015 Monitoring Report* for Atlantic Richfield Company (a BP affiliated company) for Station #374 located at 6407 Telegraph Avenue, Oakland, California (Site). Should you have questions regarding the work performed or results obtained, please do not hesitate to contact us at (707) 455-7290.

Sincerely,
BROADBENT & ASSOCIATES, INC.



Kristene Tidwell, P.G., C.H.G.
Associate Hydrogeologist

Enclosures

cc: Ms. Karol Detterman, Alameda County Environmental Health (Submitted via ACEH ftp site)
Electronic copy uploaded to GeoTracker

FIRST QUARTER 2015
MONITORING REPORT
ATLANTIC RICHFIELD COMPANY STATION #374
OAKLAND, CALIFORNIA

Broadbent & Associates, Inc. (Broadbent) is pleased to present this *First Quarter 2015 Monitoring Report* on behalf of Atlantic Richfield Company (ARC, a BP affiliated company) for Station #374 located at 6407 Telegraph Avenue, Oakland, Alameda County, California (the Site). Monitoring activities at the Site were performed in accordance with an agency directive issued by the Alameda County Environmental Health (ACEH). Details of work performed, discussion of results, and recommendations are provided below.

Facility Name / Address:	Station #374 / 6407 Telegraph Avenue, Oakland, California
Client Project Manager / Title:	Mr. Chuck Carmel / Operations Project Manager
Broadbent Contact:	Ms. Kristene Tidwell, P.G., C.HG.
Broadbent Project No.:	06-88-602
Primary Regulatory Agency / ID No.:	ACEH / Case #RO0000078
Current phase of project:	Monitoring
List of Acronyms / Abbreviations:	See end of report text for list of acronyms/abbreviations used in report.

WORK PERFORMED THIS QUARTER (First Quarter 2015):

1. Submitted *Fourth Quarter 2014 Status Report* on January 15, 2015.
2. Broadbent conducted First Quarter 2015 groundwater monitoring and sampling event on February 12, 2015.
3. Completed activities related to Broadbent's June 2014 *Second Addendum to Soil Vapor Investigation Work Plan* and submitted *Soil Investigation and Vapor Intrusion Assessment Report* on March 31, 2015.

WORK SCHEDULED FOR NEXT QUARTER (Second Quarter 2015):

1. Submit *First Quarter 2015 Monitoring Report* (contained herein).
2. No other environmental field activities are planned for Second Quarter 2015.

QUARTERLY MONITORING PLAN SUMMARY:

Groundwater level gauging:	MW-1 through MW-9	(Semi-Annually, 1Q & 3Q)
Groundwater sample collection:	MW-1, MW-2, MW-4, MW-7, MW-8, and MW-9	(Semi-Annually, 1Q & 3Q)
	MW-3, MW-5, and MW-6	(Annually, 3Q)

QUARTERLY RESULTS SUMMARY:

LNAPL

LNAPL observed this quarter:	No	(yes\no)
LNAPL recovered this quarter:	None	(gal)
Cumulative LNAPL recovered:	None	(gal)

Groundwater Elevation and Gradient:

Depth to groundwater:	1.40 (MW-6) to 7.13 (MW-8)	(ft below TOC)
Gradient direction:	Southwest	(compass direction)
Gradient magnitude:	0.16	(ft/ft)
Average change in elevation:	1.96	(ft since last measurement)

Laboratory Analytical Data Summary:

Analytical results are as follows:

- GRO was detected in one well at a maximum concentration of 7000 µg/L in well MW-4
- Benzene was detected in one well at a concentration of 120 µg/L in well MW-4
- MTBE was detected in five wells at a maximum concentration of 130 µg/L in well MW-1
- TAME was detected in one well at a concentration of 0.57 µg/L in well MW-1
- Ethylbenzene was detected in one well at a concentration of 31 µg/L in well MW-4
- Total xylenes were detected in one well at a concentration of 22 µg/L in well MW-4
- Toluene was detected in one well at a concentration of 8 µg/L in well MW-4

ACTIVITIES CONDUCTED & RESULTS:

First Quarter 2015 groundwater monitoring was conducted on February 12, 2015 in accordance with the monitoring plan summary presented above. No irregularities were noted during water level gauging. Collected depth to water measurements ranged from 1.40 ft in monitoring well MW-6 to 7.13 ft in monitoring well MW-8. Resulting groundwater surface elevations ranged from 151.58 ft bgs in well MW-5 to 158.04 ft bgs in well MW-7. Groundwater elevations are summarized in Table 1. Water level elevations yielded a potentiometric groundwater gradient to the southwest at approximately 0.16 ft/ft. Historical groundwater gradient direction and magnitude data are summarized in Table 3. Field methods used during groundwater monitoring are provided in Appendix A. Field data sheets are included in Appendix B.

Groundwater samples collected from monitoring wells MW-1, MW-2, MW-4, and MW-7 through MW-9 were submitted to Test America Laboratories, Inc. (Test America) of Irvine, California for analysis of GRO, by EPA Method 8015B; BTEX, MTBE, ETBE, TAME, DIPE, TBA, EDB, 1,2-DCA, and ethanol by EPA Method 8260B. No significant irregularities were encountered during analysis of the samples. Laboratory analytical report and chain of custody record are provided in Appendix C.

Results of this sampling event are included in the laboratory analytical data summary presented above. These results indicate that the highest overall petroleum concentrations are present in well MW-4. The analytes detected this quarter are within historical concentration ranges. Further discussion of these results are presented below.

DISCUSSION:

Review of historical groundwater gradient data indicates that the gradient measured during First Quarter 2015 monitoring is consistent with predominant measurements observed historically at the Site. During First Quarter 2015, groundwater elevations increased an average of 1.96 feet across the Site relative to measurements collected during Third Quarter 2014.

Review of historical groundwater results indicate that well MW-4 contains the highest residual

concentrations of petroleum compounds due to its location near the former Underground Storage Tank (UST). Petroleum hydrocarbon concentrations from the First Quarter 2015 monitoring event were within historical ranges with the following exceptions: MTBE and ethanol reached historic minimums in MW-4 of <0.50 μg/L and <150 μg/L, respectively. Historical analytical data indicates decreasing trends for all Site wells.

Groundwater levels in several Site wells are currently above the top of their respective screen intervals. Ideally, groundwater samples would not be collected from wells where screens are flooded. In general, wells with flooded screens are older wells, where water levels over time may have risen. Additionally, these wells only periodically have flooded screens. For example, well MW-4 is one of the oldest Site wells, and has elevated residual petroleum concentrations.

The screen in this well is periodically flooded, with the concentrations noted during events when the screen is not flooded are comparable to those where the screen is flooded. Additionally, data from wells with lower hydrocarbon concentrations is comparable to site wells without flooded screens. For these reasons, the data reported herein appears valid despite the occurrence of flooded screens at the Site.

RECOMMENDATIONS:

Additional soil vapor and groundwater investigation activities have been carried out. An updated conceptual site model (CSM) and investigation report has been submitted following these activities which recommends additional groundwater and vapor sampling. Additional offsite sampling may also be warranted to further delineate the source of contamination at the Site.

LIMITATIONS:

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

ATTACHMENTS:

Drawing 1:	Site Location Map
Drawing 2:	Groundwater Elevation Contour and Analytical Summary Map
Table 1:	Summary of Groundwater Monitoring Data: Relative Water Elevations and Laboratory Analyses
Table 2:	Summary of Fuel Additives Analytical Data
Table 3:	Historical Groundwater Gradient - Direction and Magnitude
Appendix A:	Field Methods
Appendix B:	Field Data Sheets and Non-Hazardous Waste Data Form
Appendix C:	Laboratory Report and Chain-of-Custody Documentation
Appendix D:	GeoTracker Upload Confirmation Receipts

LIST OF COMMONLY USED ACRONYMS/ABBREVIATIONS:

ACEH	Alameda County Environmental Health	gal:	Gallons
ARC:	Atlantic Richfield Company	GRO:	Gasoline Range Organics (C6-12)
BAI:	Broadbent & Associates, Inc.	LNAPL:	Light Non-Aqueous Phase Liquid
BTEX:	Benzene, Toluene, Ethylbenzene, Total Xylenes	MTBE:	Methyl Tertiary Butyl Ether
1,2-DCA:	1,2-Dichloroethane	TAME:	Tert-Amyl Methyl Ether
DIPE:	Di-Isopropyl Ether	TBA:	Tert-Butyl Alcohol
EDB:	1,2-Dibromomethane	TOC:	Top Of Casing
ft/ft:	Feet Per Foot	μg/L:	Micrograms Per Liter
UST:	Underground Storage Tank	ft bgs:	Feet Below Ground Surface

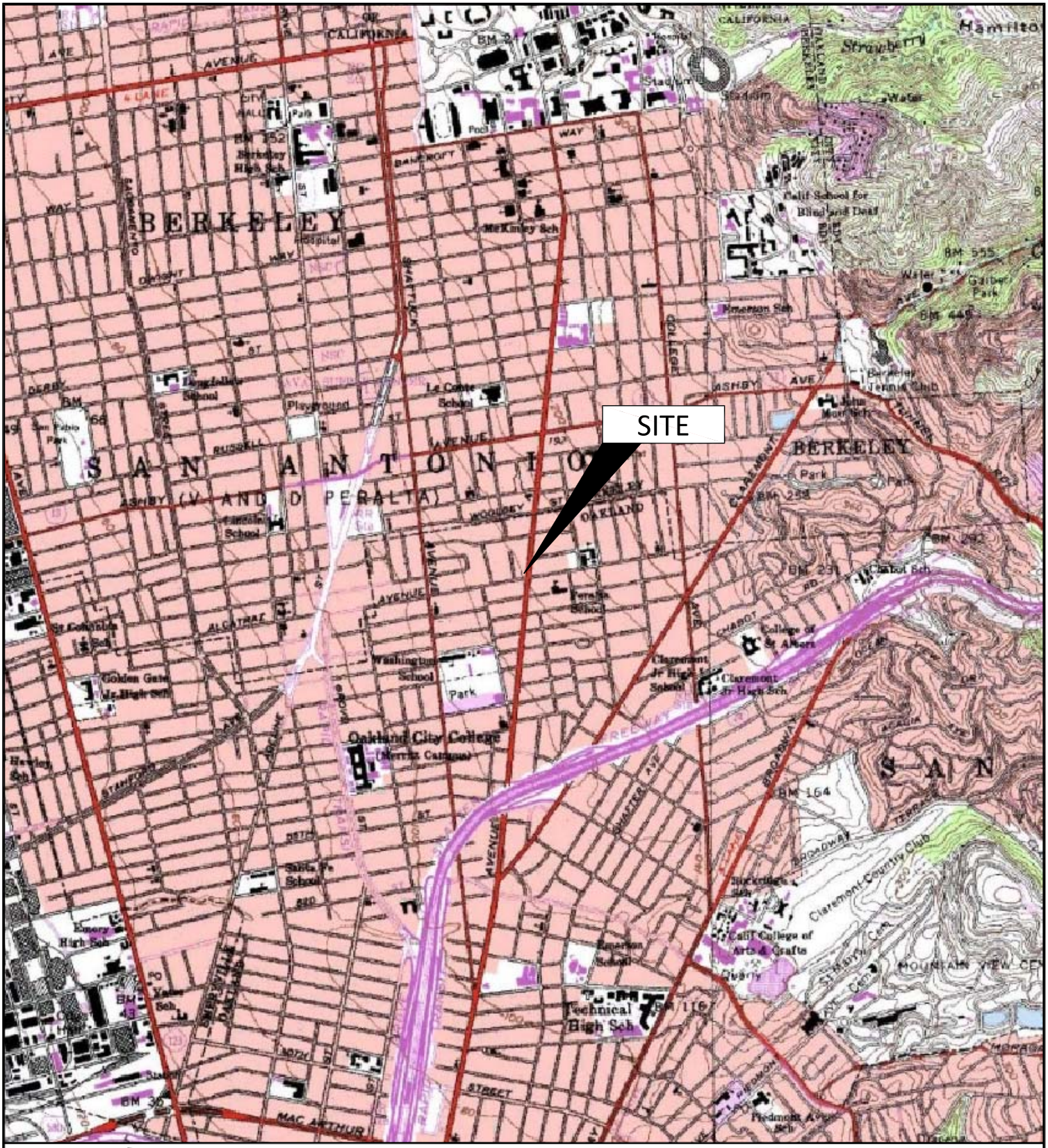


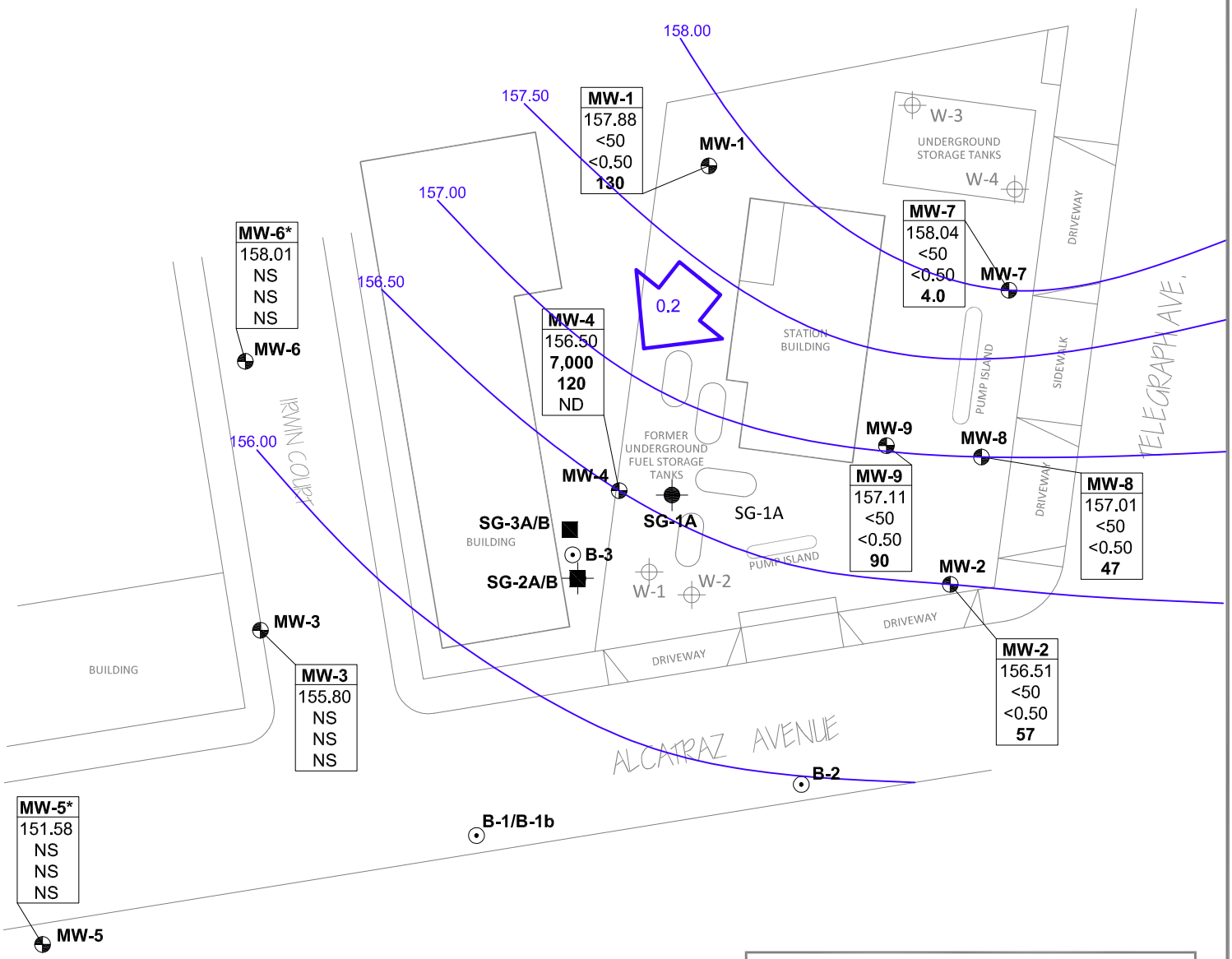
IMAGE SOURCE: USGS

BROADBENT
875 Cotting Lane, Suite G
Vacaville, California 95688
Project No.: 06-88-602 Date: 3/8/2013

Station #374
6407 Telegraph Ave.
Oakland, California

Site Location Map

Drawing
1



NOTE: SITE MAP ADAPTED FROM IT CORPORATION FIGURES.
SITE DIMENSIONS AND FACILITY LOCATIONS NOT VERIFIED.

BROADBENT
4820 Business Center Dr., Ste. 110
Fairfield, CA 94534
Project No.: 06-88-602 Date: 3/10/2015

Station #374
6407 Telegraph Ave.
Oakland, California

Groundwater Elevation Contour and Analytical Summary Map
February 12, 2015

Drawing
2

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

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	P/NP	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in µg/L						DO (mg/L)	pH	Footnote
							GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE			
ESL - DW							100	1.0	40	30	20	5.0			
ESL - NDW							210	46	130	43	100	1,800			
MW-1															
6/20/2000	--	158.91	7.00	27.00	6.86	152.05	--	--	--	--	--	--	--	--	
9/28/2000	--		7.00	27.00	7.50	151.41	--	--	--	--	--	--	--	--	
12/17/2000	--		7.00	27.00	7.49	151.42	--	--	--	--	--	--	--	--	
3/23/2001	--		7.00	27.00	5.90	153.01	<50	<0.5	<0.5	<0.5	<0.5	***2,710***	--	--	
6/21/2001	--		7.00	27.00	7.45	151.46	--	--	--	--	--	--	--	--	
9/23/2001	--		7.00	27.00	8.46	150.45	--	--	--	--	--	--	--	--	
12/31/2001	--		7.00	27.00	5.50	153.41	--	--	--	--	--	--	--	--	
3/21/2002	--		7.00	27.00	4.71	154.20	***<5,000***	***<50***	*<50*	***<50***	*<50*	***2,000***	--	--	
4/17/2002	--		7.00	27.00	5.54	153.37	--	--	--	--	--	--	--	--	
8/12/2002	--		7.00	27.00	7.77	151.14	--	--	--	--	--	--	--	--	
12/6/2002	--		7.00	27.00	7.65	151.26	--	--	--	--	--	--	--	--	
1/29/2003	--		7.00	27.00	5.88	153.03	--	--	--	--	--	--	--	--	b
5/23/2003	--		7.00	27.00	5.62	153.29	***<10,000***	***<100***	*<100*	***<100***	*<100*	*1,600*	1.3	7.1	
9/4/2003	--		7.00	27.00	7.85	151.06	--	--	--	--	--	--	--	--	
11/20/2003	P		7.00	27.00	8.17	150.74	***1,600***	*<10*	<10	<10	<10	*1,500*	1.7	6.7	
2/2/2004	P	164.57	7.00	27.00	6.71	157.86	--	--	--	--	--	--	1.0	--	f
5/14/2004	P		7.00	27.00	7.08	157.49	***<2,500***	*<25*	<25	<25	*<25*	*1,200*	1.4	6.6	
9/2/2004	P		7.00	27.00	8.12	156.45	***580***	*<5.0*	<5.0	<5.0	<5.0	*660*	3.8	6.7	
11/4/2004	P		7.00	27.00	7.38	157.19	***1,700***	*<10*	<10	<10	<10	*580*	6.0	6.5	
2/8/2005	P		7.00	27.00	6.60	157.97	***<1,000***	*<10*	<10	<10	<10	*610*	0.71	6.5	
5/9/2005	P		7.00	27.00	6.84	157.73	***540***	*<5.0*	<5.0	<5.0	5.5	*620*	3.12	6.6	e
8/11/2005	P		7.00	27.00	7.36	157.21	***540***	*<2.5*	<2.5	<2.5	4.0	*390*	0.8	6.6	
11/18/2005	P		7.00	27.00	8.02	156.55	***350***	*<2.5*	<2.5	<2.5	<2.5	*340*	2.6	6.7	e
2/16/2006	P		7.00	27.00	6.44	158.13	***350***	*<2.5*	<2.5	<2.5	<2.5	*340*	1.6	6.7	e
5/30/2006	P		7.00	27.00	6.87	157.70	***270***	*<2.5*	<2.5	<2.5	<2.5	*420*	4.73	6.4	
8/24/2006	P		7.00	27.00	7.75	156.82	95	*<5.0*	<5.0	<5.0	<5.0	*180*	0.65	6.9	
11/1/2006	P		7.00	27.00	8.28	156.29	*120*	*<5.0*	<5.0	<5.0	<5.0	*220*	1.65	7.07	
2/7/2007	NP		7.00	27.00	7.40	157.17	*120*	*<5.0*	<5.0	<5.0	<5.0	*190*	1.88	7.45	e

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

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	P/NP	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in µg/L						DO (mg/L)	pH	Footnote
							GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE			
ESL - DW							100	1.0	40	30	20	5.0			
ESL - NDW							210	46	130	43	100	1,800			
MW-1 Cont.															
5/8/2007	P	164.57	7.00	27.00	6.50	158.07	***<500***	*<5.0*	<5.0	<5.0	<5.0	*420*	1.21	6.94	
8/8/2007	NP		7.00	27.00	8.17	156.40	82	<0.50	<0.50	<0.50	<0.50	*110*	1.16	7.00	e
11/14/2007	NP		7.00	27.00	8.01	156.56	*170*	*<2.5*	<2.5	<2.5	<2.5	*210*	1.92	6.49	
2/22/2008	P		7.00	27.00	6.00	158.57	<50	<0.50	<0.50	<0.50	<0.50	*250*	2.57	6.65	
5/24/2008	NP		7.00	27.00	7.58	156.99	<50	*<5.0*	<5.0	<5.0	<5.0	*380*	2.28	6.81	
8/21/2008	NP		7.00	27.00	8.60	155.97	<50	*<2.5*	<2.5	<2.5	<2.5	*170*	2.16	6.98	
11/19/2008	NP		7.00	27.00	8.88	155.69	<50	<0.50	<0.50	<0.50	<0.50	*30*	2.12	7.27	
2/23/2009	P		7.00	27.00	6.40	158.17	78	*<2.5*	<2.5	<2.5	<2.5	*240*	2.19	6.03	
5/14/2009	P		7.00	27.00	6.67	157.90	53	<0.50	<0.50	<0.50	<0.50	*200*	1.75	6.69	
8/20/2009	NP		7.00	27.00	8.25	156.32	*150*	*<2.0*	<2.0	<2.0	<2.0	*170*	2.14	6.25	i (GRO)
2/19/2010	P		7.00	27.00	6.07	158.50	<50	<0.50	<0.50	<0.50	<0.50	*170*	0.92	6.66	
8/10/2010	NP		7.00	27.00	7.58	156.99	<50	*<2.5*	<2.5	<2.5	<2.5	*230*	3.86	7.1	
12/16/2010	P	164.45	7.00	27.00	6.64	157.81	<50	*<2.0*	<2.0	<2.0	<2.0	*140*	1.20	6.86	j
2/14/2011	NP		7.00	27.00	7.10	157.35	<50	*<2.5*	<2.5	<2.5	<2.5	*170*	1.18	6.7	
5/20/2011	--		7.00	27.00	6.38	158.07	--	--	--	--	--	--	--	--	
8/15/2011	NP		7.00	27.00	7.24	157.21	<50	*<2.5*	<2.5	<2.5	<2.5	*130*	2.54	6.9	
2/2/2012	P		7.00	27.00	7.32	157.13	<50	<1.0	<1.0	<1.0	<1.0	*66*	1.01	7.1	
8/9/2012	P		7.00	27.00	6.69	157.76	<50	<0.50	<0.50	<0.50	<1.0	*170*	1.65	6.99	
2/14/2013	P		7.00	27.00	5.97	158.48	<50	<0.50	<0.50	<0.50	<1.0	*140*	1.74	7.20	
8/22/2013	P		7.00	27.00	7.87	156.58	<50	<0.50	<0.50	<0.50	<1.0	*91*	5.69	7.21	
2/11/2014	P		7.00	27.00	7.75	156.70	<50	<0.50	<0.50	<0.50	<1.0	*26*	2.02	7.04	
8/15/2014	P		7.00	27.00	8.51	155.94	<50	<0.50	<0.50	<0.50	<1.0	*120*	1.82	6.70	
2/12/2015	P		7.00	27.00	6.57	157.88	<50	<0.50	<0.50	<0.50	<1.0	*130*	1.00	6.17	
MW-2															
6/20/2000	--	157.92	7.00	27.00	7.67	150.25	--	--	--	--	--	--	--	--	
9/28/2000	--		7.00	27.00	8.51	149.41	--	--	--	--	--	--	--	--	
12/17/2000	--		7.00	27.00	8.14	149.78	--	--	--	--	--	--	--	--	
3/23/2001	--		7.00	27.00	7.21	150.71	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	

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

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	P/NP	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in µg/L						DO (mg/L)	pH	Footnote
							GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE			
ESL - DW							100	1.0	40	30	20	5.0			
ESL - NDW							210	46	130	43	100	1,800			
MW-2 Cont.															
6/21/2001	--	157.92	7.00	27.00	7.99	149.93	--	--	--	--	--	--	--	--	
9/23/2001	--		7.00	27.00	8.52	149.40	--	--	--	--	--	--	--	--	
12/31/2001	--		7.00	27.00	6.01	151.91	--	--	--	--	--	--	--	--	
3/21/2002	--		7.00	27.00	5.95	151.97	<50	<0.5	<0.5	<0.5	<0.5	*45*	--	--	
4/17/2002	--		7.00	27.00	6.45	151.47	--	--	--	--	--	--	--	--	
8/12/2002	--		7.00	27.00	8.08	149.84	--	--	--	--	--	--	--	--	
12/6/2002	--		7.00	27.00	8.29	149.63	--	--	--	--	--	--	--	--	
1/29/2003	--		7.00	27.00	7.22	150.70	--	--	--	--	--	--	--	--	b
5/23/2003	--		7.00	27.00	6.85	151.07	<50	<0.50	<0.50	<0.50	<0.50	*55*	1.4	7.2	
9/4/2003	--		7.00	27.00	7.94	149.98	--	--	--	--	--	--	--	--	
11/20/2003	--		7.00	27.00	8.05	149.87	--	--	--	--	--	--	--	--	
2/2/2004	P	163.46	7.00	27.00	7.00	156.46	74	<0.50	<0.50	<0.50	<0.50	*37*	1.1	8.9	f
5/14/2004	--		7.00	27.00	7.97	155.49	--	--	--	--	--	--	--	--	
9/2/2004	P		7.00	27.00	8.19	155.27	***<250***	*<2.5*	<2.5	<2.5	<2.5	*67*	2.7	6.9	
11/4/2004	--		7.00	27.00	7.54	155.92	--	--	--	--	--	--	--	--	
2/8/2005	P		7.00	27.00	6.72	156.74	<50	<0.50	<0.50	<0.50	<0.50	*30*	0.86	6.7	
5/9/2005	--		7.00	27.00	7.16	156.30	--	--	--	--	--	--	--	--	
8/11/2005	P		7.00	27.00	7.85	155.61	<50	<0.50	<0.50	<0.50	<0.50	*35*	1.0	6.6	
11/18/2005	--		7.00	27.00	8.23	155.23	--	--	--	--	--	--	--	--	
2/16/2006	P		7.00	27.00	6.82	156.64	<50	<0.50	<0.50	<0.50	<0.50	*39*	1.3	7.0	
5/30/2006	--		7.00	27.00	7.23	156.23	--	--	--	--	--	--	--	--	
8/24/2006	P		7.00	27.00	8.00	155.46	60	<0.50	<0.50	<0.50	<0.50	*25*	0.90	6.8	
11/1/2006	--		7.00	27.00	8.38	155.08	--	--	--	--	--	--	--	--	
2/7/2007	NP		7.00	27.00	7.88	155.58	<50	0.50	<0.50	<0.50	<0.50	*7.2*	0.94	7.39	
5/8/2007	--		7.00	27.00	7.28	156.18	--	--	--	--	--	--	--	--	
8/8/2007	NP		7.00	27.00	8.38	155.08	88	*3.2*	<0.50	<0.50	<0.50	*7.2*	0.94	7.75	
11/14/2007	--		7.00	27.00	8.10	155.36	--	--	--	--	--	--	--	--	
2/22/2008	P		7.00	27.00	6.75	156.71	<50	<0.50	<0.50	<0.50	<0.50	*24*	2.18	7.02	

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

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	P/NP	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in µg/L						DO (mg/L)	pH	Footnote
							GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE			
ESL - DW							100	1.0	40	30	20	5.0			
ESL - NDW							210	46	130	43	100	1,800			
MW-2 Cont.															
5/24/2008	--	163.46	7.00	27.00	7.98	155.48	--	--	--	--	--	--	--	--	
8/21/2008	NP		7.00	27.00	8.58	154.88	<50	*2.6*	<0.50	<0.50	<0.50	4.9	2.20	7.11	
11/19/2008	--		7.00	27.00	8.66	154.80	--	--	--	--	--	--	--	--	
2/23/2009	P		7.00	27.00	6.67	156.79	74	1.0	<0.50	<0.50	<0.50	*24*	2.25	6.16	
5/14/2009	--		7.00	27.00	7.02	156.44	--	--	--	--	--	--	--	--	
8/20/2009	NP		7.00	27.00	8.41	155.05	82	*2.4*	<0.50	<0.50	<0.50	*8.4*	2.19	6.37	
2/19/2010	NP		7.00	27.00	7.36	156.10	<50	<0.50	<0.50	<0.50	<0.50	*22*	0.81	6.90	
8/10/2010	NP		7.00	27.00	7.69	155.77	<50	<0.50	<0.50	<0.50	<0.50	*23*	2.40	7.67	
12/16/2010	P	163.49	7.00	27.00	7.12	156.37	<50	<0.50	<0.50	<0.50	<0.50	*17*	0.69	7.06	j
2/14/2011	NP		7.00	27.00	7.35	156.14	<50	<0.50	<0.50	<0.50	<0.50	*11*	0.87	7.0	
5/20/2011	--		7.00	27.00	7.02	156.47	--	--	--	--	--	--	--	--	
8/15/2011	NP		7.00	27.00	7.62	155.87	<50	<0.50	<0.50	<0.50	<0.50	1.7	1.45	7.1	
2/2/2012	P		7.00	27.00	7.56	155.93	<50	<0.50	<0.50	<0.50	<0.50	1.8	0.85	7.3	
8/9/2012	P		7.00	27.00	6.31	157.18	<50	<0.50	<0.50	<0.50	<1.0	*73*	1.28	7.15	
2/14/2013	P		7.00	27.00	6.03	157.46	<50	<0.50	<0.50	<0.50	<1.0	*46*	1.71	7.48	
8/22/2013	P		7.00	27.00	7.79	155.70	<50	<0.50	<0.50	<0.50	<1.0	*82*	4.16	7.23	
2/11/2014	P		7.00	27.00	7.12	156.37	<50	<0.50	<0.50	<0.50	<1.0	*7.5*	2.32	6.65	
8/15/2014	P		7.00	27.00	8.53	154.96	<50	<0.50	<0.50	<0.50	<1.0	*61*	2.90	6.02	
2/12/2015	P		7.00	27.00	6.98	156.51	<50	<0.50	<0.50	<0.50	<1.0	*57*	0.78	6.27	
MW-3															
6/20/2000	--	153.64	7.00	27.00	6.42	147.22	<50	<0.5	<0.5	<0.5	<1.0	*<10*	--	--	
9/28/2000	--		7.00	27.00	7.31	146.33	--	--	--	--	--	--	--	--	
12/17/2000	--		7.00	27.00	6.45	147.19	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	
3/23/2001	--		7.00	27.00	6.01	147.63	--	--	--	--	--	--	--	--	
6/21/2001	--		7.00	27.00	6.80	146.84	*110*	*5.5*	<0.5	5.4	4.1	2.5	--	--	
9/23/2001	--		7.00	27.00	7.32	146.32	--	--	--	--	--	--	--	--	
12/31/2001	--		7.00	27.00	4.48	149.16	<50	<0.5	<0.5	<0.5	<0.5	4.9	--	--	
3/21/2002	--		7.00	27.00	4.36	149.28	--	--	--	--	--	--	--	--	

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

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	P/NP	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in µg/L						DO (mg/L)	pH	Footnote
							GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE			
ESL - DW							100	1.0	40	30	20	5.0			
ESL - NDW							210	46	130	43	100	1,800			
MW-3 Cont.															
4/17/2002	--	153.64	7.00	27.00	5.31	148.33	<50	<0.5	<0.5	<0.5	<0.5	*8.7*	--	--	
8/12/2002	--		7.00	27.00	7.00	146.64	--	--	--	--	--	--	--	--	
12/6/2002	--		7.00	27.00	7.32	146.32	<50	<0.5	<0.5	<0.5	<0.5	*6.2*	1.4	6.7	
1/29/2003	--		7.00	27.00	6.07	147.57	--	--	--	--	--	--	--	--	b
5/23/2003	--		7.00	27.00	6.45	147.19	<50	<0.50	<0.50	<0.50	<0.50	1.6	0.9	7.7	
9/4/2003	--		7.00	27.00	6.93	146.71	--	--	--	--	--	--	--	--	c
11/20/2003	--		7.00	27.00	7.04	146.60	--	--	--	--	--	--	--	--	c
2/2/2004	--	159.21	7.00	27.00	5.92	153.29	--	--	--	--	--	--	--	--	f
5/14/2004	--		7.00	27.00	7.52	151.69	--	--	--	--	--	--	--	--	
9/2/2004	P		7.00	27.00	7.19	152.02	<50	<0.50	<0.50	<0.50	<0.50	*6.5*	9.3	8.9	
11/4/2004	--		7.00	27.00	6.40	152.81	--	--	--	--	--	--	--	--	
2/8/2005	--		7.00	27.00	6.01	153.20	--	--	--	--	--	--	--	--	
5/9/2005	--		7.00	27.00	6.74	152.47	--	--	--	--	--	--	--	--	
8/11/2005	P		7.00	27.00	6.77	152.44	<50	<0.50	<0.50	<0.50	<0.50	*11*	1.9	6.5	
11/18/2005	--		7.00	27.00	7.83	151.38	--	--	--	--	--	--	--	--	
2/16/2006	--		7.00	27.00	7.26	151.95	--	--	--	--	--	--	--	--	
5/30/2006	--		7.00	27.00	5.82	153.39	--	--	--	--	--	--	--	--	
8/24/2006	P		7.00	27.00	7.00	152.21	<50	<0.50	<0.50	<0.50	<0.50	*7.6*	1.15	6.4	
11/1/2006	--		7.00	27.00	7.50	151.71	--	--	--	--	--	--	--	--	
2/7/2007	--		7.00	27.00	6.90	152.31	--	--	--	--	--	--	--	--	
5/8/2007	--		7.00	27.00	5.95	153.26	--	--	--	--	--	--	--	--	
8/8/2007	NP		7.00	27.00	7.47	151.74	<50	<0.50	<0.50	<0.50	<0.50	1.2	1.21	6.93	
11/14/2007	--		7.00	27.00	7.05	152.16	--	--	--	--	--	--	--	--	
2/22/2008	--		7.00	27.00	5.50	153.71	--	--	--	--	--	--	--	--	
5/24/2008	--		7.00	27.00	7.03	152.18	--	--	--	--	--	--	--	--	
8/21/2008	NP		7.00	27.00	7.80	151.41	<50	<0.50	<0.50	<0.50	<0.50	3.1	2.11	6.84	
11/19/2008	--		7.00	27.00	7.69	151.52	--	--	--	--	--	--	--	--	
2/23/2009	--		7.00	27.00	7.28	151.93	--	--	--	--	--	--	--	--	

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

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	P/NP	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in µg/L						DO (mg/L)	pH	Footnote
							GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE			
ESL - DW							100	1.0	40	30	20	5.0			
ESL - NDW							210	46	130	43	100	1,800			
MW-3 Cont.															
5/14/2009	--	159.21	7.00	27.00	6.17	153.04	--	--	--	--	--	--	--	--	
8/20/2009	NP		7.00	27.00	7.38	151.83	<50	<0.50	<0.50	<0.50	<0.50	2.2	2.05	7.01	
2/19/2010	--		7.00	27.00	5.31	153.90	--	--	--	--	--	--	--	--	
8/10/2010	NP		7.00	27.00	7.12	152.09	<50	<0.50	<0.50	<0.50	<0.50	1.6	1.27	7.33	
12/16/2010	--		7.00	27.00	5.65	153.56	--	--	--	--	--	--	--	--	j
2/14/2011	--		7.00	27.00	6.20	153.01	--	--	--	--	--	--	--	--	
5/20/2011	--		7.00	27.00	5.77	153.44	--	--	--	--	--	--	--	--	
8/15/2011	P		7.00	27.00	6.41	152.80	<50	<0.50	<0.50	<0.50	<0.50	1.2	1.04	7.0	
2/2/2012	--		7.00	27.00	6.34	152.87	--	--	--	--	--	--	--	--	
8/9/2012	P		7.00	27.00	6.62	152.59	<50	<0.50	<0.50	<0.50	<1.0	2.0	1.16	6.71	
2/14/2013	--		7.00	27.00	6.09	153.12	--	--	--	--	--	--	--	--	
8/22/2013	P		7.00	27.00	7.15	152.06	<50	<0.50	<0.50	<0.50	<1.0	1.4	4.35	6.72	
2/11/2014	--		7.00	27.00	5.79	153.42	--	--	--	--	--	--	--	--	
8/15/2014	P		7.00	27.00	6.30	152.91	<50	<0.50	<0.50	<0.50	<1.0	1.2	0.15	6.12	
2/12/2015	--		7.00	27.00	3.41	155.80	--	--	--	--	--	--	--	--	
MW-4															
6/20/2000	--	156.53	7.00	27.00	7.50	149.03	***20,000***	***5,100***	***440***	***1,000***	***1,700***	*<250*	--	--	c
9/28/2000	--		7.00	27.00	8.20	148.33	--	--	--	--	--	--	--	--	
12/17/2000	--		7.00	27.00	8.11	148.42	***4,320***	***1,240***	<20	27.2	***249***	*<100*	--	--	
3/23/2001	--		7.00	27.00	6.69	149.84	--	--	--	--	--	--	--	--	
6/21/2001	--		7.00	27.00	8.01	148.52	***2,800***	***470***	16	19	***160***	*130*	--	--	
9/23/2001	--		7.00	27.00	8.91	147.62	--	--	--	--	--	--	--	--	
12/31/2001	--		7.00	27.00	4.42	152.11	***4,600***	***1,500***	*100*	***160***	***210***	*160*	--	--	
3/21/2002	--		7.00	27.00	4.98	151.55	--	--	--	--	--	--	--	--	
4/17/2002	--		7.00	27.00	6.23	150.30	***7,100***	***2,200***	*110*	***290***	***450***	*<250*	--	--	
8/12/2002	--		7.00	27.00	8.24	148.29	--	--	--	--	--	--	--	--	
12/6/2002	--		7.00	27.00	8.42	148.11	***1,500***	***410***	6.8	20	*29*	*43*	1.1	6.7	a
1/29/2003	--		7.00	27.00	7.20	149.33	--	--	--	--	--	--	--	--	b

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

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	P/NP	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in µg/L						DO (mg/L)	pH	Footnote
							GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE			
ESL - DW							100	1.0	40	30	20	5.0			
ESL - NDW							210	46	130	43	100	1,800			
MW-4 Cont.															
5/23/2003	--	156.53	7.00	27.00	7.18	149.35	***<5,000***	***1,300***	*89*	***210***	***260***	*<50*	1.4	6.9	
9/4/2003	--		7.00	27.00	8.15	148.38	--	--	--	--	--	--	--	--	c
11/20/2003	--		7.00	27.00	8.73	147.80	--	--	--	--	--	--	--	--	c
2/2/2004	P	163.25	7.00	27.00	6.25	157.00	***980***	***280***	21	29	*38*	*29*	1.4	10.6	c, f, g
5/14/2004	--		7.00	27.00	8.38	154.87	--	--	--	--	--	--	--	--	g
9/2/2004	P		7.00	27.00	8.36	154.89	***260***	*11*	<1.0	5.5	14	*28*	2.4	7.4	g
11/4/2004	--		7.00	27.00	7.71	155.54	--	--	--	--	--	--	--	--	c, g
2/8/2005	P		7.00	27.00	6.27	156.98	***7,500***	***1,700***	***320***	***480***	***920***	*45*	0.65	6.5	g
5/9/2005	--		7.00	27.00	5.90	157.35	--	--	--	--	--	--	--	--	g
8/11/2005	P		7.00	27.00	7.96	155.29	***3,100***	***1,100***	*41*	***160***	***110***	*32*	0.6	6.5	g
11/18/2005	--		7.00	27.00	8.57	154.68	--	--	--	--	--	--	--	--	g
2/16/2006	P		7.00	27.00	6.28	156.97	***9,400***	***1,800***	*130*	***600***	***420***	*35*	0.5	6.8	g
5/30/2006	--	162.47	7.00	27.00	7.02	155.45	--	--	--	--	--	--	--	--	g
8/24/2006	P		7.00	27.00	8.26	154.21	***3,600***	***1,400***	21	***110***	*70*	*39*	1.00	6.8	
11/1/2006	--		7.00	27.00	8.67	153.80	--	--	--	--	--	--	--	--	
2/7/2007	NP		7.00	27.00	8.02	154.45	***3,100***	***570***	17	***170***	***110***	*67*	0.95	7.07	
5/8/2007	--		7.00	27.00	7.03	155.44	--	--	--	--	--	--	--	--	
8/8/2007	NP		7.00	27.00	8.60	153.87	***2,900***	***630***	22	***67***	*57*	*72*	0.93	6.79	
11/14/2007	--		7.00	27.00	8.53	153.94	--	--	--	--	--	--	--	--	
2/22/2008	P		7.00	27.00	6.25	156.22	***3,900***	***880***	39	***180***	*92*	*70*	2.31	6.87	
5/24/2008	--		7.00	27.00	--	--	--	--	--	--	--	--	--	--	d
8/21/2008	NP		7.00	27.00	8.96	153.51	***3,700***	***1,100***	26	***85***	***130***	*53*	2.26	6.80	
11/19/2008	--		7.00	27.00	9.20	153.27	--	--	--	--	--	--	--	--	
2/23/2009	P		7.00	27.00	6.35	156.12	***3,000***	***220***	9.1	23	19	*39*	2.21	6.51	
5/14/2009	--		7.00	27.00	7.00	155.47	--	--	--	--	--	--	--	--	
8/20/2009	NP		7.00	27.00	8.05	154.42	***5,700***	***1,100***	35	***110***	*100*	*23*	2.17	6.81	
2/19/2010	P		7.00	27.00	5.71	156.76	***12,000***	***1,200***	*120*	***230***	***390***	<5.0	0.81	6.70	i
8/10/2010	NP		7.00	27.00	7.59	154.88	***9,700***	***1,500***	*120*	***400***	***400***	*<20*	3.81	6.8	

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

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	P/NP	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in µg/L						DO (mg/L)	pH	Footnote
							GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE			
ESL - DW							100	1.0	40	30	20	5.0			
ESL - NDW							210	46	130	43	100	1,800			
MW-4 Cont.															
12/16/2010	P	162.48	7.00	27.00	6.83	155.65	***15,000***	***1,800***	*82*	***270***	***210***	*<25*	0.49	6.81	j
2/14/2011	NP		7.00	27.00	7.33	155.15	***260***	<0.50	<0.50	2.7	11	*13*	0.80	7.10	
5/20/2011	--		7.00	27.00	6.89	155.59	--	--	--	--	--	--	--	--	
8/15/2011	P		7.00	27.00	7.59	154.89	***8,600***	***2,100***	*86*	***250***	***210***	*<12*	1.02	7.0	l
2/2/2012	P		7.00	27.00	7.71	154.77	***4,600***	***1,000***	34	23	*33*	*<12*	0.60	7.2	
8/9/2012	P		7.00	27.00	6.57	155.91	***3,200***	***660***	*44*	***53***	*57*	<5.0	1.09	7.05	
2/14/2013	P		7.00	27.00	6.26	156.22	***7,200***	***1,400***	***150***	***390***	***700***	*<10*	1.20	7.51	
8/22/2013	P		7.00	27.00	7.59	154.89	***6,900***	***1,600***	*100*	***120***	***330***	*<10*	4.50	6.98	
2/11/2014	P		7.00	27.00	7.13	155.35	*140*	***800***	*80*	***84***	***230***	<5.0	1.03	6.65	
8/15/2014	P		7.00	27.00	8.33	154.15	***6,300***	***900***	*45*	*38*	*92*	<5.0	0.21	6.14	
2/12/2015	P		7.00	27.00	5.98	156.50	***7,000***	***120***	8.0	*31*	*22*	<0.50	0.61	6.23	
MW-5															
6/20/2000	--	151.33	10.00	23.00	7.84	143.49	<50	<0.5	<0.5	<0.5	<1.0	*<10*	--	--	
9/28/2000	--		10.00	23.00	8.37	142.96	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	
12/17/2000	--		10.00	23.00	8.36	142.97	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	
3/23/2001	--		10.00	23.00	7.55	143.78	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	
6/21/2001	--		10.00	23.00	8.20	143.13	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	
9/23/2001	--		10.00	23.00	8.68	142.65	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	
12/31/2001	--		10.00	23.00	7.57	143.76	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	
3/21/2002	--		10.00	23.00	6.12	145.21	<50	<0.5	<0.5	<0.5	<0.5	3.2	--	--	
4/17/2002	--		10.00	23.00	6.61	144.72	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	
8/12/2002	--		10.00	23.00	8.14	143.19	<50	<0.5	<0.5	<0.5	<0.5	<2.5	4.1	7.6	
12/6/2002	--		10.00	23.00	8.65	142.68	<50	<0.5	<0.5	<0.5	<0.5	<2.5	1.1	6.8	
1/29/2003	--		10.00	23.00	7.22	144.11	<50	<0.5	<0.5	<0.5	<0.5	<0.50	1	6.6	b
5/23/2003	--		10.00	23.00	7.31	144.02	<50	<0.50	<0.50	<0.50	<0.50	<0.50	1.1	6.6	
9/4/2003	--		10.00	23.00	9.50	141.83	<50	<0.50	<0.50	<0.50	<0.50	<0.50	3.2	6.7	
11/20/2003	--		10.00	23.00	8.31	143.02	--	--	--	--	--	--	--	--	
2/2/2004	--		10.00	23.00	6.92	144.41	--	--	--	--	--	--	--	--	c, f, h

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

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	P/NP	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in µg/L						DO (mg/L)	pH	Footnote
							GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE			
ESL - DW							100	1.0	40	30	20	5.0			
ESL - NDW							210	46	130	43	100	1,800			
MW-5 Cont.															
5/14/2004	--	151.33	10.00	23.00	8.56	142.77	--	--	--	--	--	--	--	--	h
9/2/2004	P		10.00	23.00	8.79	142.54	<50	<0.50	<0.50	<0.50	<0.50	<0.50	3.5	6.8	h
11/4/2004	--		10.00	23.00	8.33	143.00	--	--	--	--	--	--	--	--	c, h
2/8/2005	--		10.00	23.00	7.28	144.05	--	--	--	--	--	--	--	--	h
5/9/2005	--		10.00	23.00	8.19	143.14	--	--	--	--	--	--	--	--	h
8/11/2005	P		10.00	23.00	8.39	142.94	<50	<0.50	<0.50	<0.50	<0.50	<0.50	1.2	6.6	h
11/18/2005	--		10.00	23.00	11.25	140.08	--	--	--	--	--	--	--	--	h
2/16/2006	--		10.00	23.00	9.22	142.11	--	--	--	--	--	--	--	--	h
5/30/2006	--		10.00	23.00	7.52	143.81	--	--	--	--	--	--	--	--	h
8/24/2006	P		10.00	23.00	7.95	143.38	<50	<0.50	<0.50	<0.50	<0.50	<0.50	2.60	6.6	
11/1/2006	--		10.00	23.00	8.32	143.01	--	--	--	--	--	--	--	--	
2/7/2007	--		10.00	23.00	8.25	143.08	--	--	--	--	--	--	--	--	
5/8/2007	--		10.00	23.00	7.60	143.73	--	--	--	--	--	--	--	--	
8/8/2007	P		10.00	23.00	8.12	143.21	<50	<0.50	<0.50	<0.50	<0.50	<0.50	3.26	7.31	
11/14/2007	--		10.00	23.00	9.10	142.23	--	--	--	--	--	--	--	--	
2/22/2008	--		10.00	23.00	7.48	143.85	--	--	--	--	--	--	--	--	
5/24/2008	--		10.00	23.00	8.12	143.21	--	--	--	--	--	--	--	--	
8/21/2008	P		10.00	23.00	8.65	142.68	<50	<0.50	<0.50	<0.50	<0.50	<0.50	2.14	6.54	
11/19/2008	--		10.00	23.00	11.86	139.47	--	--	--	--	--	--	--	--	
2/23/2009	--		10.00	23.00	10.20	141.13	--	--	--	--	--	--	--	--	
5/14/2009	--		10.00	23.00	9.63	141.70	--	--	--	--	--	--	--	--	
8/20/2009	P		10.00	23.00	8.52	142.81	<50	<0.50	<0.50	<0.50	<0.50	<0.50	2.01	6.47	
2/19/2010	--		10.00	23.00	--	--	--	--	--	--	--	--	--	--	d
8/10/2010	P		10.00	23.00	8.05	143.28	<50	<0.50	<0.50	<0.50	<0.50	<0.50	1.15	7.1	
12/16/2010	--	156.90	10.00	23.00	8.10	148.80	--	--	--	--	--	--	--	--	j
2/14/2011	--		10.00	23.00	--	--	--	--	--	--	--	--	--	--	d
5/20/2011	--		10.00	23.00	--	--	--	--	--	--	--	--	--	--	d
8/15/2011	P		10.00	23.00	7.91	148.99	<50	<0.50	<0.50	<0.50	<0.50	<0.50	2.46	7.4	

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

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	P/NP	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in µg/L						DO (mg/L)	pH	Footnote
							GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE			
ESL - DW							100	1.0	40	30	20	5.0			
ESL - NDW							210	46	130	43	100	1,800			
MW-5 Cont.															
2/2/2012	--	156.90	10.00	23.00	8.08	148.82	--	--	--	--	--	--	--	--	
8/9/2012	P		10.00	23.00	8.02	148.88	<50	<0.50	<0.50	<0.50	<1.0	<0.50	1.25	6.99	
2/14/2013	--		10.00	23.00	7.54	149.36	--	--	--	--	--	--	--	--	
8/22/2013	P		10.00	23.00	8.34	148.56	<50	<0.50	<0.50	<0.50	<1.0	<0.50	4.33	6.95	
2/11/2014	--		10.00	23.00	7.61	149.29	--	--	--	--	--	--	--	--	
8/15/2014	P		10.00	23.00	8.06	148.84	<50	<0.50	<0.50	<0.50	<1.0	<0.50	2.33	5.92	
2/12/2015	--		10.00	23.00	5.32	151.58	--	--	--	--	--	--	--	--	
MW-6															
6/20/2000	--	153.84	5.00	15.00	4.79	149.05	--	--	--	--	--	--	--	--	
9/28/2000	--		5.00	15.00	5.39	148.45	--	--	--	--	--	--	--	--	
12/17/2000	--		5.00	15.00	4.71	149.13	--	--	--	--	--	--	--	--	
3/23/2001	--		5.00	15.00	4.69	149.15	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	
6/21/2001	--		5.00	15.00	5.22	148.62	--	--	--	--	--	--	--	--	
9/23/2001	--		5.00	15.00	5.40	148.44	--	--	--	--	--	--	--	--	
12/31/2001	--		5.00	15.00	3.95	149.89	--	--	--	--	--	--	--	--	
3/21/2002	--		5.00	15.00	2.94	150.90	<50	<0.5	<0.5	<0.5	<0.5	*5.2*	--	--	
4/17/2002	--		5.00	15.00	5.11	148.73	--	--	--	--	--	--	--	--	
8/12/2002	--		5.00	15.00	5.23	148.61	--	--	--	--	--	--	--	--	
12/6/2002	--		5.00	15.00	5.29	148.55	--	--	--	--	--	--	--	--	
1/29/2003	--		5.00	15.00	4.79	149.05	--	--	--	--	--	--	--	--	b
5/23/2003	--		5.00	15.00	4.31	149.53	<50	<0.50	<0.50	<0.50	<0.50	*9.4*	1	6.7	
9/4/2003	--		5.00	15.00	--	--	--	--	--	--	--	--	--	--	d
11/20/2003	--		5.00	15.00	6.31	147.53	--	--	--	--	--	--	--	--	
2/2/2004	--	159.41	5.00	15.00	4.78	154.63	--	--	--	--	--	--	--	--	f
5/14/2004	--		5.00	15.00	6.29	153.12	--	--	--	--	--	--	--	--	
9/2/2004	--		5.00	15.00	5.79	153.62	--	--	--	--	--	--	--	--	d
11/4/2004	--		5.00	15.00	--	--	--	--	--	--	--	--	--	--	d
2/8/2005	--		5.00	15.00	5.13	154.28	--	--	--	--	--	--	--	--	

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

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	P/NP	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in µg/L						DO (mg/L)	pH	Footnote
							GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE			
ESL - DW							100	1.0	40	30	20	5.0			
ESL - NDW							210	46	130	43	100	1,800			
MW-6 Cont.															
5/9/2005	--	159.41	5.00	15.00	4.52	154.89	--	--	--	--	--	--	--	--	
8/11/2005	P		5.00	15.00	5.02	154.39	<50	<0.50	<0.50	<0.50	<0.50	*7.9*	2.1	6.6	
11/18/2005	--		5.00	15.00	6.31	153.10	--	--	--	--	--	--	--	--	
2/16/2006	--		5.00	15.00	4.24	155.17	--	--	--	--	--	--	--	--	
5/30/2006	--		5.00	15.00	4.45	154.96	--	--	--	--	--	--	--	--	
8/24/2006	P		5.00	15.00	5.18	154.23	<50	<0.50	<0.50	<0.50	<0.50	*12*	3.4	6.8	
11/1/2006	--		5.00	15.00	6.05	153.36	--	--	--	--	--	--	--	--	
2/7/2007	--		5.00	15.00	5.00	154.41	--	--	--	--	--	--	--	--	
5/8/2007	--		5.00	15.00	4.30	155.11	--	--	--	--	--	--	--	--	
8/8/2007	NP		5.00	15.00	5.51	153.90	<50	<0.50	<0.50	<0.50	<0.50	0.57	2.94	6.87	
11/14/2007	--		5.00	15.00	5.38	154.03	--	--	--	--	--	--	--	--	
2/22/2008	--		5.00	15.00	4.70	154.71	--	--	--	--	--	--	--	--	
5/24/2008	--		5.00	15.00	5.25	154.16	--	--	--	--	--	--	--	--	
8/21/2008	NP		5.00	15.00	6.14	153.27	<50	<0.50	<0.50	<0.50	<0.50	1.9	1.99	7.13	
11/19/2008	--		5.00	15.00	5.94	153.47	--	--	--	--	--	--	--	--	
2/23/2009	--		5.00	15.00	5.00	154.41	--	--	--	--	--	--	--	--	
5/14/2009	--		5.00	15.00	4.60	154.81	--	--	--	--	--	--	--	--	
8/20/2009	NP		5.00	15.00	5.65	153.76	<50	<0.50	<0.50	<0.50	<0.50	2.0	1.98	6.81	
2/19/2010	--		5.00	15.00	7.28	152.13	--	--	--	--	--	--	--	--	
8/10/2010	NP		5.00	15.00	5.02	154.39	<50	<0.50	<0.50	<0.50	<0.50	4.3	1.99	6.93	
12/16/2010	--		5.00	15.00	4.50	154.91	--	--	--	--	--	--	--	--	j
2/14/2011	--		5.00	15.00	4.80	154.61	--	--	--	--	--	--	--	--	
5/20/2011	--		5.00	15.00	4.29	155.12	--	--	--	--	--	--	--	--	
8/15/2011	P		5.00	15.00	4.52	154.89	<50	<0.50	<0.50	<0.50	<0.50	2.2	1.55	7.1	
2/2/2012	--		5.00	15.00	--	--	--	--	--	--	--	--	--	--	d
8/9/2012	P		5.00	15.00	4.65	154.76	<50	<0.50	<0.50	<0.50	<1.0	3.6	1.14	6.89	
2/14/2013	--		5.00	15.00	--	--	--	--	--	--	--	--	--	--	d
8/22/2013	--		5.00	15.00	--	--	--	--	--	--	--	--	--	--	d

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

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	P/NP	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in µg/L						DO (mg/L)	pH	Footnote
							GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE			
ESL - DW							100	1.0	40	30	20	5.0			
ESL - NDW							210	46	130	43	100	1,800			
MW-6 Cont.															
2/11/2014	--	159.41	5.00	15.00	4.67	154.74	--	--	--	--	--	--	--	--	
8/15/2014	P		5.00	15.00	2.84	156.57	<50	<0.50	<0.50	<0.50	<1.0	1.7	1.08	6.01	
2/12/2015	--		5.00	15.00	1.40	158.01	--	--	--	--	--	--	--	--	
MW-7															
12/16/2010	P	164.80	5.00	20.00	6.52	158.28	***700***	<0.50	<0.50	15	*32*	*62*	--	7.08	j
2/14/2011	NP		5.00	20.00	6.77	158.03	***7,100***	***1,700***	*98*	***260***	***210***	*<20*	1.02	6.8	
5/20/2011	NP		5.00	20.00	5.84	158.96	***570***	<0.50	<0.50	*37*	*25*	4.6	1.66	6.7	l (GRO)
8/15/2011	P		5.00	20.00	6.96	157.84	***420***	<1.0	<1.0	***49***	6.7	*14*	0.58	6.9	
2/2/2012	P		5.00	20.00	7.15	157.65	<50	<0.50	<0.50	<0.50	<0.50	*6.2*	0.45	7.5	
8/9/2012	P		5.00	20.00	5.05	159.75	85	<0.50	<0.50	5.8	1.1	*7.0*	1.04	7.25	
2/14/2013	P		5.00	20.00	4.38	160.42	***310***	*1.2*	<0.50	1.6	6.3	*5.1*	1.31	7.64	
8/22/2013	P		5.00	20.00	7.39	157.41	78	<0.50	<0.50	3.9	<1.0	3.1	4.01	7.00	
2/11/2014	P		5.00	20.00	7.37	157.43	<50	<0.50	<0.50	<0.50	<1.0	*12*	1.90	6.94	
8/15/2014	P		5.00	20.00	8.39	156.41	<50	<0.50	<0.50	<0.50	<1.0	*50*	0.14	6.34	
2/12/2015	P		5.00	20.00	6.76	158.04	<50	<0.50	<0.50	<0.50	<1.0	4.0	0.65	6.38	
MW-8															
12/16/2010	P	164.14	5.00	20.00	6.85	157.29	***520***	*43*	<0.50	4.1	*21*	*150*	0.46	7.12	j
2/14/2011	NP		5.00	20.00	7.30	156.84	<50	*<2.0*	<2.0	<2.0	<2.0	*110*	1.07	6.7	
5/20/2011	NP		5.00	20.00	6.88	157.26	<50	*<2.0*	<2.0	<2.0	<2.0	*88*	1.35	6.5	
8/15/2011	P		5.00	20.00	6.00	158.14	<50	*5.2*	<1.0	9.7	<1.0	*57*	0.51	6.7	
2/2/2012	P		5.00	20.00	7.57	156.57	<50	<0.50	<0.50	<0.50	<0.50	3.9	0.68	7.1	
8/9/2012	P		5.00	20.00	6.08	158.06	*110*	***67***	<0.50	<0.50	<1.0	*150*	1.16	6.98	
2/14/2013	P		5.00	20.00	5.70	158.44	***720***	***350***	<2.0	<2.0	<4.0	*240*	1.23	7.40	
8/22/2013	P		5.00	20.00	7.95	156.19	<50	*1.5*	<0.50	<0.50	<1.0	*180*	3.96	6.88	
2/11/2014	P		5.00	20.00	7.56	156.58	<50	<0.50	<0.50	<0.50	<1.0	*78*	1.93	6.72	
8/15/2014	P		5.00	20.00	8.65	155.49	<50	<0.50	<0.50	<0.50	<1.0	*21*	1.92	5.88	
2/12/2015	P		5.00	20.00	7.13	157.01	<50	<0.50	<0.50	<0.50	<1.0	*47*	6.27	5.96	

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

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	P/NP	TOC (feet)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	DTW (feet)	Water Level Elevation (feet)	Concentrations in µg/L						DO (mg/L)	pH	Footnote
							GRO/ TPHg	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MTBE			
ESL - DW							100	1.0	40	30	20	5.0			
ESL - NDW							210	46	130	43	100	1,800			
MW-9															
12/16/2010	P	163.77	5.00	20.00	6.63	157.14	***330***	*18*	<0.50	11	*38*	*390*	0.57	6.97	j
2/14/2011	NP		5.00	20.00	6.85	156.92	<50	*<4.0*	<4.0	<4.0	<4.0	*270*	0.98	6.9	
5/20/2011	NP		5.00	20.00	6.39	157.38	66	*<4.0*	<4.0	<4.0	<4.0	*280*	1.64	6.7	l (GRO)
8/15/2011	NP		5.00	20.00	7.09	156.68	<50	*<2.0*	<2.0	<2.0	<2.0	*120*	0.88	7.1	
2/2/2012	P		5.00	20.00	7.18	156.59	<50	<0.50	<0.50	<0.50	<0.50	*34*	0.65	7.2	
8/9/2012	P		5.00	20.00	5.68	158.09	82	*1.9*	<0.50	<0.50	<1.0	*19*	1.61	7.13	
2/14/2013	P		5.00	20.00	5.27	158.50	***250***	*5.2*	<0.50	<0.50	1.4	*25*	1.23	7.51	
8/22/2013	P		5.00	20.00	7.46	156.31	***290***	0.71	<0.50	<0.50	1.4	*31*	4.71	7.07	
2/11/2014	P		5.00	20.00	7.07	156.70	***250***	<0.50	<0.50	<0.50	<1.0	*39*	1.12	7.07	
8/15/2014	P		5.00	20.00	8.27	155.50	*180*	<0.50	<0.50	<0.50	<1.0	*68*	0.10	6.03	
2/12/2015	P		5.00	20.00	6.63	157.14	<50	<0.50	<0.50	<0.50	<1.0	*90*	0.61	6.17	

Symbols & Abbreviations:
-- = Not analyzed/applicable/measured/available
< = Not detected at or above laboratory reporting limit
DO = Dissolved oxygen
DTW = Depth to water in ft below TOC
ft bgs = Feet below ground surface
GRO = Gasoline range organics
GWE = Groundwater elevation measured in ft
mg/L = Milligrams per liter
MTBE = Methyl tert-butyl ether
NP = Well was not purged prior to sampling
P = Well was purged prior to sampling
TOC = Top of casing measured in ft
TPH-g = Total petroleum hydrocarbons as gasoline
µg/L = Micrograms per liter
BTEX = Benzene, toluene, ethylbenzene and xylenes

ESL - DW = Environmental Screning Levels (ESLs), shallow soils (<3 meters bgs), groundwater is a current or potential source of drinking water, for residential land use. Ref. California Regional Water Quality Control Board, San Francisco Bay Region (CRWQCB-SFBR), Screening for Environmental Concerns at Sites with Contaminated Soil & Groundwater, Interim Final-November 2007 (Revised May 2008).

ESL - NDW = Environmental Screning Levels (ESLs), shallow soils (<3 meters bgs), groundwater is NOT a current or potential source of drinking water, for residential land use. Ref. California Regional Water Quality Control Board, San Francisco Bay Region (CRWQCB-SFBR), Screening for Environmental Concerns at Sites with Contaminated Soil & Groundwater, Interim Final-November 2007 (Revised May 2008).

NE = ESL not established

Footnotes:
a = Chromatogram pattern: Gasoline C6-C10 for GRO/TPH-g
b = Beginning this quarter, groundwater samples were analyzed by EPA method 8260B for TPH-g, BTEX, and fuel oxygenates
c = Wells gauged with ORC sock in well
d = Well inaccessible
e = The hydrocarbon result for GRO was partly due to individual peaks in the quantitative range
f = Well resurveyed on 1/27/2004 to NAVD88
g = Upon review of survey data (1/27/2004), TOC elevation for MW-4 is actually 162.47 ft.
h = Upon review of survey data (1/27/2004), MW-5 was not surveyed from the TOC. MW-5 was surveyed from the pavement due to inaccessibility to the TOC. Therefore, survey data for MW-5 from the TOC is unavailable. Historic data prior to 5/30/2006 (change in consultant) not modified
i = Quantitation of unknown hydrocarbon(s) in sample based on gasoline
j = Surveyed 12/9/2010
k = Grab groundwater sample
l = Quantitated against gasoline

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

The DTW's and TOC's for wells MW-5 and MW-6 were taken from Delta Environmental sampling sheets because the well logs were not available

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

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

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	Concentrations in µg/L								Footnote
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
ESL - DW	NE	12	5.0	NE	NE	NE	0.5	0.05	
ESL - NDW	NE	18,000	1,800	NE	NE	NE	200	150	
MW-1									
3/23/2001	--	--	***2,710***	--	--	--	--	--	
3/21/2002	--	--	***2,000***	--	--	--	--	--	
5/23/2003	<20,000	*<4,000*	*1,600*	<100	<100	<100	--	--	
11/20/2003	<2,000	*<400*	*1,500*	<10	<10	<10	--	--	a
5/14/2004	<5,000	*<1,000*	*1,200*	<25	<25	<25	*<25*	*<25*	
9/2/2004	<1,000	*<200*	*660*	<5.0	<5.0	<5.0	*<5.0*	*<5.0*	
11/4/2004	<2,000	*<400*	*580*	<10	<10	<10	*<10*	*<10*	
2/8/2005	<2,000	*<400*	*610*	<10	<10	<10	*<10*	*<10*	
5/9/2005	<1,000	*<200*	*620*	<5.0	<5.0	<5.0	*<5.0*	*<5.0*	a
8/11/2005	<500	*250*	*390*	<2.5	<2.5	2.6	*<2.5*	*<2.5*	a
11/18/2005	<500	*<100*	*340*	<2.5	<2.5	<2.5	*<2.5*	*<2.5*	a
2/16/2006	<1,500	*<100*	*340*	<2.5	<2.5	<2.5	*<2.5*	*<2.5*	
5/30/2006	<1,500	*<100*	*420*	<2.5	<2.5	<2.5	*<2.5*	*<2.5*	a
8/24/2006	<3,000	*<200*	*180*	<5.0	<5.0	<5.0	*<5.0*	*<5.0*	
11/1/2006	<3,000	*<200*	*220*	<5.0	<5.0	<5.0	*<5.0*	*<5.0*	a
2/7/2007	<3,000	*<200*	*190*	<5.0	<5.0	<5.0	*<5.0*	*<5.0*	
5/8/2007	<3,000	*<200*	*420*	<5.0	<5.0	<5.0	*<5.0*	*<5.0*	
8/8/2007	<300	*<20*	*110*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
11/14/2007	<1,500	*<100*	*210*	<2.5	<2.5	<2.5	*<2.5*	*<2.5*	
2/22/2008	<300	<10	*250*	<0.50	<0.50	1.5	<0.50	*<0.50*	
5/24/2008	<3,000	*<100*	*380*	<5.0	<5.0	<5.0	*<5.0*	*<5.0*	
8/21/2008	<1,500	*<50*	*170*	<2.5	<2.5	<2.5	*<2.5*	*<2.5*	
11/19/2008	<300	<10	*30*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
2/23/2009	<1,500	*<50*	*240*	<2.5	<2.5	<2.5	*<2.5*	*<2.5*	
5/14/2009	<300	<10	*200*	<0.50	<0.50	1.3	<0.50	*<0.50*	
8/20/2009	<1,200	*<40*	*170*	<2.0	<2.0	<2.0	*<2.0*	*<2.0*	
2/19/2010	<300	<10	*170*	<0.50	<0.50	1.2	<0.50	*<0.50*	
8/10/2010	<1,500	*<50*	*230*	<2.5	<2.5	<2.5	*<2.5*	*<2.5*	
12/16/2010	<1,200	*<40*	*140*	<2.0	<2.0	<2.0	*<2.0*	*<2.0*	

Table 2. Summary of Fuel Additives Analytical Data

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	Concentrations in µg/L								Footnote
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
ESL - DW	NE	12	5.0	NE	NE	NE	0.5	0.05	
ESL - NDW	NE	18,000	1,800	NE	NE	NE	200	150	
MW-1 Cont.									
2/14/2011	<1,500	*<50*	*170*	<2.5	<2.5	<2.5	*<2.5*	*<2.5*	
8/15/2011	<1,500	*<50*	*130*	<2.5	<2.5	<2.5	*<2.5*	*<2.5*	
2/2/2012	<600	*<20*	*66*	<1.0	<1.0	<1.0	*<1.0*	*<1.0*	
8/9/2012	<150	<10	*170*	<0.50	<0.50	0.78	<0.50	*<0.50*	
2/14/2013	<150	<10	*140*	<0.50	<0.50	0.58	<0.50	*<0.50*	
8/22/2013	<150	<10	*91*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
2/11/2014	<150	<10	*26*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/15/2014	<150	<10	*120*	<0.50	<0.50	0.61	<0.50	*<0.50*	
2/12/2015	<150	<10	*130*	<0.50	<0.50	0.57	<0.50	*<0.50*	
MW-2									
3/23/2001	--	--	<2.5	--	--	--	--	--	
3/21/2002	--	--	*45*	--	--	--	--	--	
5/23/2003	<100	*<20*	*55*	<0.50	<0.50	0.53	--	--	
2/2/2004	<100	*<20*	*37*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
9/2/2004	<500	*<100*	*67*	<2.5	<2.5	<2.5	*<2.5*	*<2.5*	
2/8/2005	<100	*<20*	*30*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/11/2005	<100	*<20*	*35*	<0.50	<0.50	<0.50	<0.50	*<0.50*	a
2/16/2006	<300	*<20*	*39*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/24/2006	<300	*<20*	*25*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
2/7/2007	<300	*<20*	*7.2*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/8/2007	<300	*<20*	*7.2*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
2/22/2008	<300	<10	*24*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/21/2008	<300	<10	4.9	<0.50	<0.50	<0.50	<0.50	*<0.50*	
2/23/2009	<300	<10	*24*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/20/2009	<300	<10	*8.4*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
2/19/2010	<300	<10	*22*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/10/2010	<300	<10	*23*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
12/16/2010	<300	<10	*17*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
2/14/2011	<300	<10	*11*	<0.50	<0.50	<0.50	<0.50	*<0.50*	

Table 2. Summary of Fuel Additives Analytical Data

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	Concentrations in µg/L								Footnote
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
ESL - DW	NE	12	5.0	NE	NE	NE	0.5	0.05	
ESL - NDW	NE	18,000	1,800	NE	NE	NE	200	150	
MW-2 Cont.									
8/15/2011	<300	<10	1.7	<0.50	<0.50	<0.50	<0.50	*<0.50*	
2/2/2012	<300	<10	1.8	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/9/2012	<150	<10	*73*	<0.50	<0.50	0.61	<0.50	*<0.50*	
2/14/2013	<150	<10	*46*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/22/2013	<150	<10	*82*	<0.50	<0.50	1.1	<0.50	*<0.50*	
2/11/2014	<150	<10	*7.5*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/15/2014	<150	<10	*61*	<0.50	<0.50	0.73	<0.50	*<0.50*	
2/12/2015	<150	<10	*57*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
MW-3									
6/20/2000	--	--	*<10*	--	--	--	--	--	
12/17/2000	--	--	<2.5	--	--	--	--	--	
6/21/2001	--	--	2.5	--	--	--	--	--	
12/31/2001	--	--	4.9	--	--	--	--	--	
4/17/2002	--	--	*8.7*	--	--	--	--	--	
12/6/2002	--	--	*6.2*	--	--	--	--	--	
5/23/2003	<100	*<20*	1.6	<0.50	<0.50	<0.50	--	--	
9/2/2004	<100	*<20*	*6.5*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/11/2005	<100	*<20*	*11*	<0.50	<0.50	<0.50	<0.50	*<0.50*	a
8/24/2006	<300	*<20*	*7.6*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/8/2007	<300	*<20*	1.2	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/21/2008	<300	<10	3.1	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/20/2009	<300	<10	2.2	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/10/2010	<300	<10	1.6	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/15/2011	<300	<10	1.2	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/9/2012	<150	<10	2.0	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/22/2013	<150	<10	1.4	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/15/2014	<150	<10	1.2	<0.50	<0.50	<0.50	<0.50	*<0.50*	
MW-4									

Table 2. Summary of Fuel Additives Analytical Data

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	Concentrations in µg/L								Footnote
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
ESL - DW	NE	12	5.0	NE	NE	NE	0.5	0.05	
ESL - NDW	NE	18,000	1,800	NE	NE	NE	200	150	
MW-4 Cont.									
6/20/2000	--	--	*<250*	--	--	--	--	--	
12/17/2000	--	--	*<100*	--	--	--	--	--	
6/21/2001	--	--	*130*	--	--	--	--	--	
12/31/2001	--	--	*160*	--	--	--	--	--	
4/17/2002	--	--	*<250*	--	--	--	--	--	
12/6/2002	--	--	*43*	--	--	--	--	--	
5/23/2003	<10,000	*<2,000*	*<50*	<50	<50	<50	--	--	
2/2/2004	<500	*<100*	*29*	<2.5	<2.5	2.6	*<2.5*	*<2.5*	
9/2/2004	<200	*<40*	*28*	<1.0	<1.0	<1.0	*<1.0*	*<1.0*	
2/8/2005	<5,000	*<1,000*	*45*	<25	<25	<25	*<25*	*<25*	
8/11/2005	<2,000	*<400*	*32*	<10	<10	<10	*<10*	*<10*	
2/16/2006	<6,000	*<400*	*35*	<10	<10	<10	*<10*	*<10*	
8/24/2006	<1,500	*<100*	*39*	<2.5	<2.5	<2.5	*<2.5*	*<2.5*	
2/7/2007	<6,000	*<400*	*67*	<10	<10	<10	*<10*	*<10*	
8/8/2007	<6,000	*<400*	*72*	<10	<10	<10	*<10*	*<10*	
2/22/2008	<6,000	*<200*	*70*	<10	<10	<10	*<10*	*<10*	
8/21/2008	<12,000	*<400*	*53*	<20	<20	<20	*<20*	*<20*	
2/23/2009	<3,000	*<100*	*39*	<5.0	<5.0	<5.0	*<5.0*	*<5.0*	
8/20/2009	<12,000	*<400*	*23*	<20	<20	<20	*<20*	*<20*	
2/19/2010	<3,000	*<100*	<5.0	<5.0	<5.0	<5.0	*<5.0*	*<5.0*	
8/10/2010	<12,000	*<400*	*<20*	<20	<20	<20	*<20*	*<20*	
12/16/2010	<15,000	*<500*	*<25*	<25	<25	<25	*<25*	*<25*	
2/14/2011	<300	<10	*13*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/15/2011	<7,500	*<250*	*<12*	<12	<12	<12	*<12*	*<12*	
2/2/2012	<7,500	*<250*	*<12*	<12	<12	<12	*<12*	*<12*	
8/9/2012	<1,500	*<100*	<5.0	<5.0	<5.0	<5.0	*<5.0*	*<5.0*	
2/14/2013	<3,000	*<200*	*<10*	<10	<10	<10	*<10*	*<10*	
8/22/2013	<3,000	*<200*	*<10*	<10	<10	<10	*<10*	*<10*	
2/11/2014	<1,500	*<100*	<5.0	<5.0	<5.0	<5.0	*<5.0*	*<5.0*	

Table 2. Summary of Fuel Additives Analytical Data

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	Concentrations in µg/L								Footnote
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
ESL - DW	NE	12	5.0	NE	NE	NE	0.5	0.05	
ESL - NDW	NE	18,000	1,800	NE	NE	NE	200	150	
MW-4 Cont.									
8/15/2014	<1,500	*<100*	<5.0	<5.0	<5.0	<5.0	*<5.0*	*<5.0*	
2/12/2015	<150	<10	<0.50	<0.50	<0.50	<0.50	<0.50	*<0.50*	
MW-5									
6/20/2000	--	--	*<10*	--	--	--	--	--	
9/28/2000	--	--	<2.5	--	--	--	--	--	
12/17/2000	--	--	<2.5	--	--	--	--	--	
3/23/2001	--	--	<2.5	--	--	--	--	--	
6/21/2001	--	--	<2.5	--	--	--	--	--	
9/23/2001	--	--	<2.5	--	--	--	--	--	
12/31/2001	--	--	<2.5	--	--	--	--	--	
3/21/2002	--	--	3.2	--	--	--	--	--	
4/17/2002	--	--	<2.5	--	--	--	--	--	
8/12/2002	--	--	<2.5	--	--	--	--	--	
12/6/2002	--	--	<2.5	--	--	--	--	--	
1/29/2003	<40	*<20*	<0.50	<0.50	<0.50	<0.50	--	--	
5/23/2003	<100	*<20*	<0.50	<0.50	<0.50	<0.50	--	--	
9/4/2003	<100	*<20*	<0.50	<0.50	<0.50	<0.50	<0.50	*<0.50*	
9/2/2004	<100	*<20*	<0.50	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/11/2005	<100	*<20*	<0.50	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/24/2006	<300	*<20*	<0.50	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/8/2007	<300	*<20*	<0.50	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/21/2008	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/20/2009	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/10/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/15/2011	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/9/2012	<150	<10	<0.50	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/22/2013	<150	<10	<0.50	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/15/2014	<150	<10	<0.50	<0.50	<0.50	<0.50	<0.50	*<0.50*	

Table 2. Summary of Fuel Additives Analytical Data

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	Concentrations in µg/L								Footnote
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
ESL - DW	NE	12	5.0	NE	NE	NE	0.5	0.05	
ESL - NDW	NE	18,000	1,800	NE	NE	NE	200	150	
MW-6									
3/23/2001	--	--	<2.5	--	--	--	--	--	
3/21/2002	--	--	*5.2*	--	--	--	--	--	
5/23/2003	<100	*<20*	*9.4*	<0.50	<0.50	<0.50	--	--	
8/11/2005	<100	*<20*	*7.9*	<0.50	<0.50	<0.50	<0.50	*<0.50*	a
8/24/2006	<300	*<20*	*12*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/8/2007	<300	*<20*	0.57	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/21/2008	<300	<10	1.9	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/20/2009	<300	<10	2.0	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/10/2010	<300	<10	4.3	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/15/2011	<300	<10	2.2	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/9/2012	<150	<10	3.6	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/15/2014	<150	<10	1.7	<0.50	<0.50	<0.50	<0.50	*<0.50*	
MW-7									
12/16/2010	<300	<10	*62*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
2/14/2011	<1,2000	*<400*	*<20*	<20	<20	<20	*<20*	*<20*	
5/20/2011	<300	<10	4.6	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/15/2011	<600	*<20*	*14*	<1.0	<1.0	<1.0	*<1.0*	*<1.0*	
2/2/2012	<300	<10	*6.2*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/9/2012	<150	<10	*7.0*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
2/14/2013	<150	<10	*5.1*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/22/2013	<150	<10	3.1	<0.50	<0.50	<0.50	<0.50	*<0.50*	
2/11/2014	<150	<10	*12*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/15/2014	<150	<10	*50*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
2/12/2015	<150	<10	4.0	<0.50	<0.50	<0.50	<0.50	*<0.50*	
MW-8									
12/16/2010	<300	<10	*150*	<0.50	<0.50	1.7	<0.50	*<0.50*	
2/14/2011	<1,200	*<40*	*110*	<2.0	<2.0	<2.0	*<2.0*	*<2.0*	
5/20/2011	<1,200	*<40*	*88*	<2.0	<2.0	<2.0	*<2.0*	*<2.0*	

Table 2. Summary of Fuel Additives Analytical Data

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Well ID and Date Monitored	Concentrations in µg/L								Footnote
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
ESL - DW	NE	12	5.0	NE	NE	NE	0.5	0.05	
ESL - NDW	NE	18,000	1,800	NE	NE	NE	200	150	
MW-8 Cont.									
8/15/2011	<600	*<20*	*57*	<1.0	<1.0	<1.0	*<1.0*	*<1.0*	
2/2/2012	<300	<10	3.9	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/9/2012	<150	*31*	*150*	<0.50	<0.50	2.0	<0.50	*<0.50*	
2/14/2013	<600	*150*	*240*	<2.0	<2.0	5.2	*<2.0*	*<2.0*	
8/22/2013	<150	*39*	*180*	<0.50	<0.50	2.8	<0.50	*<0.50*	
2/11/2014	<150	<10	*78*	<0.50	<0.50	0.83	<0.50	*<0.50*	
8/15/2014	<150	<10	*21*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
2/12/2015	<150	<10	*47*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
MW-9									
12/16/2010	<300	*40*	*390*	<0.50	<0.50	4.1	<0.50	*<0.50*	
2/14/2011	<2,400	*<80*	*270*	<4.0	<4.0	<4.0	*<4.0*	*<4.0*	
5/20/2011	<2,400	*<80*	*280*	<4.0	<4.0	<4.0	*<4.0*	*<4.0*	
8/15/2011	<1,200	*<40*	*120*	<2.0	<2.0	<2.0	*<2.0*	*<2.0*	
2/2/2012	<300	<10	*34*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/9/2012	<150	<10	*19*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
2/14/2013	<150	<10	*25*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/22/2013	<150	<10	*31*	<0.50	<0.50	0.55	<0.50	*<0.50*	
2/11/2014	<150	<10	*39*	<0.50	<0.50	<0.50	<0.50	*<0.50*	
8/15/2014	<150	<10	*68*	<0.50	<0.50	0.67	<0.50	*<0.50*	
2/12/2015	<150	<10	*90*	<0.50	<0.50	<0.50	<0.50	*<0.50*	

Symbols & Abbreviations:
-- = Not analyzed/applicable/measured/available
< = Not detected at or above the laboratory reporting limi
1,2-DCA = 1,2-Dichloroethane
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

ESL - DW = Environmental Screning Levels (ESLs), shallow soils (<3 meters bgs), groundwater is a current or potential source of drinking water, for residential land use. Ref. California Regional Water Quality Control Board, San Francisco Bay Region (CRWQCB-SFBR), Screening for Environmental Concerns at Sites with Contaminated Soil & Groundwater, Interim Final-November 2007 (Revised May 2008).

ESL - NDW = Environmental Screning Levels (ESLs), shallow soils (<3 meters bgs), groundwater is NOT a current or potential source of drinking water, for residential land use. Ref. California Regional Water Quality Control Board, San Francisco Bay Region (CRWQCB-SFBR), Screening for Environmental Concerns at Sites with Contaminated Soil & Groundwater, Interim Final-November 2007 (Revised May 2008).

NE = ESL not established

Footnotes:
a = The continuing calibration verification for ethanol was outside of client contractual limits, however, it was within method acceptance limits. The data should still be useful for its intended purpose

Notes:
All volatile organic compounds analyzed using EPA Method 8260B

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. Summary of Groundwater Gradient - Direction and Magnitude

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Date Measured	Approximate Gradient Direction	Approximate Gradient Magnitude (ft/ft)
1/31/1996	Southwest	0.04
4/10/1996	Southwest	0.04
7/16/1996	Southwest	0.03
10/14/1996	Southwest	0.03
3/27/1997	Southwest	0.04
5/27/1997	Southwest	0.03
8/12/1997	Southwest	0.04
11/17/1997	Southwest	0.03
3/16/1998	Southwest	0.03
5/12/1998	Southwest	0.04
7/27/1998	Southwest	0.04
10/15/1998	Southwest	0.02
2/18/1999	Southwest	0.05
5/24/1999	Southwest	0.03
8/27/1999	Southwest	0.03
10/26/1999	Southwest	0.03
2/3/2000	Southwest	0.047
6/20/2000	Southwest	0.035
9/28/2000	Southwest	0.034
12/17/2000	Southwest	0.032
3/23/2001	Southwest	0.034
6/21/2001	Southwest	0.032
9/23/2001	Southwest	0.029
12/31/2001	Southwest	0.043
3/21/2002	Southwest	0.038
4/17/2002	Southwest	0.031
8/12/2002	Southwest	0.032
12/6/2002	Southwest	0.020
1/29/2003	Southwest	0.027
5/23/2003	Southwest	0.039
9/4/2003	Southwest	0.033
11/20/2003	Southwest	0.029
2/2/2004	Southwest	0.043 (a)
5/14/2004	Southwest	0.037 (a)
9/2/2004	Southwest	0.027 (a)
11/4/2004	Southwest	0.034 (a)
2/8/2005	Southwest	0.061 (a)
5/9/2005	Southwest	0.08 (a)
8/11/2005	Southwest	0.06 (a)
11/18/2005	Southwest	0.07 (a)
2/16/2006	Southwest	0.09 (a)
5/30/2006	Southwest	0.06 (a)
8/24/2006	Southwest	0.03
11/1/2006	Southwest	0.02
2/7/2007	Southwest	0.03

Table 3. Summary of Groundwater Gradient - Direction and Magnitude

ARCO Service Station #0374, 6407 Telegraph Ave., Oakland, CA

Date Measured	Approximate Gradient Direction	Approximate Gradient Magnitude (ft/ft)
5/8/2007	Southwest	0.03
8/8/2007	Southwest	0.03
11/14/2007	Southwest	0.03
2/22/2008	Southwest	0.03
5/24/2008	Southwest	0.03
8/21/2008	Southwest	0.03
11/19/2008	Southwest	0.03
2/23/2009	Southwest	0.04
5/14/2009	Southwest	0.03
8/20/2009	Southwest	0.03
2/19/2010	West-Southwest	0.05
8/10/2010	Southwest	0.03
12/16/2010	Southwest	0.03
2/14/2011	Southwest	0.03
5/20/2011	Southwest	0.03
8/15/2011	Southwest	0.03
2/2/2012	Southwest	0.03
8/9/2012	Southwest	0.03
2/14/2013	Southwest	0.04
8/22/2013	Southwest	0.03
2/11/2014	Southwest	0.03
8/15/2014	South-Southwest	0.03
2/12/2015	**South-Southwest**	**0.16**

Footnotes:
a = Gradients potentially suspect due to error in MW-4 and MW-5 TOC measuring point elevations discovered third quarter 2006

Notes:
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

QUALITY ASSURANCE/QUALITY CONTROL
FIELD METHODS

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

1.0 Equipment Calibration

Equipment calibration was performed per equipment manufacturer specifications before use.

2.0 Depth to Groundwater and Light Non-Aqueous Phase Liquid Measurement

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

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

3.0 Well Purging and Groundwater Sample Collection

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

3.1 Purging a Predetermined Well Volume

Purging a predetermined well volume is performed per ASTM International (ASTM) D4448-01. This purging method has the objective of removing a predetermined volume of stagnant water from the well prior to sampling. The volume of stagnant water

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

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

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

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

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

3.2 Low-Flow Purging and Sampling

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

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

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

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

3.3 Minimal Purge, Discrete Depth, and Passive Sampling

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

---

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

4.0 Decontamination

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

5.0 Sample Containers, Labeling, and Storage

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

6.0 Chain of Custody Record and Procedure

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

7.0 Field Records

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

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

DAILY REPORT
Page ____ of ____

Project: BP 374 Project No.: 06-88-602

Field Representative(s): JC/NV Day: Thurs Date: 2-12-15

Time Onsite: From: 0730 To: 1100; From: ____ To: ____; From: ____ To: ____

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

Weather: Sunny

Equipment In Use: LEL, horiba, peripump

Visitors: n/a

TIME:	WORK DESCRIPTION:
0230	Mobonsite and complete safety meeting
0740	Gauge all wells
0810	Setup @ MW-1
0835	Setup @ MW-2
0855	Setup @ MW-9
0920	Setup @ MW-8
0945	Setup @ MW-7
1010	Setup @ MW-4
1100	Cleanup and offsite

Signature: [signature]

BROADBENT

GROUNDWATER MONITORING SITE SHEET

Page ____ of ____

Project: BP 374 Project No.: 06-88-602 Date: 2-12-15

Field Representative: JC/NV Elevation: ____

Formation recharge rate is historically: High Low *(circle one)*

W. L. Indicator ID #: ____ Oil/Water Interface ID #: ____ *(List #s of all equip used.)*

WELL ID RECORD					WELL GAUGING RECORD					LAB ANALYSES					
Well ID	Well Sampling Order	As-Built Well Diameter (inches)	As-Built Well Screen Interval (ft)	Previous Depth to Water (ft)	Time (24:00)	Depth to LNAPL (ft)	Apparent LNAPL Thickness (ft)*	Depth to Water (ft)	Well Total Depth (ft)						
MW-1	1				755			6.57	26.67						
MW-2	2				0800			6.98	26.29						
MW-3					741			3.41	26.73						
MW-4	6				0819			5.98	26.95						
MW-5					744			5.32	23.04						
MW-6					738			1.40	14.56						
MW-7	5				0815			6.76	19.90						
MW-8	4				0810			7.13	19.50						
MW-9	3				0805			6.63	19.50						

* Device used to measure LNAPL thickness: Bailer Oil/Water Interface Meter *(circle one)*

If bailer used, note bailer dimensions (inches): Entry Diameter ____ Chamber Diameter ____

Signature:

Revision 1/24/2012

BROADBENT

GROUNDWATER SAMPLING DATA SHEET

Page ____ of ____

Project: BP374 Project No.: 06-88-602 Date: 2-12-15

Field Representative: JC/NU

Well ID: MW-1 Start Time: 0820 End Time: 0835 Total Time (minutes): 15

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

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

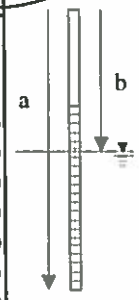
PURGING/SAMPLING METHOD Predetermined Well Volume (Low-Flow) Other: *(circle one)*

PREDETERMINED WELL VOLUME

Casing Diameter | Unit Volume (gal/ft) *(circle one)*

1" | (0.04)	1.25" | (0.08)	2" | (0.17)	3" | (0.38)	Other:
4" | (0.66)	6" | (1.50)	8" | (2.60)	12" | (5.81)	___" | (___)

Total Well Depth (a): _____ (ft)
Initial Depth to Water (b): _____ (ft)
Water Column Height (WCH) = (a - b): _____ (ft)
Water Column Volume (WCV) = WCH x Unit Volume: _____ (gal)
Three Casing Volumes = WCV x 3: _____ (gal)
Five Casing Volumes = WCV x 5: _____ (gal)
Pump Depth (if pump used): _____ (ft)



LOW-FLOW

Previous Low-Flow Purge Rate: _____ (lpm)
Total Well Depth (a): 26.67 (ft)
Initial Depth to Water (b): 6.93 (ft)
Pump In-take Depth = b + (a-b)/2: 16.62 (ft)
Maximum Allowable Drawdown = (a-b)/8: 2.51 (ft)
Low-Flow Purge Rate: 0.25 (Lpm)*
Comments:

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

GROUNDWATER STABILIZATION PARAMETER RECORD

Time (24:00)	Cumulative Vol. gal or L	Temperature °C	pH	Conductivity µS or mS	DO mg/L	ORP mV	Turbidity NTU	NOTES Odor, color, sheen or other
0822	0	16.63	6.12	0.872	3.29	97	0.7	
24	.5	16.72	6.15	0.867	1.84	50	12.0	
26	1	16.76	6.17	0.866	1.21	22	3.2	
28	1.5	16.78	6.17	0.866	1.08	19	0.0	
30	2	16.79	6.17	0.866	1.00	18	0.0	
Previous Stabilized Parameters								

PURGE COMPLETION RECORD X Low Flow & Parameters Stable ___ 3 Casing Volumes & Parameters Stable ___ 5 Casing Volumes
___ Other:

SAMPLE COLLECTION RECORD

Depth to Water at Sampling: 6.93 (ft)
Sample Collected Via: ___ Disp. Bailer ___ Dedicated Pump Tubing
X Disp. Pump Tubing Other:
Sample ID: MW-1 Sample Collection Time: 0835 (24:00)
Containers (#): 6 VOA (X preserved or ___ unpreserved) ___ Liter Amber
___ Other: ___ Other:
___ Other: ___ Other:

GEOCHEMICAL PARAMETERS

Parameter	Time	Measurement
DO (mg/L)		
Ferrous Iron (mg/L)		
Redox Potential (mV)		
Alkalinity (mg/L)		
Other:		
Other:		

Signature:

Revision: 3/15/2013

BROADBENT

GROUNDWATER SAMPLING DATA SHEET

Page _____ of _____

Project: BP 374 Project No.: 0688602 Date: 2-12-15

Field Representative: JC/NV

Well ID: MW-2 Start Time: 0835 End Time: 0855 Total Time (minutes): 20

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

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

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

PREDETERMINED WELL VOLUME

Casing Diameter | Unit Volume (gal/ft) *(circle one)*
1" | (0.04) 1.25" | (0.08) 2" | (0.17) 3" | (0.38) Other:
4" | (0.66) 6" | (1.50) 8" | (2.60) 12" | (5.81) ___" | (___)

Total Well Depth (a): ________(ft)
Initial Depth to Water (b): ________(ft)
Water Column Height (WCH) = (a - b): ________(ft)
Water Column Volume (WCV) = WCH x Unit Volume: ________(gal)
Three Casing Volumes = WCV x 3: ________(gal)
Five Casing Volumes = WCV x 5: ________(gal)
Pump Depth (if pump used): ________(ft)

LOW-FLOW

Previous Low-Flow Purge Rate: ________(lpm)
Total Well Depth (a): 26.29 (ft)
Initial Depth to Water (b): 6.98 (ft)
Pump In-take Depth = b + (a-b)/2: 16.62 (ft)
Maximum Allowable Drawdown = (a-b)/8: 2.41 (ft)
Low-Flow Purge Rate: 0.25 (lpm)*
Comments:

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

GROUNDWATER STABILIZATION PARAMETER RECORD

Time (24:00)	Cumulative Vol. gal or (L)	Temperature °C	pH	Conductivity µS or (mS)	DO mg/L	ORP mV	Turbidity NTU	NOTES Odor, color, sheen or other
0840	0	19.44	6.30	0.637	2.52	103	0	
42	.5	19.94	6.29	0.632	1.27	102	0	
4	1	20.13	6.29	0.632	0.88	99	0	
6	1.5	20.20	6.27	0.632	0.78	99	0	
8	2	20.25	6.27	0.632	0.78	98	0	
Previous Stabilized Parameters								

PURGE COMPLETION RECORD X Low Flow & Parameters Stable __ 3 Casing Volumes & Parameters Stable __ 5 Casing Volumes
__ Other:

SAMPLE COLLECTION RECORD

Depth to Water at Sampling: 7.21 (ft)
Sample Collected Via: __ Disp. Bailer __ Dedicated Pump Tubing
X Disp. Pump Tubing Other:
Sample ID: MW-2 Sample Collection Time: 0850 (24:00)
Containers (#): 6 VOA (X preserved or __ unpreserved) __ Liter Amber
__ Other: ________ __ Other: ________
__ Other: ________ __ Other: ________

GEOCHEMICAL PARAMETERS

Parameter	Time	Measurement
DO (mg/L)		
Ferrous Iron (mg/L)		
Redox Potential (mV)		
Alkalinity (mg/L)		
Other:		
Other:		

Signature: [signature]

Revision: 3/15/2013

BROADBENT

GROUNDWATER SAMPLING DATA SHEET

Page ____ of ____

Project: BP574 Project No.: 01088602 Date: 4/12/15

Field Representative: JC/NV

Well ID: MW-9 Start Time: 0855 End Time: 0920 Total Time (minutes): 25

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

WELL HEAD INTEGRITY (cap, lock, vault, etc.) Comments:

Good Improvement Needed *(circle one)*

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

PREDETERMINED WELL VOLUME

Casing Diameter | Unit Volume (gal/ft) *(circle one)*

1" | (0.04) 1.25" | (0.08) 2" | (0.17) 3" | (0.38) Other:

4" | (0.66) 6" | (1.50) 8" | (2.60) 12" | (5.81) ____" | (____)

Total Well Depth (a): _____ (ft)

Initial Depth to Water (b): _____ (ft)

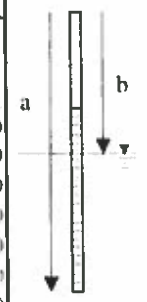
Water Column Height (WCH) = (a - b): _____ (ft)

Water Column Volume (WCV) = WCH x Unit Volume: _____ (gal)

Three Casing Volumes = WCV x 3: _____ (gal)

Five Casing Volumes = WCV x 5: _____ (gal)

Pump Depth (if pump used): _____ (ft)



LOW-FLOW

Previous Low-Flow Purge Rate: _____ (lpm)

Total Well Depth (a): 19.50 (ft)

Initial Depth to Water (b): 6.63 (ft)

Pump In-take Depth = b + (a-b)/2: 13.07 (ft)

Maximum Allowable Drawdown = (a-b)/8: 1.61 (ft)

Low-Flow Purge Rate: 0.25 (l.pm)*

Comments:

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

GROUNDWATER STABILIZATION PARAMETER RECORD

Time (24:00)	Cumulative Vol. gal / mL	Temperature °C	pH	Conductivity µS or mS	DO mg/L	ORP mV	Turbidity NTU	NOTES Odor, color, sheen or other
0900	0	19.10	6.25	0.853	2.02	93	38.7	
02	.5	19.35	6.18	0.836	0.80	-3	12.7	
04	1	19.39	6.17	0.836	0.70	-24	0.6	
06	1.5	19.41	6.18	0.836	0.65	-39	0.0	
08	2	19.45	6.17	0.836	0.61	-49	0.0	
Previous Stabilized Parameters								

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

___ Other:

SAMPLE COLLECTION RECORD

Depth to Water at Sampling: 6.95 (ft)

Sample Collected Via: ___ Disp. Bailer ___ Dedicated Pump Tubing

X Disp. Pump Tubing Other:

Sample ID: MW-9 Sample Collection Time: 0910 (24:00)

Containers (#): 6 VOA (X preserved or ___ unpreserved) ___ Liter Amber

___ Other: ___ Other:

___ Other: ___ Other:

GEOCHEMICAL PARAMETERS

Parameter	Time	Measurement
DO (mg/L)		
Ferrous Iron (mg/L)		
Redox Potential (mV)		
Alkalinity (mg/L)		
Other:		
Other:		

Signature:

Revision: 3/15/2013

BROADBENT

GROUNDWATER SAMPLING DATA SHEET

Page ____ of ____

Project: BP 374 Project No.: 06.88.602 Date: 2-12-15

Field Representative: JC/NV

Well ID: MW-8 Start Time: 0920 End Time: 0945 Total Time (minutes): 25

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

WELL HEAD INTEGRITY (cap, lock, vault, etc.) Comments:

(Good) Improvement Needed *(circle one)*

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

PREDETERMINED WELL VOLUME

Casing Diameter | Unit Volume (gal/ft) *(circle one)*

1" | (0.04) 1.25" | (0.08) 2" | (0.17) 3" | (0.38) Other: ___" | (___)

4" | (0.66) 6" | (1.50) 8" | (2.60) 12" | (5.81) ___" | (___)

Total Well Depth (a): _____ (ft)

Initial Depth to Water (b): _____ (ft)

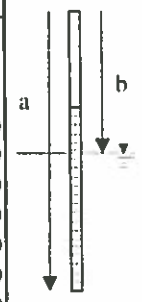
Water Column Height (WCH) = (a - b): _____ (ft)

Water Column Volume (WCV) = WCH x Unit Volume: _____ (gal)

Three Casing Volumes = WCV x 3: _____ (gal)

Five Casing Volumes = WCV x 5: _____ (gal)

Pump Depth (if pump used): _____ (ft)



LOW-FLOW

Previous Low-Flow Purge Rate: _____ (lpm)

Total Well Depth (a): 19.50 (ft)

Initial Depth to Water (b): 7.13 (ft)

Pump In-take Depth = b + (a-b)/2: 13.32 (ft)

Maximum Allowable Drawdown = (a-b)/8: 1.55 (ft)

Low-Flow Purge Rate: 0.25 (Lpm)*

Comments:

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

GROUNDWATER STABILIZATION PARAMETER RECORD

Time (24:00)	Cumulative Vol. gal or L?	Temperature °C	pH	Conductivity µS or mS	DO mg/L	ORP mV	Turbidity NTU	NOTES Odor, color, sheen or other
0925	0	19.92	6.09	0.574	21.14	84	0.0	
7	.5	20.07	6.00	0.570	8.42	87	0.0	
9	1	20.12	5.96	0.568	7.12	89	0.0	
31	1.5	20.16	5.96	0.568	6.68	90	0.0	
33	2	20.17	5.96	0.567	6.27	91	0.0	
Previous Stabilized Parameters								

PURGE COMPLETION RECORD — X Low Flow & Parameters Stable — ___ 3 Casing Volumes & Parameters Stable — ___ 5 Casing Volumes — ___ Other:

SAMPLE COLLECTION RECORD

Depth to Water at Sampling: 8.50 (ft)

Sample Collected Via: ___ Disp. Bailer ___ Dedicated Pump Tubing

X Disp. Pump Tubing Other:

Sample ID: MW-8 Sample Collection Time: 0935 (24:00)

Containers (#): 6 VOA (X preserved or ___ unpreserved) ___ Liter Amber

___ Other: ___ ___ Other: ___

___ Other: ___ ___ Other: ___

GEOCHEMICAL PARAMETERS

Parameter	Time	Measurement
DO (mg/L)		
Ferrous Iron (mg/L)		
Redox Potential (mV)		
Alkalinity (mg/L)		
Other:		
Other:		

Signature:

Revision: 3/15/2013

BROADBENT

GROUNDWATER SAMPLING DATA SHEET

Page ____ of ____

Project: BP 374 Project No.: 06886602 Date: 2/12/15

Field Representative: JC/NV

Well ID: MW-7 Start Time: 0945 End Time: 1010 Total Time (minutes): 25

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

WELL HEAD INTEGRITY (cap, lock, vault, etc.) Comments: very difficult to remove one bolt
Good Improvement Needed (circle one)

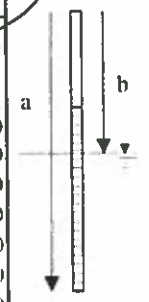
PURGING/SAMPLING METHOD Predetermined Well Volume Low-Flow Other: (circle one)

PREDETERMINED WELL VOLUME

Casing Diameter | Unit Volume (gal/ft) (circle one)

1" | (0.04)	1.25" | (0.08)	2" | (0.17)	3" | (0.38)	Other:
4" | (0.66)	6" | (1.50)	8" | (2.60)	12" | (5.81)	___" | (___)

Total Well Depth (a): ____ (ft)
Initial Depth to Water (b): ____ (ft)
Water Column Height (WCH) = (a - b): ____ (ft)
Water Column Volume (WCV) = WCH x Unit Volume: ____ (gal)
Three Casing Volumes = WCV x 3: ____ (gal)
Five Casing Volumes = WCV x 5: ____ (gal)
Pump Depth (if pump used): ____ (ft)



LOW-FLOW

Previous Low-Flow Purge Rate: ____ (lpm)
Total Well Depth (a): 19.90 (ft)
Initial Depth to Water (b): 6.76 (ft)
Pump In-take Depth = b + (a-b)/2: 13.33 (ft)
Maximum Allowable Drawdown = (a-b)/8: 1.64 (ft)
Low-Flow Purge Rate: 025 (Lpm)*
Comments:

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

GROUNDWATER STABILIZATION PARAMETER RECORD

Time (24:00)	Cumulative Vol. gal or (L)	Temperature °C	pH	Conductivity µS or (mS)	DO mg/L	ORP mV	Turbidity NTU	NOTES Odor, color, sheen or other
0950	0	1848	6.37	0.805	1.44	83	0	
2	.5	1847	6.37	0.806	1.34	82	100	
4	1	1839	6.38	0.806	0.79	74	0	
6	1.5	1841	6.38	0.806	0.71	68		
8	2	1838	6.38	0.806	0.65	61	0	
Previous Stabilized Parameters								

PURGE COMPLETION RECORD X Low Flow & Parameters Stable ___ 3 Casing Volumes & Parameters Stable ___ 5 Casing Volumes
___ Other:

SAMPLE COLLECTION RECORD

Depth to Water at Sampling: 7.10 (ft)
Sample Collected Via: ___ Disp. Bailer ___ Dedicated Pump Tubing
X Disp. Pump Tubing Other:
Sample ID: MW-7 Sample Collection Time: 1000 (24:00)
Containers (#): 6 VOA (X preserved or ___ unpreserved) ___ Liter Amber
___ Other: ___ ___ Other: ___
___ Other: ___ ___ Other: ___

GEOCHEMICAL PARAMETERS

Parameter	Time	Measurement
DO (mg/L)		
Ferrous Iron (mg/L)		
Redox Potential (mV)		
Alkalinity (mg/L)		
Other:		
Other:		

Signature:

Revision: 3/15/2013

BROADBENT

GROUNDWATER SAMPLING DATA SHEET

Page ____ of ____

Project: BP 374 Project No.: 06-88-602 Date: 2-12-15

Field Representative: JC/NV

Well ID: MW-4 Start Time: 1010 End Time: 1040 Total Time (minutes): 30

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

WELL HEAD INTEGRITY (cap, lock, vault, etc.) Comments:

Good / Improvement Needed (circle one)

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

PREDETERMINED WELL VOLUME

Casing Diameter | Unit Volume (gal/ft) (circle one)

1" | (0.04) 1.25" | (0.08) 2" | (0.17) 3" | (0.38) Other: ___" | (____)

4" | (0.66) 6" | (1.50) 8" | (2.60) 12" | (5.81) ____" | (____)

Total Well Depth (a): ____ (ft)

Initial Depth to Water (b): ____ (ft)

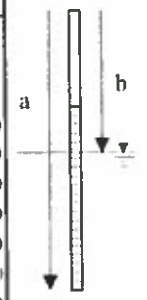
Water Column Height (WCH) = (a - b): ____ (ft)

Water Column Volume (WCV) = WCH x Unit Volume: ____ (gal)

Three Casing Volumes = WCV x 3: ____ (gal)

Five Casing Volumes = WCV x 5: ____ (gal)

Pump Depth (if pump used): ____ (ft)



LOW-FLOW

Previous Low-Flow Purge Rate: ____ (lpm)

Total Well Depth (a): 26.95 (ft)

Initial Depth to Water (b): 5.98 (ft)

Pump In-take Depth = b + (a-b)/2: 16.47 (ft)

Maximum Allowable Drawdown = (a-b)/8: 2.62 (ft)

Low-Flow Purge Rate: 0.25 (l.pm)*

Comments:

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

GROUNDWATER STABILIZATION PARAMETER RECORD

Time (24:00)	Cumulative Vol. gal or L	Temperature °C	pH	Conductivity µS or mS	DO mg/L	ORP mV	Turbidity NTU	NOTES Odor, color, sheen or other
1015	0	18.59	6.23	0.876	5.94	+190	0.0	
17	.5	18.47	6.23	0.878	1.30	+204	0.0	
19	1	18.45	6.22	0.878	0.92	+209	0.0	Strong
21	1.5	18.44	6.23	0.876	0.68	+214	0.0	
23	2	18.43	6.23	0.876	0.61	+215	0.0	ODOR
Previous Stabilized Parameters								

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

___ Other:

SAMPLE COLLECTION RECORD

Depth to Water at Sampling: 6.85 (ft)

Sample Collected Via: ___ Disp. Bailer ___ Dedicated Pump Tubing

✓ Disp. Pump Tubing Other:

Sample ID: MW-4 Sample Collection Time: 1025 (24:00)

Containers (#): 6 VOA (✓ preserved or ___ unpreserved) ___ Liter Amber

___ Other: ___ ___ Other: ___

___ Other: ___ ___ Other: ___

GEOCHEMICAL PARAMETERS

Parameter	Time	Measurement
DO (mg/L)		
Ferrous Iron (mg/L)		
Redox Potential (mV)		
Alkalinity (mg/L)		
Other:		
Other:		

Signature:

Revision: 3/15/2013

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

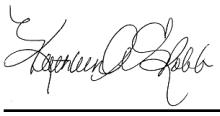
ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Irvine
17461 Derian Ave
Suite 100
Irvine, CA 92614-5817
Tel: (949)261-1022

TestAmerica Job ID: 440-101849-1
Client Project/Site: ARCO 0374, Oakland

For:
Broadbent & Associates, Inc.
4820 Business Center Drive
#110
Fairfield, California 94534

Attn: Kristene Tidwell



Authorized for release by:
2/28/2015 3:20:37 PM

Kathleen Robb, Project Manager II
(949)261-1022
kathleen.robb@testamericainc.com

Table of Contents

Sample Summary

Client: Broadbent & Associates, Inc.
Project/Site: ARCO 0374, Oakland

TestAmerica Job ID: 440-101849-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
440-101849-1	MW-1	Water	02/12/15 08:35	02/13/15 09:45
440-101849-2	MW-2	Water	02/12/15 08:50	02/13/15 09:45
440-101849-3	MW-4	Water	02/12/15 10:25	02/13/15 09:45
440-101849-4	MW-7	Water	02/12/15 10:00	02/13/15 09:45
440-101849-5	MW-8	Water	02/12/15 09:35	02/13/15 09:45
440-101849-6	MW-9	Water	02/12/15 09:10	02/13/15 09:45

Job ID: 440-101849-1

Laboratory: TestAmerica Irvine

Narrative

Job Narrative
440-101849-1

Comments
No additional comments.

Receipt
The samples were received on 2/13/2015 9:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice.
The temperature of the cooler at receipt was 3.8º C.

GC/MS VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample ID: MW-1
Date Collected: 02/12/15 08:35
Date Received: 02/13/15 09:45

Lab Sample ID: 440-101849-1
Matrix: Water

Method: 8260B/5030B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.50		ug/L			02/22/15 13:38	1
1,2-Dichloroethane	ND		0.50		ug/L			02/22/15 13:38	1
Benzene	ND		0.50		ug/L			02/22/15 13:38	1
Ethanol	ND		150		ug/L			02/22/15 13:38	1
Ethylbenzene	ND		0.50		ug/L			02/22/15 13:38	1
Ethyl-t-butyl ether (ETBE)	ND		0.50		ug/L			02/22/15 13:38	1
Isopropyl Ether (DIPE)	ND		0.50		ug/L			02/22/15 13:38	1
m,p-Xylene	ND		1.0		ug/L			02/22/15 13:38	1
Methyl-t-Butyl Ether (MTBE)	**130**		0.50		ug/L			02/22/15 13:38	1
Naphthalene	ND		1.0		ug/L			02/22/15 13:38	1
o-Xylene	ND		0.50		ug/L			02/22/15 13:38	1
Tert-amyl-methyl ether (TAME)	**0.57**		0.50		ug/L			02/22/15 13:38	1
tert-Butyl alcohol (TBA)	ND		10		ug/L			02/22/15 13:38	1
Toluene	ND		0.50		ug/L			02/22/15 13:38	1
Xylenes, Total	ND		1.0		ug/L			02/22/15 13:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*02/22/15 13:38*	*1*
Dibromofluoromethane (Surr)	*100*		*76 - 132*		*02/22/15 13:38*	*1*
Toluene-d8 (Surr)	*104*		*80 - 128*		*02/22/15 13:38*	*1*

Method: 8015B/5030B - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
GRO (C6-C12)	ND		50		ug/L			02/24/15 22:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*95*		*65 - 140*		*02/24/15 22:27*	*1*

Client: Broadbent & Associates, Inc.
Project/Site: ARCO 0374, Oakland

TestAmerica Job ID: 440-101849-1

Client Sample ID: MW-2
Date Collected: 02/12/15 08:50
Date Received: 02/13/15 09:45

Lab Sample ID: 440-101849-2
Matrix: Water

Method: 8260B/5030B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.50		ug/L			02/22/15 14:59	1
1,2-Dichloroethane	ND		0.50		ug/L			02/22/15 14:59	1
Benzene	ND		0.50		ug/L			02/22/15 14:59	1
Ethanol	ND		150		ug/L			02/22/15 14:59	1
Ethylbenzene	ND		0.50		ug/L			02/22/15 14:59	1
Ethyl-t-butyl ether (ETBE)	ND		0.50		ug/L			02/22/15 14:59	1
Isopropyl Ether (DIPE)	ND		0.50		ug/L			02/22/15 14:59	1
m,p-Xylene	ND		1.0		ug/L			02/22/15 14:59	1
Methyl-t-Butyl Ether (MTBE)	**57**		0.50		ug/L			02/22/15 14:59	1
Naphthalene	ND		1.0		ug/L			02/22/15 14:59	1
o-Xylene	ND		0.50		ug/L			02/22/15 14:59	1
Tert-amyl-methyl ether (TAME)	ND		0.50		ug/L			02/22/15 14:59	1
tert-Butyl alcohol (TBA)	ND		10		ug/L			02/22/15 14:59	1
Toluene	ND		0.50		ug/L			02/22/15 14:59	1
Xylenes, Total	ND		1.0		ug/L			02/22/15 14:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*02/22/15 14:59*	*1*
Dibromofluoromethane (Surr)	*100*		*76 - 132*		*02/22/15 14:59*	*1*
Toluene-d8 (Surr)	*102*		*80 - 128*		*02/22/15 14:59*	*1*

Method: 8015B/5030B - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
GRO (C6-C12)	ND		50		ug/L			02/24/15 22:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*65 - 140*		*02/24/15 22:01*	*1*

Client: Broadbent & Associates, Inc.
Project/Site: ARCO 0374, Oakland

TestAmerica Job ID: 440-101849-1

Client Sample ID: MW-4
Date Collected: 02/12/15 10:25
Date Received: 02/13/15 09:45

Lab Sample ID: 440-101849-3
Matrix: Water

Method: 8260B/5030B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.50		ug/L			02/22/15 15:25	1
1,2-Dichloroethane	ND		0.50		ug/L			02/22/15 15:25	1
Benzene	**120**		0.50		ug/L			02/22/15 15:25	1
Ethanol	ND		150		ug/L			02/22/15 15:25	1
Ethylbenzene	**31**		0.50		ug/L			02/22/15 15:25	1
Ethyl-t-butyl ether (ETBE)	ND		0.50		ug/L			02/22/15 15:25	1
Isopropyl Ether (DIPE)	ND		0.50		ug/L			02/22/15 15:25	1
m,p-Xylene	**21**		1.0		ug/L			02/22/15 15:25	1
Methyl-t-Butyl Ether (MTBE)	ND		0.50		ug/L			02/22/15 15:25	1
Naphthalene	**15**		1.0		ug/L			02/22/15 15:25	1
o-Xylene	**1.4**		0.50		ug/L			02/22/15 15:25	1
Tert-amyl-methyl ether (TAME)	ND		0.50		ug/L			02/22/15 15:25	1
tert-Butyl alcohol (TBA)	ND		10		ug/L			02/22/15 15:25	1
Toluene	**8.0**		0.50		ug/L			02/22/15 15:25	1
Xylenes, Total	**22**		1.0		ug/L			02/22/15 15:25	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*02/22/15 15:25*	*1*
Dibromofluoromethane (Surr)	*102*		*76 - 132*		*02/22/15 15:25*	*1*
Toluene-d8 (Surr)	*104*		*80 - 128*		*02/22/15 15:25*	*1*

Method: 8015B/5030B - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
GRO (C6-C12)	**7000**		1000		ug/L			02/24/15 21:35	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*106*		*65 - 140*		*02/24/15 21:35*	*20*

Client: Broadbent & Associates, Inc.
Project/Site: ARCO 0374, Oakland

TestAmerica Job ID: 440-101849-1

Client Sample ID: MW-7
Date Collected: 02/12/15 10:00
Date Received: 02/13/15 09:45

Lab Sample ID: 440-101849-4
Matrix: Water

Method: 8260B/5030B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.50		ug/L			02/22/15 15:52	1
1,2-Dichloroethane	ND		0.50		ug/L			02/22/15 15:52	1
Benzene	ND		0.50		ug/L			02/22/15 15:52	1
Ethanol	ND		150		ug/L			02/22/15 15:52	1
Ethylbenzene	ND		0.50		ug/L			02/22/15 15:52	1
Ethyl-t-butyl ether (ETBE)	ND		0.50		ug/L			02/22/15 15:52	1
Isopropyl Ether (DIPE)	ND		0.50		ug/L			02/22/15 15:52	1
m,p-Xylene	ND		1.0		ug/L			02/22/15 15:52	1
Methyl-t-Butyl Ether (MTBE)	**4.0**		0.50		ug/L			02/22/15 15:52	1
Naphthalene	ND		1.0		ug/L			02/22/15 15:52	1
o-Xylene	ND		0.50		ug/L			02/22/15 15:52	1
Tert-amyl-methyl ether (TAME)	ND		0.50		ug/L			02/22/15 15:52	1
tert-Butyl alcohol (TBA)	ND		10		ug/L			02/22/15 15:52	1
Toluene	ND		0.50		ug/L			02/22/15 15:52	1
Xylenes, Total	ND		1.0		ug/L			02/22/15 15:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*02/22/15 15:52*	*1*
Dibromofluoromethane (Surr)	*99*		*76 - 132*		*02/22/15 15:52*	*1*
Toluene-d8 (Surr)	*106*		*80 - 128*		*02/22/15 15:52*	*1*

Method: 8015B/5030B - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
GRO (C6-C12)	ND		50		ug/L			02/24/15 21:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*96*		*65 - 140*		*02/24/15 21:10*	*1*

Client Sample ID: MW-8
Date Collected: 02/12/15 09:35
Date Received: 02/13/15 09:45

Lab Sample ID: 440-101849-5
Matrix: Water

Method: 8260B/5030B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.50		ug/L			02/22/15 16:19	1
1,2-Dichloroethane	ND		0.50		ug/L			02/22/15 16:19	1
Benzene	ND		0.50		ug/L			02/22/15 16:19	1
Ethanol	ND		150		ug/L			02/22/15 16:19	1
Ethylbenzene	ND		0.50		ug/L			02/22/15 16:19	1
Ethyl-t-butyl ether (ETBE)	ND		0.50		ug/L			02/22/15 16:19	1
Isopropyl Ether (DIPE)	ND		0.50		ug/L			02/22/15 16:19	1
m,p-Xylene	ND		1.0		ug/L			02/22/15 16:19	1
Methyl-t-Butyl Ether (MTBE)	**47**		0.50		ug/L			02/22/15 16:19	1
Naphthalene	ND		1.0		ug/L			02/22/15 16:19	1
o-Xylene	ND		0.50		ug/L			02/22/15 16:19	1
Tert-amyl-methyl ether (TAME)	ND		0.50		ug/L			02/22/15 16:19	1
tert-Butyl alcohol (TBA)	ND		10		ug/L			02/22/15 16:19	1
Toluene	ND		0.50		ug/L			02/22/15 16:19	1
Xylenes, Total	ND		1.0		ug/L			02/22/15 16:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*02/22/15 16:19*	*1*
Dibromofluoromethane (Surr)	*101*		*76 - 132*		*02/22/15 16:19*	*1*
Toluene-d8 (Surr)	*105*		*80 - 128*		*02/22/15 16:19*	*1*

Method: 8015B/5030B - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
GRO (C6-C12)	ND		50		ug/L			02/24/15 20:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*99*		*65 - 140*		*02/24/15 20:44*	*1*

Client: Broadbent & Associates, Inc.
Project/Site: ARCO 0374, Oakland

TestAmerica Job ID: 440-101849-1

Client Sample ID: MW-9
Date Collected: 02/12/15 09:10
Date Received: 02/13/15 09:45

Lab Sample ID: 440-101849-6
Matrix: Water

Method: 8260B/5030B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.50		ug/L			02/22/15 16:46	1
1,2-Dichloroethane	ND		0.50		ug/L			02/22/15 16:46	1
Benzene	ND		0.50		ug/L			02/22/15 16:46	1
Ethanol	ND		150		ug/L			02/22/15 16:46	1
Ethylbenzene	ND		0.50		ug/L			02/22/15 16:46	1
Ethyl-t-butyl ether (ETBE)	ND		0.50		ug/L			02/22/15 16:46	1
Isopropyl Ether (DIPE)	ND		0.50		ug/L			02/22/15 16:46	1
m,p-Xylene	ND		1.0		ug/L			02/22/15 16:46	1
Methyl-t-Butyl Ether (MTBE)	**90**		0.50		ug/L			02/22/15 16:46	1
Naphthalene	ND		1.0		ug/L			02/22/15 16:46	1
o-Xylene	ND		0.50		ug/L			02/22/15 16:46	1
Tert-amyl-methyl ether (TAME)	ND		0.50		ug/L			02/22/15 16:46	1
tert-Butyl alcohol (TBA)	ND		10		ug/L			02/22/15 16:46	1
Toluene	ND		0.50		ug/L			02/22/15 16:46	1
Xylenes, Total	ND		1.0		ug/L			02/22/15 16:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*02/22/15 16:46*	*1*
Dibromofluoromethane (Surr)	*99*		*76 - 132*		*02/22/15 16:46*	*1*
Toluene-d8 (Surr)	*102*		*80 - 128*		*02/22/15 16:46*	*1*

Method: 8015B/5030B - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
GRO (C6-C12)	ND		50		ug/L			02/24/15 20:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*65 - 140*		*02/24/15 20:18*	*1*

Method Summary

Client: Broadbent & Associates, Inc.
Project/Site: ARCO 0374, Oakland

TestAmerica Job ID: 440-101849-1

Method	Method Description	Protocol	Laboratory
8260B/5030B	Volatile Organic Compounds (GC/MS)	SW846	TAL IRV
8015B/5030B	Gasoline Range Organics (GC)	SW846	TAL IRV

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Lab Chronicle

Client: Broadbent & Associates, Inc.
Project/Site: ARCO 0374, Oakland

TestAmerica Job ID: 440-101849-1

Client Sample ID: MW-1

Lab Sample ID: 440-101849-1

Date Collected: 02/12/15 08:35

Matrix: Water

Date Received: 02/13/15 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B/5030B		1	10 mL	10 mL	237964	02/22/15 13:38	WC	TAL IRV
Total/NA	Analysis	8015B/5030B		1	10 mL	10 mL	238530	02/24/15 22:27	IM	TAL IRV

Client Sample ID: MW-2

Lab Sample ID: 440-101849-2

Date Collected: 02/12/15 08:50

Matrix: Water

Date Received: 02/13/15 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B/5030B		1	10 mL	10 mL	237964	02/22/15 14:59	WC	TAL IRV
Total/NA	Analysis	8015B/5030B		1	10 mL	10 mL	238530	02/24/15 22:01	IM	TAL IRV

Client Sample ID: MW-4

Lab Sample ID: 440-101849-3

Date Collected: 02/12/15 10:25

Matrix: Water

Date Received: 02/13/15 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B/5030B		1	10 mL	10 mL	237964	02/22/15 15:25	WC	TAL IRV
Total/NA	Analysis	8015B/5030B		20	10 mL	10 mL	238530	02/24/15 21:35	IM	TAL IRV

Client Sample ID: MW-7

Lab Sample ID: 440-101849-4

Date Collected: 02/12/15 10:00

Matrix: Water

Date Received: 02/13/15 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B/5030B		1	10 mL	10 mL	237964	02/22/15 15:52	WC	TAL IRV
Total/NA	Analysis	8015B/5030B		1	10 mL	10 mL	238530	02/24/15 21:10	IM	TAL IRV

Client Sample ID: MW-8

Lab Sample ID: 440-101849-5

Date Collected: 02/12/15 09:35

Matrix: Water

Date Received: 02/13/15 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B/5030B		1	10 mL	10 mL	237964	02/22/15 16:19	WC	TAL IRV
Total/NA	Analysis	8015B/5030B		1	10 mL	10 mL	238530	02/24/15 20:44	IM	TAL IRV

Client Sample ID: MW-9

Lab Sample ID: 440-101849-6

Date Collected: 02/12/15 09:10

Matrix: Water

Date Received: 02/13/15 09:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B/5030B		1	10 mL	10 mL	237964	02/22/15 16:46	WC	TAL IRV

Client: Broadbent & Associates, Inc.
Project/Site: ARCO 0374, Oakland

TestAmerica Job ID: 440-101849-1

Client Sample ID: MW-9
Date Collected: 02/12/15 09:10
Date Received: 02/13/15 09:45

Lab Sample ID: 440-101849-6
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8015B/5030B		1	10 mL	10 mL	238530	02/24/15 20:18	IM	TAL IRV

Laboratory References:

TAL IRV = TestAmerica Irvine, 17461 Derian Ave, Suite 100, Irvine, CA 92614-5817, TEL (949)261-1022

Method: 8260B/5030B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 440-237964/14
Matrix: Water
Analysis Batch: 237964

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
1,2-Dibromoethane (EDB)	ND		0.50		ug/L			02/22/15 12:45	1
1,2-Dichloroethane	ND		0.50		ug/L			02/22/15 12:45	1
Benzene	ND		0.50		ug/L			02/22/15 12:45	1
Ethanol	ND		150		ug/L			02/22/15 12:45	1
Ethylbenzene	ND		0.50		ug/L			02/22/15 12:45	1
Ethyl-t-butyl ether (ETBE)	ND		0.50		ug/L			02/22/15 12:45	1
Isopropyl Ether (DIPE)	ND		0.50		ug/L			02/22/15 12:45	1
m,p-Xylene	ND		1.0		ug/L			02/22/15 12:45	1
Methyl-t-Butyl Ether (MTBE)	ND		0.50		ug/L			02/22/15 12:45	1
Naphthalene	ND		1.0		ug/L			02/22/15 12:45	1
o-Xylene	ND		0.50		ug/L			02/22/15 12:45	1
Tert-amyl-methyl ether (TAME)	ND		0.50		ug/L			02/22/15 12:45	1
tert-Butyl alcohol (TBA)	ND		10		ug/L			02/22/15 12:45	1
Toluene	ND		0.50		ug/L			02/22/15 12:45	1
Xylenes, Total	ND		1.0		ug/L			02/22/15 12:45	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*02/22/15 12:45*	*1*
Dibromofluoromethane (Surr)	*98*		*76 - 132*		*02/22/15 12:45*	*1*
Toluene-d8 (Surr)	*104*		*80 - 128*		*02/22/15 12:45*	*1*

Lab Sample ID: LCS 440-237964/4
Matrix: Water
Analysis Batch: 237964

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,2-Dibromoethane (EDB)			25.0	23.8		ug/L		95	70 - 130		
1,2-Dichloroethane			25.0	24.6		ug/L		98	57 - 138		
Benzene			25.0	24.2		ug/L		97	68 - 130		
Ethanol			1250	1330		ug/L		107	50 - 149		
Ethylbenzene			25.0	24.8		ug/L		99	70 - 130		
Ethyl-t-butyl ether (ETBE)			25.0	27.2		ug/L		109	60 - 136		
Isopropyl Ether (DIPE)			25.0	26.2		ug/L		105	58 - 139		
m,p-Xylene			25.0	24.1		ug/L		97	70 - 130		
Methyl-t-Butyl Ether (MTBE)			25.0	23.7		ug/L		95	63 - 131		
Naphthalene			25.0	23.7		ug/L		95	60 - 140		
o-Xylene			25.0	24.7		ug/L		99	70 - 130		
Tert-amyl-methyl ether (TAME)			25.0	22.7		ug/L		91	57 - 139		
tert-Butyl alcohol (TBA)			250	254		ug/L		102	70 - 130		
Toluene			25.0	25.1		ug/L		101	70 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*
Dibromofluoromethane (Surr)	*106*		*76 - 132*
Toluene-d8 (Surr)	*99*		*80 - 128*

Method: 8260B/5030B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 440-101849-1 MS
Matrix: Water
Analysis Batch: 237964

Client Sample ID: MW-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dibromoethane (EDB)	ND		25.0	25.9		ug/L		103	70 - 131
1,2-Dichloroethane	ND		25.0	26.6		ug/L		106	56 - 146
Benzene	ND		25.0	25.8		ug/L		103	66 - 130
Ethanol	ND		1250	1440		ug/L		115	54 - 150
Ethylbenzene	ND		25.0	27.0		ug/L		108	70 - 130
Ethyl-t-butyl ether (ETBE)	ND		25.0	29.5		ug/L		118	70 - 130
Isopropyl Ether (DIPE)	ND		25.0	28.0		ug/L		112	64 - 138
m,p-Xylene	ND		25.0	25.9		ug/L		104	70 - 133
Methyl-t-Butyl Ether (MTBE)	130		25.0	155	BB	ug/L		113	70 - 130
Naphthalene	ND		25.0	25.7		ug/L		103	60 - 140
o-Xylene	ND		25.0	27.1		ug/L		108	70 - 133
Tert-amyl-methyl ether (TAME)	0.57		25.0	25.1		ug/L		98	68 - 133
tert-Butyl alcohol (TBA)	ND		250	275		ug/L		110	70 - 130
Toluene	ND		25.0	27.4		ug/L		110	70 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*
Dibromofluoromethane (Surr)	*104*		*76 - 132*
Toluene-d8 (Surr)	*100*		*80 - 128*

Lab Sample ID: 440-101849-1 MSD
Matrix: Water
Analysis Batch: 237964

Client Sample ID: MW-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,2-Dibromoethane (EDB)	ND		25.0	24.5		ug/L		98	70 - 131	5	25
1,2-Dichloroethane	ND		25.0	25.3		ug/L		101	56 - 146	5	20
Benzene	ND		25.0	24.8		ug/L		99	66 - 130	4	20
Ethanol	ND		1250	1370		ug/L		110	54 - 150	5	30
Ethylbenzene	ND		25.0	25.3		ug/L		101	70 - 130	6	20
Ethyl-t-butyl ether (ETBE)	ND		25.0	28.2		ug/L		113	70 - 130	4	25
Isopropyl Ether (DIPE)	ND		25.0	26.8		ug/L		107	64 - 138	4	25
m,p-Xylene	ND		25.0	24.7		ug/L		99	70 - 133	5	25
Methyl-t-Butyl Ether (MTBE)	130		25.0	151	BB	ug/L		99	70 - 130	2	25
Naphthalene	ND		25.0	24.9		ug/L		100	60 - 140	3	30
o-Xylene	ND		25.0	25.3		ug/L		101	70 - 133	7	20
Tert-amyl-methyl ether (TAME)	0.57		25.0	24.3		ug/L		95	68 - 133	3	30
tert-Butyl alcohol (TBA)	ND		250	264		ug/L		106	70 - 130	4	25
Toluene	ND		25.0	25.8		ug/L		103	70 - 130	6	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*
Dibromofluoromethane (Surr)	*104*		*76 - 132*
Toluene-d8 (Surr)	*99*		*80 - 128*

Method: 8015B/5030B - Gasoline Range Organics (GC)

Lab Sample ID: MB 440-238530/6
Matrix: Water
Analysis Batch: 238530

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
GRO (C6-C12)	ND		50		ug/L			02/24/15 19:01	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*65 - 140*		*02/24/15 19:01*	*1*

Lab Sample ID: LCS 440-238530/5
Matrix: Water
Analysis Batch: 238530

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
GRO (C4-C12)			800	804		ug/L		101	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*97*		*65 - 140*

Lab Sample ID: 440-101849-1 MS
Matrix: Water
Analysis Batch: 238530

Client Sample ID: MW-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
GRO (C4-C12)	69		800	814		ug/L		93	65 - 140		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*93*		*65 - 140*

Lab Sample ID: 440-101849-1 MSD
Matrix: Water
Analysis Batch: 238530

Client Sample ID: MW-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
GRO (C4-C12)	69		800	840		ug/L		96	65 - 140	3	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*105*		*65 - 140*

GC/MS VOA

Analysis Batch: 237964

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-101849-1	MW-1	Total/NA	Water	8260B/5030B	
440-101849-1 MS	MW-1	Total/NA	Water	8260B/5030B	
440-101849-1 MSD	MW-1	Total/NA	Water	8260B/5030B	
440-101849-2	MW-2	Total/NA	Water	8260B/5030B	
440-101849-3	MW-4	Total/NA	Water	8260B/5030B	
440-101849-4	MW-7	Total/NA	Water	8260B/5030B	
440-101849-5	MW-8	Total/NA	Water	8260B/5030B	
440-101849-6	MW-9	Total/NA	Water	8260B/5030B	
LCS 440-237964/4	Lab Control Sample	Total/NA	Water	8260B/5030B	
MB 440-237964/14	Method Blank	Total/NA	Water	8260B/5030B	

GC VOA

Analysis Batch: 238530

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
440-101849-1	MW-1	Total/NA	Water	8015B/5030B	
440-101849-1 MS	MW-1	Total/NA	Water	8015B/5030B	
440-101849-1 MSD	MW-1	Total/NA	Water	8015B/5030B	
440-101849-2	MW-2	Total/NA	Water	8015B/5030B	
440-101849-3	MW-4	Total/NA	Water	8015B/5030B	
440-101849-4	MW-7	Total/NA	Water	8015B/5030B	
440-101849-5	MW-8	Total/NA	Water	8015B/5030B	
440-101849-6	MW-9	Total/NA	Water	8015B/5030B	
LCS 440-238530/5	Lab Control Sample	Total/NA	Water	8015B/5030B	
MB 440-238530/6	Method Blank	Total/NA	Water	8015B/5030B	

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
BB	Sample > 4X spike concentration

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Certification Summary

Client: Broadbent & Associates, Inc.
Project/Site: ARCO 0374, Oakland

TestAmerica Job ID: 440-101849-1

Laboratory: TestAmerica Irvine

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska	State Program	10	CA01531	06-30-15
Arizona	State Program	9	AZ0671	10-13-15
California	LA Cty Sanitation Districts	9	10256	01-31-16 *
California	State Program	9	2706	06-30-16
Guam	State Program	9	Cert. No. 12.002r	01-23-15 *
Hawaii	State Program	9	N/A	01-29-16
Nevada	State Program	9	CA015312007A	07-31-15
New Mexico	State Program	6	N/A	01-29-15 *
Northern Mariana Islands	State Program	9	MP0002	01-29-15 *
Oregon	NELAP	10	4005	01-29-16
USDA	Federal		P330-09-00080	06-06-15

* Certification renewal pending - certification considered valid.

bp rm

Laboratory Management Program LaMP Chain of Custody Record

BP Site Node Path: 06-88-602 **Req Due Date (mm/dd/yy):** _____ **Rush TAT:** Yes ____ No ____

BP Facility No: 374 **Lab Work Order Number:** _____

Lab Name: Test America	Facility Address: 6407 Telegraph Avenue	Consultant/Contractor: Broadbent and Associates, Inc.
Lab Address: 17461 Derian Avenue Suite #100, Irvine, CA 92641	City, State, ZIP Code: Oakland, CA	Consultant/Contractor Project No: 06-88-602
Lab PM: Kathleen Robb	Lead Regulatory Agency: ACEH	Address: 4820 Business Center Drive, Fairfiled, CA 94591
Lab Phone: 949-261-1022	California Global ID No.: T0600100106	Consultant/Contractor PM: Kristene Tidwell
Lab Shipping Accnt: 1103-6633-7	Enfos Proposal No: 005TT-0007 / WR273484	Phone: 707-455-7290 Fax: 707-863-9046
Lab Bottle Order No:	Accounting Mode: Provision x OOC-BU ____ OOC-RM ____	Email EDD To: ktidwell@broadbentinc.com and to lab.enfosdoc@bp.com
Other Info:	Stage: Execute (40) Activity: Project Spend (80)	Invoice To: BP x Contractor ____
BP Project Manager (PM): Chuck Carmel		
BP PM Phone: 925-275-3804		
BP PM Email: chuck.carmel@bp.com		

Lab No.	Sample Description	Date	Time	Matrix: Soil / Solid	Matrix: Water / Liquid	Matrix: Air / Vapor	Matrix: Is this location a well?	No. Containers / Preservative: Total Number of Container	Unpreserved	H2SO4	HNO3	HCl	Methanol	Requested Analyses: GRO by 8015M	BTEX/5 FO & EDB by 8260	1,2-DCA & Ethanol by 8260
	MW-1	2/12/2015	0835		x		y	6				x		x	x	x
	MW-2	2/12/2015	0850		x		y	6				x		x	x	x
	MW-4	2/12/2015	1025		x		y	6				x		x	x	x
	MW-7	2/12/2015	1000		x		y	6				x		x	x	x
	MW-8	2/12/2015	0935		x		y	6				x		x	x	x
	MW-9	2/12/2015	0910		x		y	6				x		x	x	x
	TB-374-02122015	-	-		x		n	2				x				

Report Type & QC Level

Standard x

Full Data Package ____

Comments

Note: If sample not collected, indicate "No Sample" in comments and single-strike out and initial any preprinted sample description.

440-101849 Chain of Custody

On hold

Sampler's Name: Jessica Collado/Nick Vrdoljak	Relinquished By / Affiliation	Date	Time	Accepted By / Affiliation	Date	Time
Sampler's Company: Broadbent and Associates	Nick Vrdoljak	2/12/2015	1500	VnBandi TAI	2/13/15	9:45
Shipment Method: FedEx Ship Date: 2/12/2015						
Shipment Tracking No: 8037 8050 3077						

Special Instructions: Fed: 8037 8050 3077

THIS LINE - LAB USE ONLY: Custody Seals In Place: Yes / No | Temp Blank: Yes / No | Cooler Temp on Receipt: 4.5/3.8 °F/C | Trip Blank: Yes / No | MS/MSD Sample Submitted: Yes / No

IR-65

BP Remediation Management COC - Effective Dates: BP LaMP COC Rev.

Page 20 of 21

2/18/2015

Login Sample Receipt Checklist

Client: Broadbent & Associates, Inc.

Job Number: 440-101849-1

Login Number: 101849

List Source: TestAmerica Irvine

List Number: 1

Creator: Blocker, Kristina M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	