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Hazardous Materials Specialist
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100 Montgomery Street,
Suite 300
San Francisco, CA 94104
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Subject:

Second Quarter 2015 and Third Quarter 2015 Semi-Annual Groundwater Monitoring Report

Former BP Station #11109
4280 Foothill Boulevard
Oakland, California
ACEH Case #RO0000426

ENVIRONMENT

Dear Ms. Detterman:

"I declare 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."

Date:

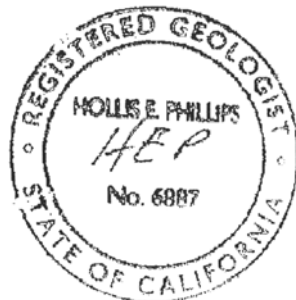
December 9, 2015

Contact:

Hollis E. Phillips

Submitted by:

ARCADIS U.S., Inc.



Phone:

415.432.6903

Email:

Hollis.Phillips@arcadis.com

Our ref:

GP09BPNA.C106.N0000

Hollis E. Phillips, P.G. (No. 6887)
Principal Geologist/Project Manager

Ms. Karel Detterman, P.G.
Hazardous Materials Specialist
Alameda County Environmental Health (ACEH)
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Second Quarter 2015 and Third Quarter 2015 Semi-Annual Groundwater Monitoring Report

Former BP Station #11109,
4280 Foothill Boulevard, Oakland, California
ACEH Case #RO0000426

ENVIRONMENT

Dear Ms. Detterman:

Arcadis U.S., Inc. (Arcadis) has prepared this *Second Quarter 2015 and Third Quarter 2015 Semi-Annual Groundwater Monitoring Report* to document the results of groundwater monitoring and sampling and remediation progress at the Former BP Service Station #11109 located at 4280 Foothill Boulevard in Oakland, Alameda County, California (the Site; Figure 1).

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1. Summary

A summary of the work performed at the Site during this reporting period and the proposed work for the next reporting period are provided below.

Work Performed – This Semi-Annual Reporting Period (April 1, 2015 to September 30, 2015)

- Submitted the *Fourth Quarter 2014 and First Quarter 2015 Semi-Annual Groundwater Monitoring Report*, dated May 1, 2015.
- Conducted Third Quarter 2015 semi-annual groundwater monitoring event on September 21, 2015. The light non-aqueous phase liquid (LNAPL) absorbent socks in monitoring wells MW-5, MW-10, and MW-12 were removed and new socks were replaced on September 21, 2015. The removed absorbent socks were placed in an on-site drum pending offsite transport and disposal.

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- Completed field activities described in the CPT/UVOST Field Investigation Work Plan and submitted a request for closure with the *CPT/UVOST Field Investigation Report* on September 16, 2015.

Work Proposed – Next Semi-Annual Reporting Period (October 1, 2015 to March 31, 2016)

- Submit the *Second Quarter 2015 and Third Quarter 2015 Semi-Annual Groundwater Monitoring Report*, contained herein.
- Prepare for semi-annual groundwater monitoring/sampling activities to be conducted in First Quarter 2016.
- Respond to Directive Letter requesting meeting with respect to the request for closure in the *CPT/UVOST Field Investigation Report*.

2. Groundwater Monitoring/Sampling Activities and Results

Third quarter 2015 groundwater monitoring was conducted on September 21, 2015 by Broadbent & Associates, Inc. (BAI) personnel. Groundwater monitoring was conducted concurrently at the adjacent Chevron #9-0076 (ACEH Case #RO0000427) to further characterize hydrogeology in the vicinity of the Site. Prior to groundwater sampling, depth-to-water (DTW) measurements were collected in wells MW-2 through MW-12 with an oil/water interface probe. No LNAPL was present in any of the wells. Monitoring well MW-2 was noted as dry during well gauging activities. DTW measurements on-site ranged from 11.75 feet (ft) below top of casing (bTOC) at MW-10 to 18.54 ft bTOC at MW-6. Resulting groundwater surface elevations on-site ranged from 24.10 feet above mean sea level (ft msl) at MW-8 to 30.65 ft msl at MW-9. Groundwater elevations provided by Chevron at the adjacent Chevron site varied from 11.11 ft msl (C-8) to 30.07 ft msl (C-10).

Field methods used during groundwater monitoring are provided as Attachment 1 and field data sheets are included as Attachment 2. Groundwater elevations are summarized in Table 1, and a groundwater elevation contour map is presented on Figure 2.

Groundwater samples were collected on September 21, 2015 from wells MW-3, MW-4, MW-6, MW-7, and MW-11 using HydraSleeve™ groundwater samplers, which collect a representative sample from a specific depth interval within the monitoring well screen. A moderate hydrocarbon odor was noted at MW-11.

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Samples were not collected from wells MW-5, MW-10, and MW-12; each of these wells contain a Soakease sock. Field staff noted a hydrocarbon odor was present from each of these wells, however, there was no LNAPL, and the Soakease were subsequently replaced. No irregularities were reported during sampling.

Samples were submitted under chain-of-custody protocol to ESC Lab Sciences (ESC) in Mount Juliet, Tennessee for analysis of Gasoline-Range Organics (GRO, C6-C12) by United States Environmental Protection Agency (EPA) Method 8260B (MW-4, MW-7, MW-11); for Benzene, Toluene, Ethylbenzene, Total Xylenes (BTEX), Ethyl Tertiary Butyl Ether (ETBE), Tert-Amyl Methyl Ether (TAME), Di-Isopropyl Ether (DIPE), 1,2-Dibromomethane (EDB), 1,2-Dichloroethane (1,2-DCA), Tert-Butyl Alcohol (TBA) and Ethanol by EPA Method 8260B (MW-7, MW-11); and Methyl Tertiary Butyl Ether (MTBE) by EPA Method 8260B (MW-3, MW-4, MW-6, MW-7, MW-11). No significant irregularities were encountered during analysis of the samples. The laboratory analytical report, including chain-of-custody documentation, is provided in Attachment 3.

3. LNAPL Removal Activities

LNAPL absorbent socks were first placed in monitoring wells MW-5, MW-10, and MW-12 on May 7, 2013 to remove residual LNAPL at each location, as discussed in the *Results of DPE Pilot Test and SPH Removal* summary letter. Following third quarter 2015 semiannual gauging and sampling activities, the adsorbent socks were replaced and samples were not collected from these wells. During the most recent monitoring event, MW-5, MW-10, and MW-12 did not have any LNAPL but did have a hydrocarbon odor. Field notes from sock replacement activities are provided in Attachment 2.

4. Discussion/Conclusions

Groundwater levels were between historic minimum and maximum elevations for MW-3 through MW-9, but the groundwater elevations at MW-10, MW-11, and MW-12 are the lowest reported since the first measurements on June 16, 2009 (MW-10) and September 30, 2009 (MW-11, MW-12). Monitoring well MW-2 has historically been reported as dry; however, further investigation has confirmed that this well is in fact damaged.

The groundwater elevations observed at monitoring wells C-4, C-10, and C-11 at the adjacent Chevron station were not consistent with other site monitoring locations, and therefore were omitted from the contours provided on Figure 2. Groundwater elevations calculated for the Site and the adjacent Chevron facility

yielded an average groundwater gradient of approximately 0.033 feet per foot (ft/ft) towards the southwest. The current groundwater elevation contour map is provided on Figure 2.

Groundwater monitoring laboratory analytical results are summarized in Table 1 and are consistent with historical concentrations observed. A groundwater analytical summary map is provided as Figure 3.

- GRO was detected in three groundwater monitoring wells (MW-4, MW-7, and MW-11) at concentrations ranging from 953 micrograms per liter ($\mu\text{g/L}$) (MW-4) to 8,610 $\mu\text{g/L}$ (MW-11).
- MTBE was detected in five groundwater monitoring wells (MW-3, MW-4, MW-6, MW-7 and MW-11) at concentrations ranging from 1.88 $\mu\text{g/L}$ (MW-6) to 17.8 $\mu\text{g/L}$ (MW-4).
- Benzene was detected in two monitoring wells (MW-7 and MW-11) at concentrations of 0.351 $\mu\text{g/L}$ (MW-7) and 155 $\mu\text{g/L}$ (MW-11).
- Toluene, ethylbenzene, and total xylenes were detected in one monitoring well (MW-11) at concentrations of 75.1 $\mu\text{g/L}$, 161 $\mu\text{g/L}$, and 359 $\mu\text{g/L}$, respectively.
- TBA was detected in MW-7 at 8.53 $\mu\text{g/L}$, but otherwise ETBE, TAME, DIPE, EDB, TBA, 1,2-DCA, and ethanol were below laboratory reporting limits.

5. Recommendations

Arcadis recommends that a status of no further action be granted, and the site be granted regulatory closure. A work plan for monitoring well destruction and decommissioning will be prepared following the case closure evaluation process and upon site approval from ACWD.

6. Limitations

The findings presented in this report are based upon observations of field personnel, points investigated, results of laboratory tests performed by ESC, and our understanding of Alameda County Environmental Health (ACEH) requirements. 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

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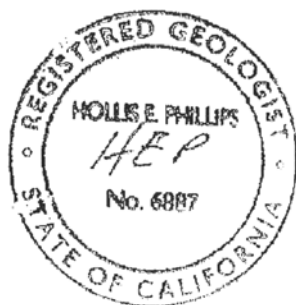
exclusive use of Arcadis and Atlantic Richfield Company. It is possible that variations in soil or groundwater conditions could exist beyond points explored in this investigation. Also, changes in site conditions could occur in the future due to variations in rainfall, temperature, regional water usage, or other factors.

If you have any questions or comments regarding the contents of this report, please contact Hollis Phillips by telephone (415.432.6903) or by e-mail (hollis.phillips@arcadis.com). Note new email address.

Sincerely,

Arcadis, U.S. Inc.

Approved by:



Hollis E. Phillips, P.G. (No. 6887)
Principal Geologist/Project Manager

Copies:

Ms. Karel Detterman, P.G., Alameda County Environmental Health (Submitted via ACEH ftp Site)

Mr. Ed Ralston, ConocoPhillips, 76 Broadway, Sacramento, California 95818 (electronic copy via GeoTracker)

Electronic copy uploaded to GeoTracker

Enclosures:

Tables

1. Summary of Groundwater Monitoring Data: Relative Water Elevations and Laboratory Analyses
2. Historical Groundwater Flow Direction and Gradient

Figures

1. Site Location Map
2. Groundwater Elevation Contour Map – September 21, 2015
3. Analytical Summary Map – September 21, 2015

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December 9, 2015

Attachments

- A. Field Methods
- B. Field Data Sheets
- C. Laboratory Report and Chain-of-Custody Documentation

TABLES



Table 1
 Summary of Groundwater Monitoring Data:
 Relative Water Elevations and Laboratory Analyses
 CA-11109
 4280 Foothill Blvd, Oakland, CA 94601



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	Notes
B-1	6/19/2015		--	--	--	--	<100	<1.0	<5.0	<1.0	<3.0	3.1	--	--	--	--	--	--	(b)
B-6	6/19/2015		--	--	--	--	<100	<1.0	<5.0	<1.0	<3.0	0.43(J)	--	--	--	--	--	--	(b)
B-7	6/22/2015		--	--	--	--	<100	<1.0	<5.0	<1.0	<3.0	6.2	--	--	--	--	--	--	(b)
MW-1	1/31/1990		38.19	15.41	--	22.78	--	--	--	--	--	--	--	--	--	--	--	--	(c)
MW-1	2/5/1990		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(c)
MW-2	2/5/1990		41.22	21.90	--	19.32	1,300	14	<0.1	9	13	--	--	--	--	--	--	--	
MW-2	2/14/1991		41.22	21.16	--	20.06	<50	<0.3	<0.3	<0.3	<0.3	--	--	--	--	--	--	--	
MW-2	5/13/1991		41.22	21.32	--	19.90	<50	<0.3	<0.3	<0.3	<0.3	--	--	--	--	--	--	--	
MW-2	7/24/1991		41.22	22.92	--	18.30	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	10/3/1991		41.22	24.90	--	16.32	<50	<0.3	0.8	<0.3	<0.3	--	--	--	--	--	--	--	
MW-2	10/15/1991		41.22	24.10	--	17.12	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	12/16/1991		41.22	23.95	--	17.27	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	1/6/1992		41.22	23.30	--	17.92	<50	<0.3	<0.3	<0.3	<0.3	--	--	--	--	--	--	--	
MW-2	1/22/1992		41.22	23.14	--	18.08	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	1/28/1992		41.22	22.99	--	18.23	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	2/5/1992		41.22	22.63	--	18.59	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	2/12/1992		41.22	22.04	--	19.18	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	2/17/1992		41.22	20.84	--	20.38	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	4/3/1992		41.22	18.29	--	22.93	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	4/8/1992		41.22	18.86	--	22.36	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-2	4/14/1992		41.22	19.45	--	21.77	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	4/29/1992		41.22	20.35	--	20.87	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	5/7/1992		41.22	20.84	--	20.38	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	7/3/1992		41.22	22.34	--	18.88	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-2	10/8/1992		41.22	23.73	--	17.49	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-2	12/31/1992		41.22	21.12	--	20.10	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-2	4/21/1993		41.22	17.68	--	23.54	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	(a)
MW-2	7/7/1993		41.22	20.30	--	20.92	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-2	9/21/1993		41.22	21.93	--	19.29	<50	0.9	0.7	0.7	2.6	21.54	--	--	--	--	--	--	
MW-2	12/17/1993		41.22	21.48	--	19.74	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	12/23/1993		--	--	--	--	<50	<0.5	<0.5	<0.5	0.7	--	--	--	--	--	--	--	
MW-2	4/7/1994		41.22	20.25	--	20.97	<50	<0.5	<0.5	<0.5	<0.5	12.2	--	--	--	--	--	5.9	
MW-2	7/6/1994		41.22	20.59	--	20.63	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	3.1	
MW-2	10/7/1994		41.22	22.04	--	19.18	<50	<0.5	<0.5	<0.5	<0.5	15.2	--	--	--	--	--	2.8	
MW-2	1/27/1995		41.22	26.12	--	15.10	<50	<0.5	<0.5	<0.5	<1.0	--	--	--	--	--	--	4.8	
MW-2	3/30/1995		41.22	12.34	--	28.88	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	7.2	
MW-2	6/20/1995		41.22	16.42	--	24.80	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	6.0	
MW-2	10/3/1995		41.22	20.06	--	21.16	<50	<0.50	<0.50	<0.50	<1.0	<5.0	--	--	--	--	--	5.7	
MW-2	12/6/1995		41.22	21.31	--	19.91	<50	<0.50	<0.50	<0.50	<1.0	46	--	--	--	--	--	5.4	
MW-2	3/21/1996		41.22	12.28	--	28.94	<50	<0.5	<1.0	<1.0	<1.0	<1.0	--	--	--	--	--	7.4	
MW-2	6/21/1996		41.22	13.28	--	27.94	<50	<0.5	<1.0	<1.0	<1.0	<1.0	--	--	--	--	--	7.3	
MW-2	9/6/1996		41.22	13.94	--	27.28	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	9/9/1996		--	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	<1.0	--	--	--	--	--	7.4	
MW-2	12/19/1996		41.22	12.19	--	29.03	<50	<0.5	<1.0	<1.0	<1.0	<1.0	--	--	--	--	--	7.9	
MW-2	3/17/1997		41.22	11.59	--	29.63	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	8/12/1997		41.22	13.21	--	28.01	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	12/10/1997		41.22	12.34	--	28.88	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	3/12/1998		41.22	11.04	--	30.18	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	6/23/1998		41.22	11.77	--	29.45	--	--	--	--	--	--	--	--	--	--	--	--	

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MW-2	3/31/1999		41.22	12.38	--	28.84	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	8/25/1999		41.22	17.72	--	23.50	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	3/9/2000		41.22	11.94	--	29.28	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	3/8/2001		41.22	10.31	--	30.91	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	3/8/2002		41.22	14.35	--	26.87	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	3/18/2002		41.22	13.11	--	28.11	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	3/11/2003		41.22	13.24	--	27.98	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-2	12/9/2003		41.22	18.58	--	22.64	350	<0.50	<0.50	0.56	2.8	24	<20	<0.50	<0.50	<0.50	<100	--		
MW-2	3/9/2004		41.22	12.52	--	28.70	74	<0.50	<0.50	0.83	4.7	27	<20	<0.50	<0.50	<0.50	<100	--		
MW-2	9/17/2004		41.22	18.05	--	23.17	59	<0.50	<0.50	<0.50	<0.50	21	<20	<0.50	<0.50	<0.50	<100	--		
MW-2	3/7/2005		41.22	2.32	--	38.90	--	--	--	--	--	--	--	--	--	--	--	--	--	(c)
MW-2	9/5/2006		41.22	10.46	--	30.76	79	<0.50	5.1	<0.50	0.73	<0.50	<20	<0.50	<0.50	<0.50	<300	--		
MW-2	3/5/2007		41.22	12.25	--	28.97	--	--	--	--	--	--	--	--	--	--	--	--	--	(c)
MW-2	3/6/2008		41.22	12.33	--	28.89	--	--	--	--	--	--	--	--	--	--	--	--	--	(d)
MW-2	9/5/2012		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(NSP); (r)
MW-2	3/20/2013		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(NSP); (r)
MW-2	9/20/2013		41.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(NSP); (r)
MW-2	3/13/2014		41.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(NSP); (r)
MW-2	9/25/2014		41.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(NSP); (r)
MW-2	3/10/2015		41.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(NSP); (r)
MW-2	9/21/2015		41.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(NSP); (r)
MW-3	2/5/1990		40.74	17.45	--	23.29	1,400	15	<2.5	11	8	--	--	--	--	--	--	--	--	
MW-3	2/14/1991		40.74	18.52	--	22.22	320	8	<0.3	8	1	--	--	--	--	--	--	--	--	
MW-3	5/13/1991		40.74	19.32	--	21.42	640	13	<0.3	18	1	--	--	--	--	--	--	--	--	
MW-3	7/24/1991		40.74	20.69	--	20.05	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	10/3/1991		40.74	19.47	--	21.27	940	21	<0.3	23	2.1	--	--	--	--	--	--	--	--	
MW-3	10/15/1991		40.74	20.46	--	20.28	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	12/4/1991		40.74	18.29	--	22.45	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	12/16/1991		40.74	18.34	--	22.40	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	1/6/1992		40.74	18.50	--	22.24	580	6.1	1	6.1	7.1	--	--	--	--	--	--	--	--	
MW-3	1/22/1992		40.74	17.86	--	22.88	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	1/28/1992		40.74	15.84	--	24.90	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	2/5/1992		40.74	17.53	--	23.21	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	2/12/1992		40.74	17.15	--	23.59	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	2/17/1992		40.74	16.18	--	24.56	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	4/3/1992		40.74	14.80	--	25.94	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	4/8/1992		40.74	17.06	--	23.68	1,100	30	4.6	32	11	--	--	--	--	--	--	--	--	
MW-3	4/14/1992		40.74	15.22	--	25.52	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	4/29/1992		40.74	15.90	--	24.84	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	5/7/1992		40.74	16.35	--	24.39	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	7/3/1992		40.74	17.74	--	23.00	1,200	38	<2.5	24	<2.5	--	--	--	--	--	--	--	--	
MW-3	10/8/1992		40.74	19.06	--	21.68	1,400	31	<0.5	25	13	--	--	--	--	--	--	--	--	
MW-3	12/31/1992		40.74	16.61	--	24.13	820	12	4.1	13	5.9	--	--	--	--	--	--	--	--	(e)
MW-3	12/31/1992	Dup	40.74	16.61	--	24.13	960	11	3.6	10	3.8	--	--	--	--	--	--	--	--	(Dup)(e)
MW-3	4/21/1993		40.74	14.24	--	26.50	420	5.6	<0.5	3.9	1.4	--	--	--	--	--	--	--	--	(e)
MW-3	4/21/1993	Dup	40.74	14.24	--	26.50	390	5	<0.5	3.7	1.5	--	--	--	--	--	--	--	--	(Dup)(e)
MW-3	7/7/1993		40.13	15.19	--	24.94	54	0.6	0.6	<0.5	<0.5	12.68	--	--	--	--	--	--	--	(f)
MW-3	9/21/1993		40.13	16.58	--	23.55	540	7.9	0.9	4.7	2.4	--	--	--	--	--	--	--	--	
MW-3	12/17/1993		40.13	15.82	--	24.31	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	12/23/1993		--	--	--	--	500	9.8	1.5	3.3	2.1	--	--	--	--	--	--	--	--	
MW-3	12/23/1993	Dup	--	--	--	--	480	9.2	<0.5	5.4	5.3	--	--	--	--	--	--	--	--	(Dup)
MW-3	4/7/1994		40.13	28.50	--	11.63	460	20	7.4	8.9	11	18.2	--	--	--	--	--	--	--	(e)
MW-3	4/7/1994	Dup	40.13	28.50	--	11.63	460	20	7.7	9	11	--	--	--	--	--	--	--	--	(Dup)(e)

Table 1
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 CA-11109
 4280 Foothill Blvd, Oakland, CA 94601



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	Notes	
MW-3	7/6/1994		--	--	--	--	300	10	0.6	1.7	6.4	5.54	--	--	--	--	--	--	4.8	
MW-3	10/7/1994		40.13	27.65	--	12.48	620	28	<0.5	2.2	12	31.4	--	--	--	--	--	--	4.4	
MW-3	1/27/1995		40.13	27.65	--	12.48	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	3/30/1995		40.13	26.05	--	14.08	300	10	6	3.4	18	--	--	--	--	--	--	--	7.6	
MW-3	6/20/1995		40.13	19.49	--	20.64	170	7.2	3.4	0.85	15	--	--	--	--	--	--	--	--	
MW-3	10/3/1995		40.13	24.93	--	15.20	170	2.1	<0.50	0.81	8	6.7	--	--	--	--	--	--	--	
MW-3	12/6/1995		40.13	25.14	--	14.99	1,700	6.7	3.1	2.8	210	64	--	--	--	--	--	--	--	(e)
MW-3	12/6/1995	Dup	40.13	25.14	--	14.99	1,400	6.1	3	1.7	190	53	--	--	--	--	--	--	--	(Dup)(e)
MW-3	3/21/1996		40.13	9.48	--	30.65	<50	0.5	<1.0	<1.0	1	<10	--	--	--	--	--	--	7.3	
MW-3	6/21/1996		40.13	11.60	--	28.53	<50	13	<1.0	<1.0	<1.0	12	--	--	--	--	--	--	7.6	
MW-3	9/6/1996		40.13	12.23	--	27.90	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	9/9/1996		--	--	--	--	<250	6.5	<5.0	<5.0	<5.0	<50	--	--	--	--	--	--	7.6	
MW-3	12/19/1996		40.13	10.46	--	29.67	<50	4.1	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	8.4	
MW-3	3/17/1997		40.13	9.86	--	30.27	50	<5.0	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	7.4	
MW-3	8/12/1997		40.13	12.11	--	28.02	<50	0.79	<1.0	<1.0	<1.0	10	--	--	--	--	--	--	6.1	
MW-3	12/10/1997		40.13	10.90	--	29.23	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	3.2	
MW-3	3/12/1998		40.13	10.20	--	29.93	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	6.3	(e)
MW-3	3/12/1998	Dup	40.13	10.20	--	29.93	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	--	(Dup)(e)
MW-3	6/23/1998		40.13	10.17	--	29.96	50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	3.4	
MW-3	3/31/1999		40.13	11.45	--	28.68	60	<1.0	<1.0	<1.0	<1.0	6.2	--	--	--	--	--	--	--	
MW-3	8/25/1999		40.13	12.52	--	27.61	<50	<1.0	<1.0	<1.0	<1.0	7.7	--	--	--	--	--	--	--	
MW-3	3/9/2000		40.13	12.39	--	27.74	<50	<0.5	0.54	<0.5	1.7	6.3	--	--	--	--	--	--	--	
MW-3	3/8/2001		40.13	10.41	--	29.72	<50	<0.5	<0.5	<0.5	0.59	7.7	--	--	--	--	--	--	--	
MW-3	3/8/2002		40.13	9.83	--	30.30	62	<0.5	<0.5	<0.5	<1.0	11.6	--	--	--	--	--	--	--	
MW-3	3/18/2002		40.13	9.20	--	30.93	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	3/11/2003		40.13	10.54	--	29.59	<50	<0.50	<0.50	<0.50	<0.50	6.7	--	--	--	--	--	--	--	
MW-3	12/9/2003		40.13	12.88	--	27.25	<50	<0.50	<0.50	<0.50	<0.50	6.4	<20	<0.50	<0.50	<0.50	<100	--	--	
MW-3	3/9/2004		40.13	9.49	--	30.64	<50	<0.50	<0.50	<0.50	0.63	6.9	<20	<0.50	<0.50	<0.50	<100	--	--	
MW-3	9/17/2004		40.13	12.76	--	27.37	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	3/7/2005		40.13	7.30	--	32.83	<50	<0.50	<0.50	<0.50	0.52	5.1	<20	<0.50	<0.50	<0.50	<100	--	--	
MW-3	9/6/2005		42.92	10.81	--	32.11	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	3/6/2006		42.92	8.85	--	34.07	<50	<0.50	<0.50	<0.50	<0.50	6.9	<20	<0.50	<0.50	<0.50	<300	--	--	
MW-3	9/5/2006		42.92	9.86	--	33.06	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	3/5/2007		42.92	8.33	--	34.59	<50	<0.50	<0.50	<0.50	<0.50	5.4	<20	<0.50	<0.50	<0.50	<300	2.31	--	
MW-3	9/7/2007		42.92	11.10	--	31.82	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	3/6/2008		42.92	8.92	--	34.00	<50	<0.50	<0.50	<0.50	<0.50	4.2	<10	<0.50	<0.50	<0.50	<300	2.5	--	
MW-3	9/3/2008		42.92	12.19	--	30.73	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	3/4/2009		42.92	8.28	--	34.64	<50	<0.50	<0.50	<0.50	<0.50	4.9	<10	<0.50	<0.50	<0.50	<300	1.19	--	
MW-3	9/30/2009		42.92	11.60	--	31.32	<50	<0.50	<0.50	<0.50	<0.50	6.8	<10	<0.50	<0.50	<0.50	<300	--	--	
MW-3	10/28/2009		42.92	10.40	--	32.52	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	3/23/2010		42.92	8.27	--	34.65	<50	<0.50	<0.50	<0.50	<1.0	3.2	<4.0	<0.50	<0.50	<0.50	<100	--	--	
MW-3	6/10/2010		42.92	9.40	--	33.52	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-3	9/16/2010		42.92	11.14	--	31.78	<50	<0.50	<0.50	<0.50	<1.0	5.9	<4.0	<0.50	<0.50	<0.50	<100	--	--	
MW-3	2/23/2011		42.92	8.71	--	34.21	--	--	--	--	--	0.58	--	--	--	--	--	--	--	
MW-3	9/28/2011		42.92	11.14	--	31.78	--	--	--	--	--	3.2	--	--	--	--	--	--	--	
MW-3	3/8/2012		42.92	11.01	--	31.91	--	--	--	--	--	<0.50(*)	--	--	--	--	--	--	--	
MW-3	9/5/2012		42.92	11.42	--	31.50	--	--	--	--	--	6.5	--	--	--	--	--	--	--	
MW-3	3/20/2013		42.92	10.30	--	32.62	--	--	--	--	--	2.6	--	--	--	--	--	--	--	
MW-3	9/20/2013		42.92	11.40	--	31.52	--	--	--	--	--	4.1	--	--	--	--	--	--	4.66	
MW-3	3/13/2014		42.92	10.73	--	32.19	--	--	--	--	--	4.2	--	--	--	--	--	--	--	
MW-3	9/25/2014		42.92	12.06	--	30.86	--	--	--	--	--	5.5	--	--	--	--	--	--	2.33	
MW-3	3/10/2015		42.92	10.16	--	32.76	--	--	--	--	--	4.0	--	--	--	--	--	--	2.43	
MW-3	9/21/2015		42.92	13.17	--	29.75	--	--	--	--	--	3.49	--	--	--	--	--	--	1.75	

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Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	Notes
MW-4	2/5/1990		40.11	20.75	--	19.36	620	<0.5	9	<0.5	10	--	--	--	--	--	--	--	--
MW-4	2/14/1991		40.11	21.73	--	18.38	180	<0.3	<0.3	0.4	2	--	--	--	--	--	--	--	--
MW-4	5/13/1991		40.11	18.55	--	21.56	72	0.7	<0.3	<0.3	<0.3	--	--	--	--	--	--	--	--
MW-4	7/24/1991		40.11	21.31	--	18.80	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	10/3/1991		40.11	22.57	--	17.54	57	<0.3	<0.3	<0.3	<0.3	--	--	--	--	--	--	--	--
MW-4	10/15/1991		40.11	22.88	--	17.23	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	12/4/1991		40.11	22.54	--	17.57	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	12/16/1991		40.11	22.59	--	17.52	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	1/6/1992		40.11	22.00	--	18.11	480	0.8	3.2	1.9	7.7	--	--	--	--	--	--	--	--
MW-4	1/22/1992		40.11	21.58	--	18.53	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	1/28/1992		40.11	21.42	--	18.69	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	2/5/1992		40.11	21.10	--	19.01	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	2/12/1992		40.11	20.74	--	19.37	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	2/17/1992		40.11	19.78	--	20.33	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	4/3/1992		40.11	16.80	--	23.31	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	4/8/1992		40.11	17.13	--	22.98	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--
MW-4	4/14/1992		40.11	17.74	--	22.37	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	4/29/1992		40.11	18.56	--	21.55	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	5/7/1992		40.11	19.10	--	21.01	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	7/3/1992		40.11	20.71	--	19.40	<50	0.6	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--
MW-4	10/8/1992		40.11	22.43	--	17.68	270	<0.5	2.1	2.5	3.2	--	--	--	--	--	--	--	--
MW-4	12/31/1992		40.11	19.58	--	20.53	150	<0.5	<0.5	<0.5	1.3	--	--	--	--	--	--	--	--
MW-4	4/21/1993		40.11	17.79	--	22.32	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--
MW-4	7/7/1993		40.11	18.44	--	21.67	160	1.2	5.4	3.8	19	5.51	--	--	--	--	--	--	--
MW-4	9/21/1993		40.11	20.14	--	19.97	71	<0.5	1.9	<0.5	2.1	--	--	--	--	--	--	--	--
MW-4	12/17/1993		40.11	19.80	--	20.31	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	12/23/1993		--	--	--	--	<50	3.1	1.6	0.8	3.8	5.7	--	--	--	--	--	--	--
MW-4	4/7/1994		40.11	19.12	--	20.99	<50	<0.5	<0.5	<0.5	<0.5	11.7	--	--	--	--	--	6.6	--
MW-4	7/6/1994		40.11	19.90	--	20.21	62	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	4.1	--
MW-4	10/7/1994		40.11	20.07	--	20.04	<50	<0.5	<0.5	<0.5	<0.5	7.38	--	--	--	--	--	3.6	--
MW-4	1/27/1995		40.11	13.72	--	26.39	<50	<0.5	<0.5	<0.5	<1.0	--	--	--	--	--	--	2.7	--
MW-4	3/30/1995		40.11	11.46	--	28.65	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	8.3	--
MW-4	6/20/1995		40.11	14.78	--	25.33	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	--	--
MW-4	10/3/1995		40.11	19.62	--	20.49	<50	<0.50	<0.50	<0.50	<1.0	5	--	--	--	--	--	5.8	--
MW-4	12/6/1995		40.11	19.91	--	20.20	<50	<0.50	<0.50	<0.50	<1.0	47	--	--	--	--	--	5.7	--
MW-4	3/21/1996		40.11	11.12	--	28.99	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	7.8	--
MW-4	6/21/1996		40.11	12.21	--	27.90	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	7.9	--
MW-4	9/6/1996		40.11	12.89	--	27.22	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	9/9/1996		--	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	7.2	--
MW-4	12/19/1996		40.11	11.01	--	29.10	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	8.4	--
MW-4	3/17/1997		40.11	10.42	--	29.69	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	8/12/1997		40.11	12.77	--	27.34	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	12/10/1997		40.11	11.22	--	28.89	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	3/12/1998		40.11	10.81	--	29.30	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	6/23/1998		40.11	10.61	--	29.50	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	3/31/1999		40.11	11.46	--	28.65	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	8/25/1999		40.11	16.16	--	23.95	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	3/9/2000		40.11	12.23	--	27.88	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	3/8/2001		40.11	11.04	--	29.07	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	3/8/2002		40.11	12.73	--	27.38	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	3/18/2002		40.11	11.62	--	28.49	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	3/11/2003		40.11	13.44	--	26.67	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	12/9/2003		40.11	15.03	--	25.08	<250	<2.5	<2.5	<2.5	<2.5	130	<100	<2.5	<2.5	2.7	<500	--	--
MW-4	3/9/2004		40.11	11.04	--	29.07	<50	<0.50	<0.50	<0.50	<0.50	35	<20	<0.50	<0.50	<0.50	<100	--	--

Table 1
 Summary of Groundwater Monitoring Data:
 Relative Water Elevations and Laboratory Analyses
 CA-11109
 4280 Foothill Blvd, Oakland, CA 94601



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	Notes
MW-4	9/17/2004		40.11	16.75	--	23.36	<250	<2.5	<2.5	<2.5	<2.5	140	<100	<2.5	<2.5	2.6	<500	--	
MW-4	3/7/2005		40.11	11.02	--	29.09	67	<0.50	<0.50	<0.50	<0.50	42	<20	<0.50	<0.50	0.56	<100	--	
MW-4	9/6/2005		42.88	14.64	--	28.24	81	<0.50	<0.50	<0.50	<1.5	180	<10	<0.50	<0.50	2.8	<150	--	
MW-4	3/6/2006		42.88	12.42	--	30.46	<100	<1.0	<1.0	<1.0	<1.0	110	<40	<1.0	<1.0	1.4	<600	--	
MW-4	9/5/2006		42.88	13.81	--	29.07	130	<1.0	<1.0	<1.0	<1.0	190	<40	<1.0	<1.0	1.7	<600	--	
MW-4	3/5/2007		42.88	10.63	--	32.25	<50	<0.50	<0.50	<0.50	<0.50	13	<20	<0.50	<0.50	<0.50	<300	3.34	
MW-4	9/7/2007		42.88	14.77	--	28.11	90	<0.50	<0.50	<0.50	<0.50	130	<20	<0.50	<0.50	1.7	<300	1.14	
MW-4	3/6/2008		42.88	11.30	--	31.58	<50	<0.50	<0.50	<0.50	<0.50	170	14	<0.50	<0.50	2.1	<300	1.76	
MW-4	9/3/2008		42.88	16.11	--	26.77	<50	<5.0	<5.0	<5.0	<5.0	150	<100	<5.0	<5.0	<5.0	<3,000	1.97	
MW-4	3/4/2009		42.88	10.78	--	32.10	140	<5.0	<5.0	<5.0	<5.0	110	<100	<5.0	<5.0	<5.0	<3,000	1.31	
MW-4	9/30/2009		42.88	16.48	--	26.40	240	<2.0	<2.0	<2.0	<2.0	140	<40	<2.0	<2.0	<2.0	<1,200	0.08	
MW-4	10/28/2009		42.88	15.07	--	27.81	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	3/23/2010		42.88	10.82	--	32.06	<50	<0.50	<0.50	<0.50	<1.0	84	18	<0.50	<0.50	0.88	<100	--	
MW-4	6/10/2010		42.88	12.67	--	30.21	--	--	--	--	--	--	--	--	--	--	--	--	
MW-4	9/16/2010		42.88	15.72	--	27.16	120	<0.50	<0.50	<0.50	<1.0	72	8.0	<0.50	<0.50	0.82	<100	--	
MW-4	2/23/2011		42.88	11.43	--	31.45	<50	--	--	--	--	55	--	--	--	--	--	--	
MW-4	9/28/2011		42.88	15.34	--	27.54	150	--	--	--	--	62	--	--	--	--	--	--	
MW-4	3/8/2012		42.88	15.03	--	27.85	120	--	--	--	--	42	--	--	--	--	--	--	
MW-4	9/5/2012		42.88	15.90	--	26.98	56	<0.50	<0.50	<0.50	<1.0	47	18	<0.50	<0.50	<0.50	<250	--	
MW-4	3/20/2013		42.88	13.80	--	29.08	<50	--	--	--	--	17	--	--	--	--	--	--	
MW-4	9/20/2013		42.88	15.69	--	27.19	830	--	--	--	--	21	--	--	--	--	--	4.41	
MW-4	3/13/2014		42.88	15.59	--	27.29	<50	--	--	--	--	19	--	--	--	--	--	--	
MW-4	9/25/2014		42.88	17.10	--	25.78	190	--	--	--	--	17	--	--	--	--	--	2.06	(i)
MW-4	3/10/2015		42.88	14.36	--	28.52	90	--	--	--	--	17	--	--	--	--	--	1.87	
MW-4	9/21/2015		42.88	18.45	--	24.43	953	--	--	--	--	17.8	--	--	--	--	--	1.89	
MW-5	10/3/1991		39.55	18.08	--	21.47	79,000	13,000	7,400	1,400	6,200	--	--	--	--	--	--	--	
MW-5	10/15/1991		39.55	18.55	--	21.00	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	12/4/1991		39.55	18.44	0.13	20.98	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	12/16/1991		39.55	18.66	0.01	20.88	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	1/6/1992		39.55	19.12	0.11	20.32	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	1/22/1992		39.55	14.59	--	24.96	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	1/28/1992		39.55	15.25	--	24.30	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	2/5/1992		39.55	15.58	--	23.97	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	2/12/1992		39.55	15.54	0.01	24.00	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	2/17/1992		39.55	13.98	--	25.57	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	4/3/1992		39.55	13.63	0.04	25.88	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	4/8/1992		39.55	13.17	0.01	26.37	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	4/14/1992		39.55	13.45	0.01	26.09	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	4/29/1992		39.55	13.75	0.07	25.73	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	5/7/1992		39.55	16.15	0.04	23.36	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	7/3/1992		39.55	17.67	0.08	21.80	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	9/1/1992		39.55	17.83	0.50	21.22	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	10/8/1992		39.55	17.86	0.92	20.77	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	12/31/1992		39.55	15.20	--	24.35	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	4/21/1993		39.55	12.64	0.02	26.89	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	7/7/1993		39.14	12.68	0.82	25.64	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	9/21/1993		39.14	14.35	--	24.79	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	12/17/1993		39.14	12.61	0.41	26.12	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	4/7/1994		39.14	30.00	--	9.14	66,000	3,000	1,700	250	6,800	2,002	--	--	--	--	--	--	
MW-5	7/6/1994		--	--	--	--	29,000	1,900	330	63	2,700	1,141	--	--	--	--	--	--	
MW-5	10/7/1994		39.14	28.70	--	10.44	250,000	2,600	660	830	5,200	37.7	--	--	--	--	--	4.2	(e)
MW-5	10/7/1994	Dup	39.14	28.70	--	10.44	45,000	2,900	540	260	2,600	--	--	--	--	--	--	--	(Dup)(e)
MW-5	1/27/1995		39.14	28.70	--	10.44	--	--	--	--	--	--	--	--	--	--	--	--	

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Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	Notes
MW-5	3/30/1995		39.14	28.95	--	10.19	50,000	7,900	2,600	520	6,400	--	--	--	--	--	--	5.5	(e)
MW-5	3/30/1995	Dup	39.14	28.95	--	10.19	43,000	7,900	2,500	440	6,200	--	--	--	--	--	--	--	(Dup)(e)
MW-5	6/20/1995		39.14	22.54	--	16.60	34,000	5,100	1,900	300	3,700	--	--	--	--	--	--	--	(e)
MW-5	6/20/1995	Dup	39.14	22.54	--	16.60	26,000	3,500	290	<25	3,300	--	--	--	--	--	--	--	(Dup)(e)
MW-5	10/3/1995		39.14	18.84	--	20.30	12,000	68	42	11	1,600	330	--	--	--	--	--	--	(e)
MW-5	10/3/1995	Dup	39.14	18.84	--	20.30	12,000	46	39	10	1,600	320	--	--	--	--	--	--	(Dup)(e)
MW-5	12/6/1995		39.14	19.07	--	20.07	16,000	1,200	93	51	700	600	--	--	--	--	--	--	(e)
MW-5	3/21/1996		39.14	7.43	--	31.71	1,500	89	28	6	250	<10	--	--	--	--	--	7.2	(e)
MW-5	3/21/1996	Dup	39.14	7.43	--	31.71	1,900	92	30	7	270	<10	--	--	--	--	--	--	(Dup)(e)
MW-5	6/21/1996		39.14	9.87	--	29.27	3,500	740	150	19	400	<100	--	--	--	--	--	7.1	(e)
MW-5	6/21/1996	Dup	39.14	9.87	--	29.27	2,700	680	140	20	400	<50	--	--	--	--	--	--	(Dup)(e)
MW-5	9/6/1996		39.14	10.52	--	28.62	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	9/9/1996		--	--	--	--	82,000	3,100	1,700	850	9,100	<2,500	--	--	--	--	--	7.5	(e)
MW-5	9/9/1996	Dup	--	--	--	--	90,000	2,900	1,600	670	6,900	<2,500	--	--	--	--	--	--	(Dup)
MW-5	12/19/1996		39.14	8.62	--	30.52	41,000	790	820	120	2,040	<500	--	--	--	--	--	7.7	(e)
MW-5	12/19/1996	Dup	39.14	8.62	--	30.52	26,000	490	430	63	1,140	<500	--	--	--	--	--	--	(Dup)(e)
MW-5	3/17/1997		39.14	8.22	--	30.92	5,500	1.9	2.4	<1.0	<1.0	29	--	--	--	--	--	6.4	(e)
MW-5	3/17/1997	Dup	39.14	8.22	--	30.92	6,600	2.5	2.7	<1.0	<1.0	28	--	--	--	--	--	--	(Dup)(e)
MW-5	8/12/1997		39.14	12.18	0.22	26.74	33,000	6,400	2,400	680	4,400	<1,000	--	--	--	--	--	6.8	(g)
MW-5	8/12/1997	Dup	39.14	12.18	0.22	26.74	36,000	6,100	2,500	720	4,500	<500	--	--	--	--	--	--	(Dup)(g)
MW-5	12/10/1997		39.14	10.78	0.06	28.30	31,000	3,000	2,500	560	5,100	500	--	--	--	--	--	1.8	(g)
MW-5	12/10/1997	Dup	39.14	10.78	0.06	28.30	37,000	2,900	2,500	440	4,800	--	--	--	--	--	--	--	(Dup)(g)
MW-5	3/12/1998		39.14	10.11	0.22	28.81	100,000	1,600	870	250	2,600	<250	--	--	--	--	--	6.1	(g)
MW-5	6/23/1998		39.14	10.20	0.02	28.92	27,000	2,500	840	370	2,900	<250	--	--	--	--	--	2.1	(e)
MW-5	6/23/1998	Dup	39.14	10.20	0.02	28.92	27,000	2,600	840	400	2,950	<500	--	--	--	--	--	--	(Dup)(e)
MW-5	8/25/1999		39.14	14.69	0.38	24.07	180,000	2,700	400	830	2,800	26	--	--	--	--	--	--	(e)
MW-5	3/9/2000		39.14	14.83	0.60	23.71	53,000	12,000	2,600	1,900	9,100	<5.0	--	--	--	--	--	--	(e)
MW-5	3/8/2002		39.14	11.45	1.50	26.19	33,000	8,240	1,080	1,010	2,900	34.3	--	--	--	--	--	--	(e)
MW-5	3/18/2002		39.14	8.03	--	31.11	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	3/11/2003		39.14	9.60	0.45	29.09	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	12/9/2003		39.14	11.44	0.03	27.72	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	3/9/2004		39.14	7.91	--	31.23	31,000	3,900	1,100	780	3,600	<50	<2,000	<50	<50	<50	<10,000	--	(e)
MW-5	9/17/2004		39.14	12.13	0.15	27.13	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	3/7/2005		39.14	8.62	0.02	30.52	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	9/6/2005		39.14	11.16	0.18	27.98	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	3/6/2006		39.14	8.60	(SHEEN)	30.54	32,000	7,500	810	1,200	2,300	<50	<2,000	60	<50	<50	<30,000	--	(e)
MW-5	9/5/2006		39.14	6.16	0.03	32.98	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	3/5/2007		39.14	8.34	(SHEEN)	30.80	90,000	10,000	4,200	1,900	7,900	<50	<2,000	57	<50	<50	<30,000	1.30	(e)
MW-5	9/7/2007		39.14	15.15	0.15	23.99	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	1/14/2008		39.14	10.30	0.49	28.84	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	2/27/2008		39.14	13.22	0.12	25.92	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	3/6/2008		39.14	12.90	0.14	26.24	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	9/3/2008		39.14	12.90	0.99	26.24	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	3/4/2009		39.14	8.45	0.16	30.69	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	4/8/2009		39.14	9.05	0.67	30.09	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	5/11/2009		39.14	9.10	0.32	30.04	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	6/16/2009		39.14	9.15	0.02	29.99	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	7/22/2009		39.14	9.33	0.12	29.81	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	8/6/2009		39.14	10.05	0.01	29.09	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	9/30/2009		39.14	10.55	0.06	28.59	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	10/28/2009		39.14	10.48	--	28.66	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	3/23/2010		39.14	7.10	--	32.04	67,000	1,400	380	620	1,800	<5.0	<40	<5.0	<5.0	<5.0	<1,000	--	(e)
MW-5	6/10/2010		39.14	8.26	--	30.88	--	--	--	--	--	--	--	--	--	--	--	--	(e)
MW-5	9/16/2010		39.14	9.14	--	30.00	--	--	--	--	--	--	--	--	--	--	--	--	(e)

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MW-5	2/23/2011		39.14	8.33	--	30.81	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	9/28/2011		39.14	10.46	--	28.68	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	3/8/2012		39.14	10.27	--	28.87	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	9/5/2012		39.14	11.80	1.40	27.69	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	3/20/2013		39.14	9.73	0.02	29.43	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	9/20/2013		39.14	10.26	--	28.88	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	3/13/2014		39.14	9.74	--	29.40	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	9/25/2014		39.14	11.88	--	27.26	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-5	3/10/2015		39.14	9.89	0.01	29.24	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-5	9/21/2015		39.14	12.02	--	27.12	--	--	--	--	--	--	--	--	--	--	--	--	--	(m)
MW-6	10/3/1991		41.59	20.73	--	20.86	<50	0.7	0.8	<0.3	1.3	--	--	--	--	--	--	--	--	
MW-6	10/15/1991		41.59	21.20	--	20.39	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	12/4/1991		41.59	21.26	--	20.33	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	12/16/1991		41.59	21.12	--	20.47	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	1/6/1992		41.59	20.29	--	21.30	<50	<0.5	<0.5	<0.5	1.6	--	--	--	--	--	--	--	--	
MW-6	1/22/1992		41.59	20.12	--	21.47	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	1/28/1992		41.59	20.20	--	21.39	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	2/5/1992		41.59	20.09	--	21.50	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	2/12/1992		41.59	19.15	--	22.44	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	2/17/1992		41.59	18.02	--	23.57	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	4/3/1992		41.59	16.62	--	24.97	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	4/8/1992		41.59	17.06	--	24.53	<50	0.6	<0.5	0.8	<0.5	--	--	--	--	--	--	--	--	
MW-6	4/14/1992		41.59	17.23	--	24.36	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	4/29/1992		41.59	18.12	--	23.47	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	5/7/1992		41.59	18.52	--	23.07	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	7/3/1992		41.59	19.71	--	21.88	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	
MW-6	10/8/1992		41.59	21.22	--	20.37	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	(e)
MW-6	10/8/1992	Dup	41.59	21.22	--	20.37	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	(Dup)(e)
MW-6	12/31/1992		41.59	21.33	--	20.26	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	
MW-6	4/21/1993		41.59	16.45	--	25.14	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	
MW-6	7/7/1993		41.59	18.68	--	22.91	<50	<0.5	<0.5	<0.5	<0.5	28.96	--	--	--	--	--	--	--	
MW-6	9/21/1993		41.59	19.64	--	21.95	<50	<0.5	<0.5	<0.5	1.6	--	--	--	--	--	--	--	--	
MW-6	12/17/1993		41.59	21.08	--	20.51	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	12/23/1993		--	--	--	--	<50	<0.5	0.5	<0.5	0.6	13.95	--	--	--	--	--	--	--	
MW-6	4/7/1994		41.59	21.27	--	20.32	<50	<0.5	<0.5	<0.5	<0.5	35.1	--	--	--	--	--	--	6.1	
MW-6	7/6/1994		41.59	19.81	--	21.78	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	4.0	(e)
MW-6	7/6/1994	Dup	41.59	19.81	--	21.78	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	(Dup)(e)
MW-6	10/7/1994		41.59	21.25	--	20.34	<50	<0.5	<0.5	<0.5	<0.5	24.3	--	--	--	--	--	--	3.5	
MW-6	1/27/1995		41.59	12.39	--	29.20	<50	<0.5	<0.5	<0.5	<1.0	--	--	--	--	--	--	--	4.2	
MW-6	3/30/1995		41.59	11.34	--	30.25	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	--	6.1	
MW-6	6/20/1995		41.59	15.12	--	26.47	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	--	--	
MW-6	10/3/1995		41.59	20.68	--	20.91	<50	<0.50	<0.50	<0.50	<1.0	66	--	--	--	--	--	--	6.4	
MW-6	12/6/1995		41.59	23.77	--	17.82	<50	<0.50	<0.50	<0.50	<1.0	45	--	--	--	--	--	--	5.7	
MW-6	3/21/1996		41.59	11.55	--	30.04	<50	<0.5	<1.0	<1.0	<1.0	41	--	--	--	--	--	--	9.1	
MW-6	6/21/1996		41.59	12.60	--	28.99	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	8.6	
MW-6	9/6/1996		41.59	13.25	--	28.34	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	9/9/1996		--	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	22	--	--	--	--	--	--	7.9	
MW-6	12/19/1996		41.59	11.45	--	30.14	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	--	7.7	
MW-6	3/17/1997		41.59	10.80	--	30.79	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	8/12/1997		41.59	13.11	--	28.48	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	12/10/1997		41.59	13.84	--	27.75	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	3/12/1998		41.59	11.17	--	30.42	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-6	6/23/1998		41.59	13.27	--	28.32	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 1
 Summary of Groundwater Monitoring Data:
 Relative Water Elevations and Laboratory Analyses
 CA-11109
 4280 Foothill Blvd, Oakland, CA 94601

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	Notes
MW-6	3/31/1999		41.59	12.91	--	28.88	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	8/25/1999		41.59	15.93	--	25.66	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	3/9/2000		41.59	11.49	--	30.10	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	3/8/2001		41.59	10.81	--	30.78	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	3/8/2002		41.59	14.28	--	27.31	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	3/18/2002		41.59	13.10	--	28.49	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	3/11/2003		41.59	13.63	--	27.96	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	12/9/2003		41.59	14.26	--	27.33	<50	<0.50	<0.50	<0.50	<0.50	12	<20	<0.50	<0.50	<0.50	<100	--	--
MW-6	3/9/2004		41.59	11.87	--	29.72	<50	<0.50	<0.50	<0.50	<0.50	10	<20	<0.50	<0.50	<0.50	<100	--	--
MW-6	9/17/2004		41.59	16.45	--	25.14	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	3/7/2005		41.59	13.65	--	27.94	<50	<0.50	<0.50	<0.50	<0.50	5.8	<20	<0.50	<0.50	<0.50	<100	--	--
MW-6	9/6/2005		44.37	14.23	--	30.14	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	3/6/2006		44.37	12.89	--	31.48	<50	<0.50	<0.50	<0.50	<0.50	8.1	<20	<0.50	<0.50	<0.50	<300	--	--
MW-6	9/5/2006		44.37	14.10	--	30.27	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	3/5/2007		44.37	11.43	--	32.94	<50	<0.50	<0.50	<0.50	<0.50	5.6	<20	<0.50	<0.50	<0.50	<300	2.57	--
MW-6	9/7/2007		44.37	16.00	--	28.37	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	3/6/2008		44.37	11.84	--	32.53	<50	<0.50	<0.50	<0.50	<0.50	1.9	<10	<0.50	<0.50	<0.50	<300	2.34	--
MW-6	9/3/2008		44.37	16.24	--	28.13	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	3/4/2009		44.37	11.68	--	32.69	<50	<0.50	<0.50	<0.50	<0.50	2.8	<10	<0.50	<0.50	<0.50	<300	4.66	--
MW-6	9/30/2009		44.37	16.83	--	27.54	<50	<0.50	<0.50	<0.50	<0.50	4.4	<10	<0.50	<0.50	<0.50	<300	0.10	--
MW-6	10/28/2009		44.37	15.63	--	28.74	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	3/23/2010		44.37	11.48	--	32.89	<50	<0.50	<0.50	<0.50	<1.0	1.0	<4.0	<0.50	<0.50	<0.50	<100	--	--
MW-6	6/10/2010		44.37	12.54	--	31.83	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-6	9/16/2010		44.37	15.95	--	28.42	<50	<0.50	<0.50	<0.50	<1.0	0.80	<4.0	<0.50	<0.50	<0.50	<100	--	--
MW-6	2/23/2011		44.37	12.34	--	32.03	--	--	--	--	--	<0.50	--	--	--	--	--	--	--
MW-6	9/28/2011		44.37	15.81	--	28.56	--	--	--	--	--	3.4	--	--	--	--	--	--	--
MW-6	3/8/2012		44.37	15.51	--	28.86	--	--	--	--	--	0.58	--	--	--	--	--	--	--
MW-6	9/5/2012		44.37	15.88	--	28.49	--	--	--	--	--	2.1	--	--	--	--	--	--	--
MW-6	3/20/2013		44.37	14.36	--	30.01	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<4.0	<0.50	<0.50	<0.50	<250	--	--
MW-6	9/20/2013		44.37	16.02	--	28.35	--	--	--	--	--	2.4	--	--	--	--	--	4.72	--
MW-6	3/13/2014		44.37	15.43	--	28.94	--	--	--	--	--	<0.50	--	--	--	--	--	--	--
MW-6	9/25/2014		44.37	17.15	--	27.22	--	--	--	--	--	2.0	--	--	--	--	--	2.67	--
MW-6	3/10/2015		44.37	14.66	--	29.71	--	--	--	--	--	<0.50	--	--	--	--	--	3.57	--
MW-6	9/21/2015		44.37	18.54	--	25.83	--	--	--	--	--	1.88	--	--	--	--	--	2.29	--
MW-7	10/3/1991		40.64	14.93	--	25.71	360	62	13	3.4	20	--	--	--	--	--	--	--	--
MW-7	10/15/1991		40.64	15.16	--	25.48	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	12/4/1991		40.64	15.41	--	25.23	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	12/16/1991		40.64	15.21	--	25.43	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	1/6/1992		40.64	14.56	--	26.08	1,100	170	<0.5	24	23	--	--	--	--	--	--	--	--
MW-7	1/22/1992		40.64	14.63	--	26.01	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	1/28/1992		40.64	14.73	--	25.91	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	2/5/1992		40.64	14.58	--	26.06	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	2/12/1992		40.64	13.94	--	26.70	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	2/17/1992		40.64	13.10	--	27.54	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	4/3/1992		40.64	12.66	--	27.98	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	4/8/1992		40.64	12.77	--	27.87	750	150	<0.5	23	9.9	--	--	--	--	--	--	--	--
MW-7	4/14/1992		40.64	13.02	--	27.62	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	4/29/1992		40.64	13.59	--	27.05	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	5/7/1992		40.64	13.95	--	26.69	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	7/3/1992		40.64	14.73	--	25.91	660	210	<2.5	33	8	--	--	--	--	--	--	--	--
MW-7	10/8/1992		40.64	15.75	--	24.89	320	49	1.4	13	6.2	--	--	--	--	--	--	--	--
MW-7	12/31/1992		40.64	13.57	--	27.07	900	100	<2.5	28	4.3	--	--	--	--	--	--	--	--
MW-7	4/21/1993		40.64	14.56	--	26.08	510	83	1.2	10	5.8	--	--	--	--	--	--	--	--

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 4280 Foothill Blvd, Oakland, CA 94601



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	Notes
MW-7	7/7/1993		40.32	13.40	--	26.92	1,100	160	2	27	4	10.84	--	--	--	--	--	--	(f)
MW-7	7/7/1993	Dup	40.32	13.40	--	26.92	1,100	170	1.9	29	2.84	9.84	--	--	--	--	--	--	(Dup)(f)
MW-7	9/21/1993		40.32	14.40	--	25.92	690	150	3.1	26	5.7	--	--	--	--	--	--	--	(e)
MW-7	9/21/1993	Dup	40.32	14.40	--	25.92	640	140	1.7	23	2.4	--	--	--	--	--	--	--	(Dup)(e)
MW-7	12/17/1993		40.32	13.65	--	26.67	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	12/23/1993		--	--	--	--	250	64	1.2	9	1.8	7.81	--	--	--	--	--	--	
MW-7	4/7/1994		40.32	30.62	--	9.70	140	32	1.4	<0.5	<0.5	6.32	--	--	--	--	--	--	
MW-7	7/6/1994		40.32	16.88	--	23.44	410	94	1.3	10	3.5	<5.0	--	--	--	--	--	4.4	
MW-7	10/7/1994		40.32	25.59	--	14.73	<50	9.2	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	4.9	
MW-7	1/27/1995		40.32	9.82	--	30.50	810	570	3	60	17	--	--	--	--	--	--	0.0	(e)
MW-7	1/27/1995	Dup	40.32	9.82	--	30.50	930	620	4	77	21	--	--	--	--	--	--	--	(Dup)(e)
MW-7	3/30/1995		40.32	9.15	--	31.17	180	65	0.53	2	<1.0	--	--	--	--	--	--	7.8	
MW-7	6/20/1995		40.32	11.38	--	28.94	2,800	980	<5.0	<5.0	43	--	--	--	--	--	--	--	
MW-7	10/3/1995		40.32	29.95	--	10.37	<50	<0.50	<0.50	<0.50	<1.0	<5.0	--	--	--	--	--	--	
MW-7	12/6/1995		40.32	29.85	--	10.47	<50	<0.50	<0.50	<0.50	<1.0	<5.0	--	--	--	--	--	--	
MW-7	3/21/1996		40.32	9.76	--	30.56	1,000	390	2	40	13	<10	--	--	--	--	--	7.4	
MW-7	6/21/1996		40.32	11.01	--	29.31	<250	40	<5.0	<5.0	<5.0	<5.0	--	--	--	--	--	7.4	
MW-7	9/6/1996		40.32	11.68	--	28.64	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	9/9/1996		--	--	--	--	<250	13	<5.0	<5.0	<5.0	<5.0	--	--	--	--	--	7.2	
MW-7	12/19/1996		40.32	10.78	--	29.54	70	1.2	<1.0	1	<1.0	<10	--	--	--	--	--	8.3	
MW-7	3/17/1997		40.32	9.96	--	30.36	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	8/12/1997		40.32	11.44	--	28.88	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	12/10/1997		40.32	10.42	--	29.90	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	3/12/1998		40.32	9.51	--	30.81	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	6/23/1998		40.32	9.98	--	30.34	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	3/31/1999		40.32	10.38	--	29.94	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	8/25/1999		40.32	12.38	--	27.94	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	3/9/2000		40.32	8.48	--	31.84	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	3/8/2001		40.32	8.37	--	31.95	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	3/18/2002		40.32	9.94	--	30.38	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	3/11/2003		40.32	11.26	--	29.06	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	12/9/2003		40.32	12.76	--	27.56	270	26	<0.50	<0.50	<0.50	8.7	<20	<0.50	<0.50	<0.50	<100	--	
MW-7	3/9/2004		40.32	10.91	--	29.41	320	49	0.73	1.8	0.59	6.9	<20	<0.50	<0.50	<0.50	<100	--	
MW-7	9/17/2004		40.32	13.20	--	27.12	330	17	<0.50	<0.50	<0.50	7.0	<20	<0.50	<0.50	<0.50	<100	--	
MW-7	3/7/2005		40.32	8.18	--	32.14	340	41	0.79	0.79	0.73	7.2	<20	<0.50	<0.50	<0.50	<100	--	
MW-7	9/6/2005		43.10	11.80	--	31.30	1,100	130	1.2	1.8	<1.5	16	30	0.60	<0.50	<0.50	<150	--	
MW-7	3/6/2006		43.10	8.39	--	34.71	440	31	0.78	0.74	0.81	8.3	<20	<0.50	<0.50	<0.50	<300	--	
MW-7	9/5/2006		43.10	11.45	--	31.65	2,000	260	3.1	5.9	<2.5	12	<100	<2.5	<2.5	<2.5	<1,500	--	
MW-7	3/5/2007		43.10	9.31	--	33.79	2,200	110	2.2	4.0	1.8	7.6	<40	<1.0	<1.0	<1.0	<600	1.06	
MW-7	9/7/2007		43.10	12.18	--	30.92	220	8.4	<0.50	<0.50	<0.50	1.2	<20	<0.50	<0.50	<0.50	<300	0.98	
MW-7	3/6/2008		43.10	10.05	--	33.05	1,800	54	1.2	1.1	<1.0	<1.0	<20	<1.0	<1.0	<1.0	<600	--	
MW-7	9/3/2008		43.10	13.17	--	29.93	540	13	0.69	<0.50	<0.50	5.5	17	<0.50	<0.50	<0.50	<300	4.77	
MW-7	3/4/2009		43.10	8.25	--	34.85	720	15	0.59	0.53	<0.50	3.4	12	<0.50	<0.50	<0.50	<300	1.29	
MW-7	9/30/2009		43.10	12.70	--	30.40	1,200	44	1.0	0.74	0.79	3.3	<10	<0.50	<0.50	<0.50	<300	0.11	
MW-7	10/28/2009		43.10	11.17	--	31.93	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	3/23/2010		43.10	9.28	--	33.82	610	11	<0.50	<0.50	<1.0	<0.50	12	<0.50	<0.50	<0.50	<100	--	
MW-7	6/10/2010		43.10	10.24	--	32.86	--	--	--	--	--	--	--	--	--	--	--	--	
MW-7	9/16/2010		43.10	12.16	--	30.94	4,700	130	<5.0	7.4	<10	<5.0	<40	<5.0	<5.0	<5.0	<1,000	--	
MW-7	2/23/2011		43.10	9.62	--	33.48	2,200	26	1.1	1.4	1.6	4.0	<4.0	<0.50	<0.50	<0.50	<250	--	
MW-7	9/28/2011		43.10	11.80	--	31.30	3,800	380	4.8	28	4.3	9.5	13	<0.50	<0.50	<0.50	<250	--	
MW-7	3/8/2012		43.10	11.69	--	31.41	550	1.4	<0.50	<0.50	<1.0	2.3	<4.0	<0.50	<0.50	<0.50	<250	--	
MW-7	9/5/2012		43.10	11.60	--	31.50	830	16	1.3	0.66	1.4	3.0	<4.0	<0.50	<0.50	<0.50	<250	--	
MW-7	3/20/2013		43.10	10.88	--	32.22	--	--	--	--	--	3.4	--	--	--	--	--	--	
MW-7	9/20/2013		43.10	11.50	--	31.60	580	<0.50	<0.50	<0.50	<1.0	2.3	<10	<0.50	<0.50	<0.50	<250	4.18	

Table 1
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 CA-11109
 4280 Foothill Blvd, Oakland, CA 94601



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	Notes
MW-7	3/13/2014		43.10	10.81	--	32.29	100	<0.50	<0.50	<0.50	<1.0	1.3	<10	<0.50	<0.50	<0.50	<250	--	
MW-7	9/25/2014		43.10	12.15	--	30.95	640	<0.50	<0.50	<0.50	<1.0	2.6	<20	<0.50	<0.50	<0.50	<500	1.51	
MW-7	3/10/2015		43.10	10.75	--	32.35	310	0.80	<0.50	<0.50	<1.0	1.9	<20	<0.50	<0.50	<0.50	<500	1.52	
MW-7	9/21/2015		43.10	13.52	--	29.58	3,120	0.351(J)	<5.00	<1.00	<3.00	2.29	8.53	<1.00	<1.00	<1.00	<100	2.26	
MW-8	10/3/1991		38.18	22.37	--	15.81	<50	<0.3	0.6	<0.3	0.9	--	--	--	--	--	--	--	
MW-8	10/15/1991		38.18	22.70	--	15.48	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	12/4/1991		38.18	22.44	--	15.74	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	12/16/1991		38.18	22.47	--	15.71	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	1/6/1992		38.18	21.94	--	16.24	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-8	1/22/1992		38.18	21.44	--	16.74	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	1/28/1992		38.18	21.20	--	16.98	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	2/5/1992		38.18	20.88	--	17.30	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	2/12/1992		38.18	20.54	--	17.64	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	2/17/1992		38.18	19.99	--	18.19	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	4/3/1992		38.18	16.75	--	21.43	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	4/8/1992		38.18	16.57	--	21.61	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-8	4/29/1992		38.18	18.61	--	19.57	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	5/7/1992		38.18	18.41	--	19.77	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	7/3/1992		38.18	20.35	--	17.83	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-8	10/8/1992		38.18	21.74	--	16.44	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	12/31/1992		38.18	19.09	--	19.09	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-8	4/21/1993		38.18	18.92	--	19.26	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-8	7/7/1993		38.18	17.76	--	20.42	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	
MW-8	9/21/1993		38.18	19.71	--	18.47	<50	2.9	2.2	2.2	7.1	--	--	--	--	--	--	--	
MW-8	12/17/1993		38.18	21.33	--	16.85	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	12/23/1993		--	--	--	--	<50	<0.5	<0.5	<0.5	0.6	<5.0	--	--	--	--	--	--	
MW-8	4/7/1994		38.18	21.51	--	16.67	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	6.6	
MW-8	7/6/1994		38.18	17.41	--	20.77	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	4.4	
MW-8	10/7/1994		38.18	19.20	--	18.98	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	3.7	
MW-8	1/27/1995		38.18	12.25	--	25.93	<50	<0.5	<0.5	<0.5	<1.0	--	--	--	--	--	--	2.9	
MW-8	3/30/1995		38.18	10.35	--	27.83	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	8.3	
MW-8	6/20/1995		38.18	13.37	--	24.81	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	6.9	
MW-8	12/6/1995		38.18	18.42	--	19.76	<50	<0.50	<0.50	<0.50	<1.0	47	--	--	--	--	--	5.3	
MW-8	6/21/1996		38.18	13.03	--	25.15	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	7.0	
MW-8	9/6/1996		38.18	13.70	--	24.48	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	9/9/1996		--	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	7.0	
MW-8	12/19/1996		38.18	11.93	--	26.25	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	7.6	
MW-8	3/17/1997		38.18	11.29	--	26.89	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	8/12/1997		38.18	13.73	--	24.45	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	12/10/1997		38.18	11.88	--	26.30	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/12/1998		38.18	11.89	--	26.29	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	6/23/1998		38.18	11.33	--	26.85	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/31/1999		38.18	12.68	--	25.50	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	8/25/1999		38.18	14.93	--	23.25	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/9/2000		38.18	9.14	--	29.04	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/8/2001		38.18	8.41	--	29.77	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/8/2002		38.18	11.18	--	27.00	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/18/2002		38.18	10.72	--	27.46	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/11/2003		38.18	10.46	--	27.72	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/9/2004		38.18	9.79	--	28.39	<50	<0.50	<0.50	<0.50	<0.50	0.50	<20	<0.50	<0.50	<0.50	<100	--	
MW-8	9/17/2004		38.18	15.35	--	22.83	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/7/2005		38.18	7.94	--	30.24	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<100	--	
MW-8	9/6/2005		40.95	13.06	--	27.89	--	--	--	--	--	--	--	--	--	--	--	--	

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Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	Notes
MW-8	3/6/2006		40.95	9.26	--	31.69	<50	<0.50	<0.50	<0.50	<0.50	0.59	<20	<0.50	<0.50	<0.50	<300	--	
MW-8	9/5/2006		40.95	12.61	--	28.34	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/5/2007		40.95	9.12	--	31.83	<50	<0.50	<0.50	<0.50	0.53	<0.50	<20	<0.50	<0.50	<0.50	<300	6.79	
MW-8	9/7/2007		40.95	13.56	--	27.39	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/6/2008		40.95	9.80	--	31.15	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	4.14	
MW-8	9/3/2008		40.95	14.20	--	26.75	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/4/2009		40.95	9.51	--	31.44	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	2.62	
MW-8	9/30/2009		40.95	14.92	--	26.03	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	10/28/2009		40.95	13.56	--	27.39	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	6/10/2010		40.95	11.06	--	29.89	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	9/16/2010		40.95	14.41	--	26.54	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<4.0	<0.50	<0.50	<0.50	<100	--	
MW-8	9/28/2011		40.95	13.87	--	27.08	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/8/2012		40.95	13.27	--	27.68	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	9/5/2012		40.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/20/2013		40.95	11.90	--	29.05	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	9/20/2013		40.95	13.88	--	27.07	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	3/13/2014		40.95	14.29	--	26.66	--	--	--	--	--	--	--	--	--	--	--	--	
MW-8	9/25/2014		40.95	15.72	--	25.23	--	--	--	--	--	--	--	--	--	--	--	--	(NSP)
MW-8	3/10/2015		40.95	12.65	--	28.30	--	--	--	--	--	--	--	--	--	--	--	--	(NSP)
MW-8	9/21/2015		40.95	16.85	--	24.10	--	--	--	--	--	--	--	--	--	--	--	--	(NSP)
MW-9	10/3/1991		41.25	14.12	--	27.13	<50	<0.3	0.4	<0.3	<0.3	--	--	--	--	--	--	--	
MW-9	10/15/1991		41.25	14.27	--	26.98	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	12/4/1991		41.25	13.84	--	27.41	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	12/16/1991		41.25	14.18	--	27.07	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	1/6/1992		41.25	13.42	--	27.83	<50	<0.5	<0.5	<0.5	0.9	--	--	--	--	--	--	--	
MW-9	1/22/1992		41.25	13.75	--	27.50	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	1/28/1992		41.25	14.76	--	26.49	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	2/5/1992		41.25	13.38	--	27.87	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	2/12/1992		41.25	11.86	--	29.39	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	2/17/1992		41.25	10.78	--	30.47	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	4/3/1992		41.25	11.63	--	29.62	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	4/8/1992		41.25	12.25	--	29.00	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-9	4/14/1992		41.25	12.32	--	28.93	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	4/29/1992		41.25	13.07	--	28.18	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	5/7/1992		41.25	14.43	--	26.82	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	7/3/1992		41.25	13.85	--	27.40	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-9	10/8/1992		41.25	14.89	--	26.36	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-9	12/31/1992		41.25	11.90	--	29.35	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-9	4/21/1993		41.25	13.68	--	27.57	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	
MW-9	7/7/1993		41.25	13.12	--	28.13	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	
MW-9	9/21/1993		41.25	14.00	--	27.25	<50	<0.5	<0.5	<0.5	0.9	--	--	--	--	--	--	--	
MW-9	12/17/1993		41.25	12.98	--	28.27	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	12/23/1993		--	--	--	--	<50	<0.5	<0.5	<0.5	0.9	<5.0	--	--	--	--	--	--	
MW-9	4/7/1994		41.25	13.24	--	28.01	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	4.7	
MW-9	7/6/1994		41.25	13.77	--	27.48	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	3.9	
MW-9	10/7/1994		41.25	14.60	--	26.65	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	3.0	
MW-9	1/27/1995		41.25	8.47	--	32.78	<50	<0.5	<0.5	<0.5	<1.0	--	--	--	--	--	--	2.5	
MW-9	3/30/1995		41.25	8.19	--	33.06	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	8.4	
MW-9	6/20/1995		41.25	11.25	--	30.00	<50	<0.50	<0.50	<0.50	<1.0	--	--	--	--	--	--	8.1	
MW-9	10/3/1995		41.25	14.68	--	26.57	<50	<0.50	<0.50	<0.50	<1.0	<5.0	--	--	--	--	--	6.0	
MW-9	12/6/1995		41.25	16.07	--	25.18	<50	<0.50	<0.50	<0.50	<1.0	46	--	--	--	--	--	5.4	
MW-9	3/21/1996		41.25	9.60	--	31.65	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	8.0	
MW-9	6/21/1996		41.25	10.86	--	30.39	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	7.8	

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Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	Notes
MW-9	9/6/1996		41.25	11.52	--	29.73	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-9	9/9/1996		--	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	21	--	--	--	--	--	7.3	
MW-9	12/19/1996		41.25	10.43	--	30.82	<50	<0.5	<1.0	<1.0	<1.0	<10	--	--	--	--	--	7.3	
MW-9	3/17/1997		41.25	9.87	--	31.38	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	8/12/1997		41.25	11.44	--	29.81	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	12/10/1997		41.25	10.44	--	30.81	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/12/1998		41.25	9.50	--	31.75	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	6/23/1998		41.25	10.06	--	31.19	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/31/1999		41.25	9.06	--	32.19	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	8/25/1999		41.25	12.00	--	29.25	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/9/2000		41.25	10.57	--	30.68	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/8/2001		41.25	9.73	--	31.52	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/8/2002		41.25	11.89	--	29.36	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/18/2002		41.25	9.68	--	31.57	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/11/2003		41.25	9.21	--	32.04	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/9/2004		41.25	10.99	--	30.26	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<100	--	
MW-9	9/17/2004		41.25	13.35	--	27.90	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/7/2005		41.25	8.94	--	32.31	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<100	--	
MW-9	9/6/2005		44.06	11.99	--	32.07	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/6/2006		44.06	8.26	--	35.80	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<300	--	
MW-9	9/5/2006		44.06	11.63	--	32.43	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/5/2007		44.06	9.33	--	34.73	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<300	2.22	
MW-9	9/7/2007		44.06	12.28	--	31.78	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/6/2008		44.06	10.11	--	33.95	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	3.72	
MW-9	9/3/2008		44.06	13.49	--	30.57	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/4/2009		44.06	8.15	--	35.91	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	4.03	
MW-9	9/30/2009		44.06	12.98	--	31.08	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	10/28/2009		44.06	11.98	--	32.08	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/23/2010		44.06	10.59	--	33.47	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<4.0	<0.50	<0.50	<0.50	<100	--	
MW-9	6/10/2010		44.06	10.25	--	33.81	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	2/23/2011		44.06	9.71	--	34.35	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	9/28/2011		44.06	11.66	--	32.40	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/8/2012		44.06	11.56	--	32.50	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	9/5/2012		44.06	11.18	--	32.88	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/20/2013		44.06	10.00	--	34.06	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	9/20/2013		44.06	10.91	--	33.15	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	3/13/2014		44.06	9.96	--	34.10	--	--	--	--	--	--	--	--	--	--	--	--	
MW-9	9/25/2014		44.06	11.53	--	32.53	--	--	--	--	--	--	--	--	--	--	--	--	(NSP)
MW-9	3/10/2015		44.06	10.27	--	33.79	--	--	--	--	--	--	--	--	--	--	--	--	(NSP)
MW-9	9/21/2015		44.06	13.41	--	30.65	--	--	--	--	--	--	--	--	--	--	--	--	(NSP)
MW-10	6/16/2009		39.78	8.60	0.01	31.19	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	7/22/2009		39.78	9.68	0.01	30.11	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	8/6/2009		39.78	9.48	--	30.30	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	9/30/2009		39.78	9.69	0.01	30.10	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	10/28/2009		39.78	8.53	--	31.25	62,000	8,300	5,300	3,100	12,000	<50	<400	<50	<50	<50	<10,000	--	
MW-10	3/23/2010		39.78	7.70	(SHEEN)	32.08	59,000	6,500	4,800	2,300	9,700	<100	<800	<100	<100	<100	<20,000	--	
MW-10	6/10/2010		39.78	8.93	0.01	30.86	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	9/16/2010		39.78	9.69	0.01	30.10	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	2/23/2011		39.78	7.99	--	31.79	61,000	7,000	5,300	2,800	12,000	<100	<800	<100	<100	<100	<50,000	--	
MW-10	9/28/2011		39.78	10.36	0.31	29.64	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	3/8/2012		39.78	10.51	0.32	29.51	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	9/5/2012		39.78	10.25	0.01	29.54	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	3/20/2013		39.78	9.48	0.01	30.31	--	--	--	--	--	--	--	--	--	--	--	--	

Table 1
 Summary of Groundwater Monitoring Data:
 Relative Water Elevations and Laboratory Analyses
 CA-11109
 4280 Foothill Blvd, Oakland, CA 94601



Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	Notes	
MW-10	9/20/2013		39.78	10.50	--	29.28	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	3/13/2014		39.78	9.81	--	29.97	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	9/25/2014		39.78	11.08	--	28.70	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-10	3/10/2015		39.78	9.60	--	30.18	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-10	9/21/2015		39.78	11.75	--	28.03	--	--	--	--	--	--	--	--	--	--	--	--	--	(m)
MW-11	9/30/2009		40.04	10.55	--	29.49	30,000	850	1,400	1,000	3,700	27	<200	<10	<10	<10	<6,000	--		
MW-11	10/28/2009		40.04	8.00	--	32.04	27,000	1,100	2,300	1,500	5,800	<50	<400	<50	<50	<50	<10,000	--		
MW-11	3/23/2010		40.04	7.25	--	32.79	21,000	530	830	790	2,200	<25	<200	<25	<25	<25	<5,000	--		
MW-11	6/10/2010		40.04	9.65	--	30.39	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-11	9/16/2010		40.04	9.42	--	30.62	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-11	2/23/2011		40.04	7.60	--	32.44	10,000	380	260	330	540	7.2	<40	<5.0	<5.0	<5.0	<2,500	--		
MW-11	9/28/2011		40.04	9.88	--	30.16	5,900	230	92	260	370	6.4	26	<2.5	<2.5	<2.5	<1,300	--		
MW-11	3/8/2012		40.04	9.71	--	30.33	5,000	280	170	250	380	<5.0	<40	<5.0	<5.0	<5.0	<2,500	--		
MW-11	9/5/2012		40.04	10.60	--	29.44	22,000	1,000	1,600	1,200	4,500	6.2	<40	<5.0	<5.0	<5.0	<2,500	--		
MW-11	3/20/2013		40.04	9.54	--	30.50	16,000	250	620	680	2,200	<10	<80	<10	<10	<10	<5,000	--		
MW-11	9/20/2013		40.04	10.55	--	29.49	10,000	120	130	320	720	<10	<200	<10	<10	<10	<5,000	4.29		
MW-11	3/13/2014		40.04	9.71	--	30.33	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-11	9/25/2014		40.04	10.91	--	29.13	1,600	39	14	40	56	0.64	<20	<0.50	<0.50	<0.50	<500	3.05		
MW-11	3/10/2015		40.04	9.49	--	30.55	7,600	130	90	260	520	<0.50	<20	<0.50	<0.50	<0.50	<500	1.40		
MW-11	9/21/2015		40.04	11.87	--	28.17	8,610	155	75.1	161	359	1.96	<5.00	<1.00	<1.00	<1.00	<100	2.23		
MW-12	9/30/2009		40.32	11.02	0.02	29.32	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-12	10/28/2009		40.32	10.40	--	29.92	43,000	5,800	800	2,900	6,800	<50	<400	<50	<50	<50	<10,000	--		
MW-12	3/23/2010		40.32	11.46	(SHEEN)	28.86	39,000	4,800	1,000	3,100	6,400	<25	<200	<25	<25	<25	<5,000	--		
MW-12	6/10/2010		40.32	11.35	--	29.87	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-12	9/16/2010		40.32	11.54	0.02	28.80	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-12	2/23/2011		40.32	10.80	0.10	29.60	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-12	9/28/2011		40.32	11.48	0.20	28.99	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-12	3/8/2012		40.32	11.92	0.32	28.64	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-12	9/5/2012		40.32	11.63	1.43	29.76	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-12	3/20/2013		40.32	10.13	0.04	30.22	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-12	9/20/2013		40.32	10.92	--	29.40	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-12	3/13/2014		40.32	10.60	--	29.72	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-12	9/25/2014		40.32	11.42	--	28.90	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW-12	3/10/2015		40.32	10.45	--	29.87	--	--	--	--	--	--	--	--	--	--	--	--	--	(g)
MW-12	9/21/2015		40.32	12.04	--	28.28	--	--	--	--	--	--	--	--	--	--	--	--	--	(m)

Table 1
Summary of Groundwater Monitoring Data:
Relative Water Elevations and Laboratory Analyses
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	Notes
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Notes:

- /-- = Not analyzed/applicable/measured/available
- < = Not detected at or above specified laboratory reporting limit
- DO = Dissolved oxygen
- DTW = Depth to water in ft bgs
- ft bgs = Feet below ground surface
- GRO = Gasoline range organics, range C4-C12
- GWE = Groundwater elevation in ft
- mg/L = Milligrams per liter
- MTBE = Methyl tert-butyl ether
- ND = Not detected
- NP = Well not purged prior to sampling
- P = Well purged prior to sampling
- TOC = Top of casing elevation in ft
- TPH-g = Total petroleum hydrocarbons as gasoline
- µg/L = Micrograms per liter
- ANA = Anamatrix, Inc.
- PACE = Pace, Inc.
- ATI = Analytical Technologies, Inc.
- CEI = Ceimic Corporation
- SPL = Southern Petroleum Laboratories
- SEQ/SEQM= Sequoia Analytical/Sequoia Analytical - Morgan Hill (Laboratories)
- SUP = Superior Analytical Laboratory
- (a) Free product in well.
- (b) Grab groundwater sample from soil boring.
- (c) Well destroyed during tank removal in November 1990.
- (d) Methylene chloride.
- (e) 1,2-Dichloroethane.
- (f) Well inaccessible.
- (g) Sample collected from MW-2 for TPH-d analysis received in laboratory 7 days after collection; sample exceeded EPA recommended holding time for TPH-d on a water matrix.
- (h) Blind duplicate.
- (i) TOC lowered.
- (j) A copy of the documentation for this data is included in Appendix C of Alisto report 10-014-07-001.
- (k) EPA Methods 8020/8260 used.
- (l) Travel blank.
- (m) Soakease present in well, but no LNAPL. Replaced soakease and no sample collection.
- (n) A copy of the documentation for this data is included in the Blaine Tech Services, Inc. report 020308-DW-2. The data for samples taken on April 21, 1993, have been destroyed. No chromatograms could be located for the samples taken on: July 7, 1993, for well MW-2 and TB; September 21, 1993, for all wells MW-3, MW-4, MW-6, MW-7, MW-8, MW-9, the DUP and TB; December 23, 1993, for wells MW-2 and MW-3; and July 6, 1994, for wells MW-2, MW-4, MW-6, and MW-9.
- (p) Well not sampled due to damage during site construction.
- (q) Sheen in well.
- (r) Well dry.
- (s) The hydrocarbon result for GRO was partly due to individual peaks in the quantification range.
- (t) MS and/or MSD were below the acceptance limits for MTBE. Matrix interference was suspected.
- (u) Possible high bias for benzene due to CCV falling outside acceptance criteria.
- (v) The sample concentration is greater than four times the spike concentration.
- (w) Insufficient water to sample.
- (x) Well surveyed 4/13/2009.
- (y) Quantitation of unknown hydrocarbon(s) in sample based on gasoline.
- (z) Free product not observed during initial gauging activities, but was observed following or during purge.

Table 1
Summary of Groundwater Monitoring Data:
Relative Water Elevations and Laboratory Analyses
CA-11109
4280 Foothill Blvd, Oakland, CA 94601

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	DO (mg/l)	Notes
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GWE adjusted assuming a specific gravity of 0.75 for free product.
 Beginning in the fourth quarter 2003, the laboratory modified the reported analyte list. TPH-g has been changed to GRO. The GRO analysis was completed by EPA method 8260B (C4-C12) for samples collected from the time period April 2006 through
 Note: The data within this table collected prior to April 2006 was provided to Broadbent & Associates, Inc. by Atlantic Richfield
 NSP = Not sampled in accordance to monitoring schedule

Table 2
Historical Groundwater Flow Direction and Gradient
CA-11109
4280 Foothill Blvd., Oakland, CA

Date Measured	Approximate Gradient Direction	Approximate Gradient Magnitude (ft/ft)
3/6/2006	Southwest	0.05
9/5/2006	Southwest	0.05
2/21/2007	Southwest	0.02
9/7/2007	Southwest	0.03
3/6/2008	Southwest	0.01
9/3/2008	Southwest	0.006
3/4/2009	Southwest	0.02
9/30/2009	Northwest	0.07
10/28/2009	Northwest	0.04
3/23/2010	Northwest	0.03
6/10/2010	Northwest	0.02
9/16/2010	Northwest	0.07
2/23/2011	Northwest	0.04
9/28/2011	Northwest	0.02
3/8/2012	Northwest	0.06
9/5/2012	West-Northwest	0.04
3/20/2013	Southwest	0.03
9/20/2013	Southwest	0.03
3/13/2014	Southwest	0.05
9/25/2014	Southwest	0.05
3/10/2015	Southwest	0.05
9/21/2015	Southwest	0.03

Notes:

N/A = Not Available

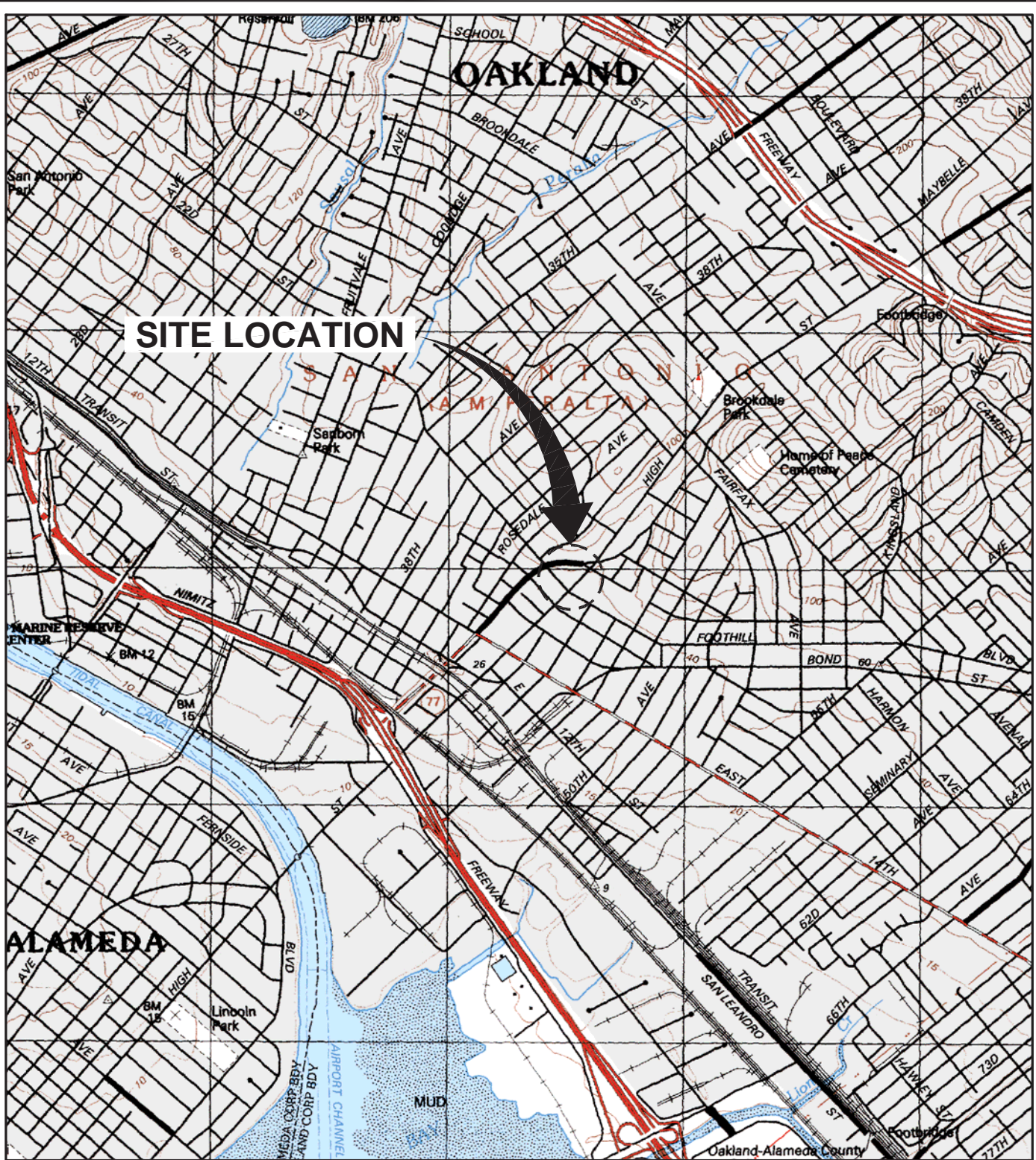
ft/ft = Feet per foot

Note: All data collected following September 2009 was collected by Arcadis U.S., Inc. (Arcadis). The data within this table collected prior to September 2009 was provided to Arcadis by Atlantic Richfield Company and their previous consultants.

FIGURES

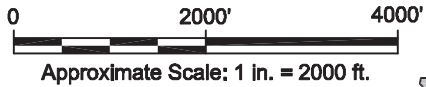


CITY: PATALUMA, CA DIV: GROUP: ENV DB: J. HARRIS LD: PIC: RM: H. PHILLIPS TM: B. MCKENNA LVR: (ON)ONL=OFF=REF
 G:\ENV\CAD\Fataluma\AC\TGP09BPNAC\106\REV000\GPO9BPNAC106-1.dwg LAYOUT: TSAVED: 11/20/2009 8:30 AM ACADVER: 17.15 (LMS TECH)\PAGESETUP: SETUP1PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 11/20/2009 8:40 AM BY: HARRIS, JESSICA
 XREFS: IMAGES: PROJECTNAME: GP09BX01.tif GP09BX03.tif



SITE LOCATION

REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., OAKLAND WEST, CA., 1993, AND SAN LEANDRO, 1993, REVISED 1996.

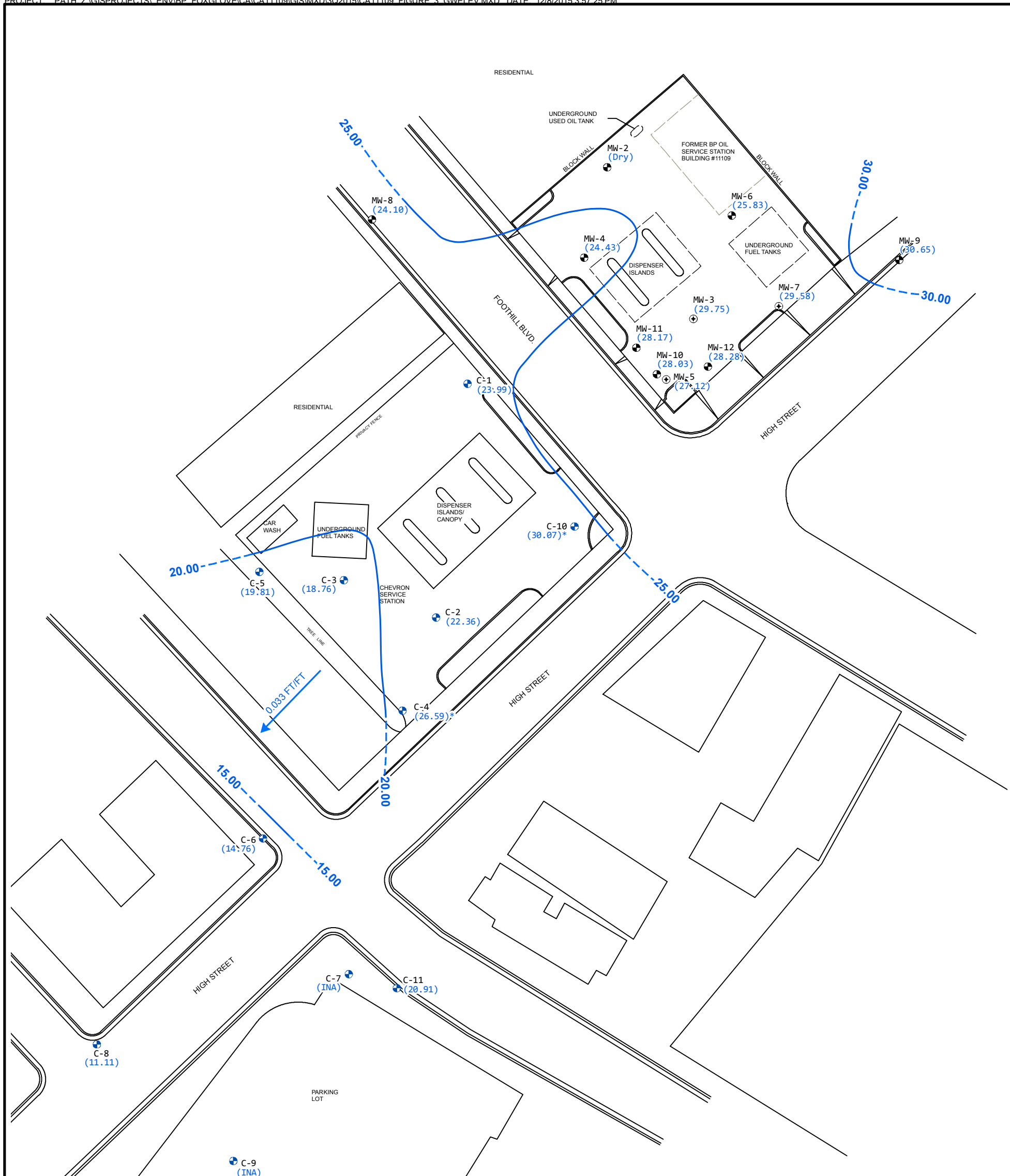


FORMER BP STATION #11109
 4280 FOOTHILL BOULEVARD
 OAKLAND, CALIFORNIA

SITE LOCATION MAP



FIGURE
1



LEGEND:

- GROUNDWATER MONITORING WELL
- ⊕ GROUNDWATER MONITORING WELL-CHEVRON
- ⊕ RECOVERY POINT
- (24.43) GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
- 20.00 — GROUNDWATER ELEVATION CONTOUR LINE (DASHED WHERE INFERRED)
- 0.033 → GROUNDWATER FLOW DIRECTION AND GRADIENT (FOOT PER FOOT)
- * NOT USED FOR CONTOURING
- INA INACCESSIBLE
- (Dry) WELL DRY DURING GROUNDWATER MONITORING EVENT

NOTES:

1. BASE MAP PROVIDED BY BROADBENT & ASSOCIATES, INC. DATED 10/26/2009, REFERENCE 06-88-646, AT A SCALE OF 1"=40'.

FORMER BP STATION #11109
 4280 FOOTHILL BOULEVARD
 OAKLAND, CALIFORNIA

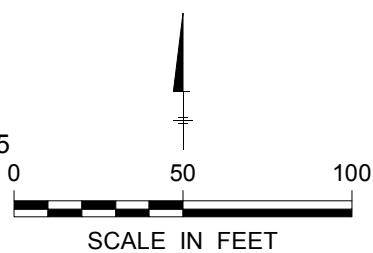
**SECOND QUARTER 2015 AND THIRD QUARTER 2015
 SEMI-ANNUAL GROUNDWATER MONITORING REPORT**

**GROUNDWATER ELEVATION CONTOUR
 MAP - SEPTEMBER 21, 2015**

ARCADIS

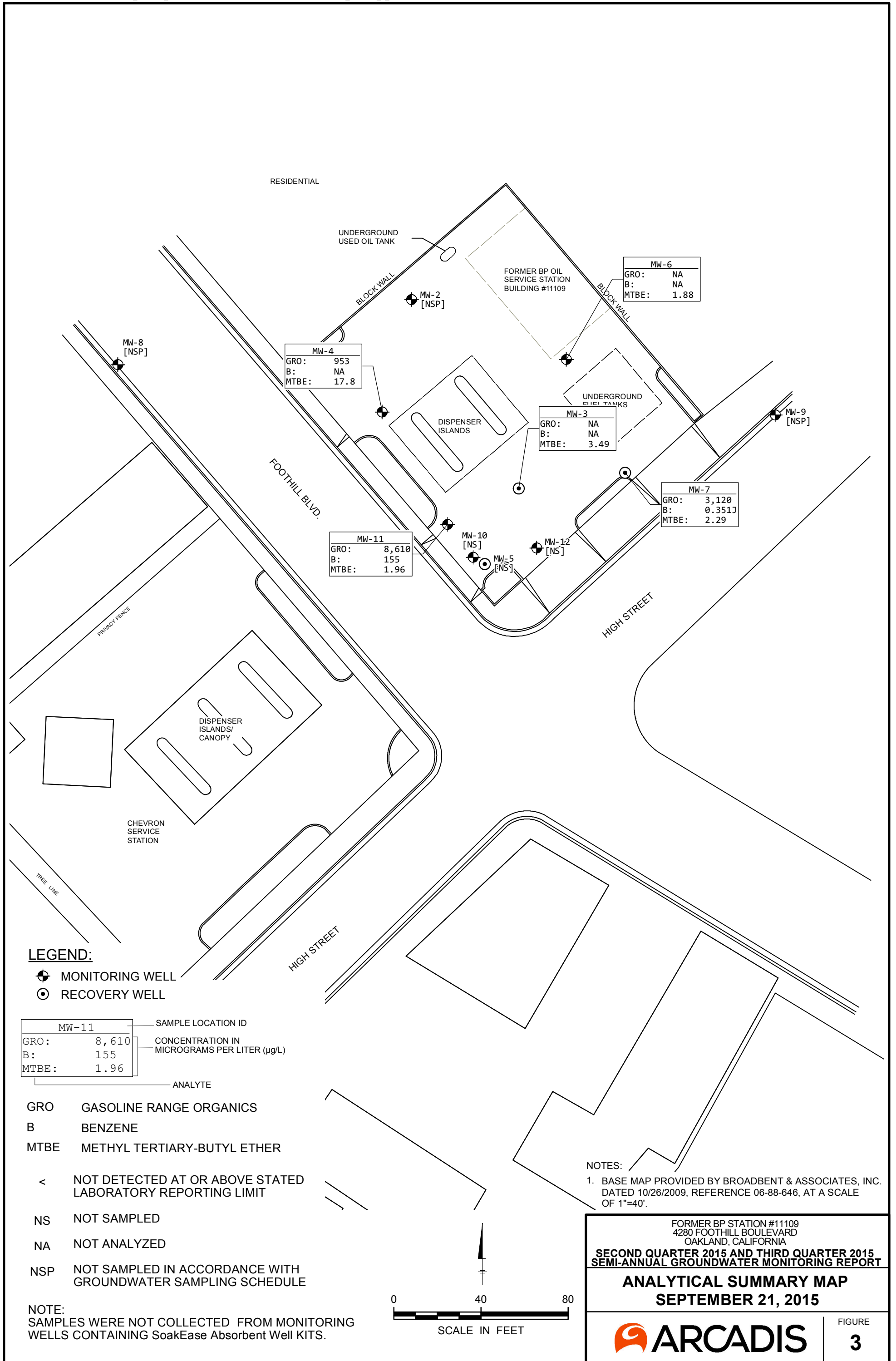
FIGURE

2



NOTES:

1. GROUNDWATER ELEVATIONS AT ADJACENT CHEVRON SITE CALCULATED BASED ON FIELD DEPTH TO WATER DATA MEASURED ON SEPTEMBER 15, 2015 AND PROVIDED BY CHEVRON; TOP OF CASING MEASUREMENTS AVAILABLE ON GEOTRACKER.



RESIDENTIAL

UNDERGROUND USED OIL TANK

FORMER BP OIL SERVICE STATION BUILDING #11109

MW-6	
GRO:	NA
B:	NA
MTBE:	1.88

MW-8 [NSP]

MW-4	
GRO:	953
B:	NA
MTBE:	17.8

MW-2 [NSP]

UNDERGROUND FUEL TANKS

MW-3	
GRO:	NA
B:	NA
MTBE:	3.49

DISPENSER ISLANDS

MW-9 [NSP]

FOOTHILL BLVD.

MW-7	
GRO:	3,120
B:	0.351
MTBE:	2.29

MW-11	
GRO:	8,610
B:	155
MTBE:	1.96

MW-10 [NS]

MW-12 [NS]

MW-5 [NS]

HIGH STREET

PRIVACY FENCE

DISPENSER ISLANDS/CANOPY

CHEVRON SERVICE STATION

TREE LINE

LEGEND:

- MONITORING WELL
- RECOVERY WELL

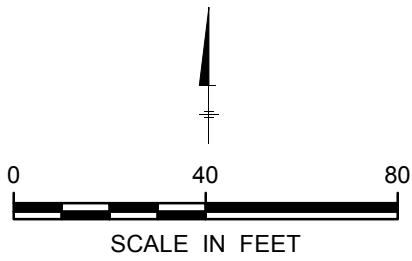
MW-11		SAMPLE LOCATION ID
GRO:	8,610	CONCENTRATION IN MICROGRAMS PER LITER (µg/L)
B:	155	
MTBE:	1.96	
		ANALYTE

- GRO GASOLINE RANGE ORGANICS
- B BENZENE
- MTBE METHYL TERTIARY-BUTYL ETHER

- < NOT DETECTED AT OR ABOVE STATED LABORATORY REPORTING LIMIT
- NS NOT SAMPLED
- NA NOT ANALYZED
- NSP NOT SAMPLED IN ACCORDANCE WITH GROUNDWATER SAMPLING SCHEDULE

NOTE: SAMPLES WERE NOT COLLECTED FROM MONITORING WELLS CONTAINING SoakEase Absorbent Well KITS.

NOTES:
 1. BASE MAP PROVIDED BY BROADBENT & ASSOCIATES, INC. DATED 10/26/2009, REFERENCE 06-88-646, AT A SCALE OF 1"=40'.



FORMER BP STATION #11109
 4280 FOOTHILL BOULEVARD
 OAKLAND, CALIFORNIA

SECOND QUARTER 2015 AND THIRD QUARTER 2015 SEMI-ANNUAL GROUNDWATER MONITORING REPORT

ANALYTICAL SUMMARY MAP
SEPTEMBER 21, 2015

ARCADIS

FIGURE **3**

ATTACHMENT 1

Field Methods



QUALITY ASSURANCE/QUALITY CONTROL FIELD METHODS

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

1.0 Equipment Calibration

Equipment calibration was performed per equipment manufacturer specifications before use.

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

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

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

3.0 Well Purging and Groundwater Sample Collection

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

3.1 Purging a Predetermined Well Volume

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

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

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

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

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

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

3.2 Low-Flow Purging and Sampling

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

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 turbidity¹. The frequency between measurements will be at an interval of one (1) to three (3) minutes; however, if a flow cell is used, the frequency will be determined based on the time required to evacuate one cell volume. Stabilization is defined as three (3) consecutive readings recorded several minutes apart falling within ranges provided in Table 1. Samples will be collected by filling appropriate containers from the pump discharge tubing at a rate not to exceed the established pumping rate.

3.3 Minimal Purge, Discrete Depth, and Passive Sampling

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

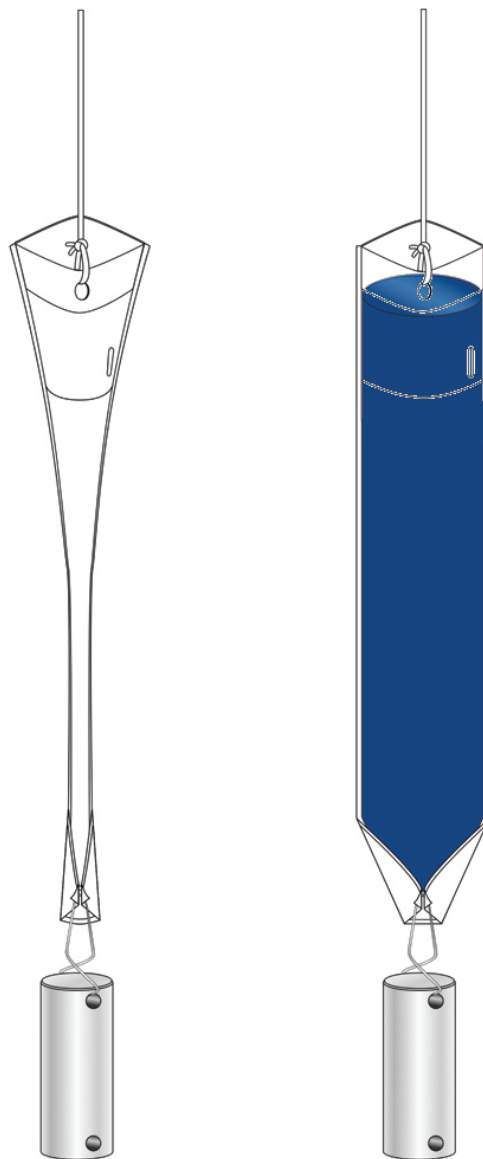
Daily Report and data forms were completed by staff personnel to provide daily record of significant events, observations, and measurements. Field records were signed, dated, and stored in the project file.

HYDRASleeve™

Simple by Design

US Patent No. 6,481,300; No. 6,837,120 others pending

Standard Operating Procedure: Sampling Ground Water with a HydraSleeve



This Guide should be used in addition to field manuals appropriate to sampling device (i.e., HydraSleeve or Super Sleeve).

Find the appropriate field manual on the HydraSleeve website at <http://www.hydrasleeve.com>.

For more information about the HydraSleeve, or if you have questions, contact:
GeoInsight, 2007 Glass Road, Las Cruces, NM 88005, 1-800-996-2225,
info@hydrasleeve.com.

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Introduction

The HydraSleeve is classified as a no-purge (passive) grab sampling device, meaning that it is used to collect ground-water samples directly from the screened interval of a well without having to purge the well prior to sample collection. When it is used as described in this Standard Operating Procedure (SOP), the HydraSleeve causes no drawdown in the well (until the sample is withdrawn from the water column) and only minimal disturbance of the water column, because it has a very thin cross section and it displaces very little water (<100 ml) during deployment in the well. The HydraSleeve collects a sample from within the screen only, and it excludes water from any other part of the water column in the well through the use of a self-sealing check valve at the top of the sampler. It is a single-use (disposable) sampler that is not intended for reuse, so there are no decontamination requirements for the sampler itself.

The use of no-purge sampling as a means of collecting representative ground-water samples depends on the natural movement of ground water (under ambient hydraulic head) from the formation adjacent to the well screen through the screen. Robin and Gillham (1987) demonstrated the existence of a dynamic equilibrium between the water in a formation and the water in a well screen installed in that formation, which results in formation-quality water being available in the well screen for sampling at all times. No-purge sampling devices like the HydraSleeve collect this formation-quality water as the sample, under undisturbed (non-pumping) natural flow conditions. Samples collected in this manner generally provide more conservative (i.e., higher concentration) values than samples collected using well-volume purging, and values equivalent to samples collected using low-flow purging and sampling (Parsons, 2005).

Applications of the HydraSleeve

The HydraSleeve can be used to collect representative samples of ground water for all analytes (volatile organic compounds [VOCs], semi-volatile organic compounds [SVOCs], common metals, trace metals, major cations and anions, dissolved gases, total dissolved solids, radionuclides, pesticides, PCBs, explosive compounds, and all other analytical parameters). Designs are available to collect samples from wells from 1" inside diameter and larger. The HydraSleeve can collect samples from wells of any yield, but it is especially well-suited to collecting samples from low-yield wells, where other sampling methods can't be used reliably because their use results in dewatering of the well screen and alteration of sample chemistry (McAlary and Barker, 1987).

The HydraSleeve can collect samples from wells of any depth, and it can be used for single-event sampling or long-term ground-water monitoring programs. Because of its thin cross section and flexible construction, it can be used in narrow, constricted or damaged wells where rigid sampling devices may not fit. Using multiple HydraSleeves deployed in series along a single suspension line or tether, it is also possible to conduct in-well vertical profiling in wells in which contaminant concentrations are thought to be stratified.

As with all groundwater sampling devices, HydraSleeves should not be used to collect groundwater samples from wells in which separate (non-aqueous) phase hydrocarbons (i.e., gasoline, diesel fuel or jet fuel) are present because of the possibility of incorporating some of the separate-phase hydrocarbon into the sample.

Description of the HydraSleeve

The HydraSleeve (Figure 1) consists of the following basic components:

- A suspension line or tether (A.), attached to the spring clip or directly to the top of the sleeve to deploy the device into and recover the device from the well. Tethers with depth indicators marked in 1-foot intervals are available from the manufacturer.
- A long, flexible, 4-mil thick lay-flat polyethylene sample sleeve (C.) sealed at the bottom (this is the sample chamber), which comes in different sizes, as discussed below with a self-sealing reed-type flexible polyethylene check valve built into the top of the sleeve (B.) to prevent water from entering or exiting the sampler except during sample acquisition.
- A reusable stainless-steel weight with clip (D.), which is attached to the bottom of the sleeve to carry it down the well to its intended depth in the water column. Bottom weights available from the manufacturer are 0.75" OD and are available in three sizes: 5 oz. (2.5" long); 8 oz. (4" long); and 16 oz. (8" long). In lieu of a bottom weight, an optional top weight may be attached to the top of the HydraSleeve to carry it to depth and to compress it at the bottom of the well (not shown in Figure 1);
- A discharge tube that is used to puncture the HydraSleeve after it is recovered from the well so the sample can be decanted into sample bottles (not shown).
- Just above the self-sealing check valve at the top of the sleeve are two holes which provide attachment points for the spring clip and/or suspension line or tether. At the bottom of the sample sleeve are two holes which provide attachment points for the weight clip and weight.

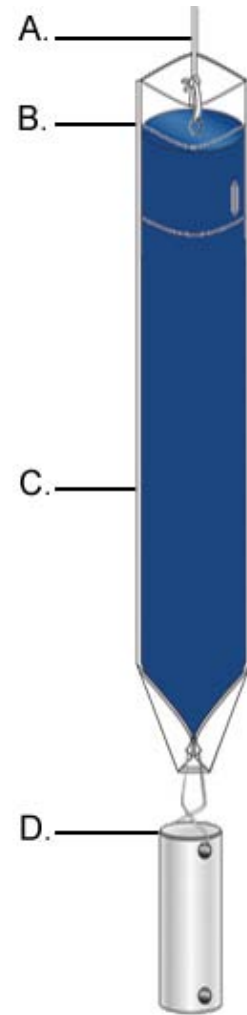


Figure 1. HydraSleeve components.

Note: The sample sleeve and the discharge tube are designed for one-time use and are disposable. The spring clip, weight and weight clip may be reused after thorough cleaning. Suspension cord is generally disposed after one use although, if it is dedicated to the well, it may be reused at the discretion of the sampling personnel.

Selecting the HydraSleeve Size to Meet Site-Specific Sampling Objectives

It is important to understand that each HydraSleeve is able to collect a finite volume of sample because, after the HydraSleeve is deployed, you only get one chance to collect an undisturbed sample. Thus, the volume of sample required to meet your site-specific sampling and analytical requirements will dictate the size of HydraSleeve you need to meet these requirements.

The volume of sample collected by the HydraSleeve varies with the diameter and length of the HydraSleeve. Dimensions and volumes of available HydraSleeve models are detailed in Table 1.

Table 1. Dimensions and volumes of HydraSleeve models.

Diameter	Volume	Length	Lay-Flat Width	Filled Dia.
<i>2-Inch HydraSleeves</i>				
Standard 625-ml HydraSleeve	625 ml	< 30"	2.5"	1.4"
Standard 1-Liter HydraSleeve	1 Liter	38"	3"	1.9"
1-Liter HydraSleeve SS	1 Liter	36"	3"	1.9"
2-Liter HydraSleeve SS	2 Liters	60"	3"	1.9"
<i>4-Inch HydraSleeves</i>				
Standard 1.6-Liter HydraSleeve	1.6 Liters	30"	3.8"	2.3"
Custom 2-Liter HydraSleeve	2 Liters	36"	4"	2.7"

HydraSleeves can be custom-fabricated by the manufacturer in varying diameters and lengths to meet specific volume requirements. HydraSleeves can also be deployed in series (i.e., multiple HydraSleeves attached to one tether) to collect additional sample to meet specific volume requirements, as described below.

If you have questions regarding the availability of sufficient volume of sample to satisfy laboratory requirements for analysis, it is recommended that you contact the laboratory to discuss the minimum volumes needed for each suite of analytes. Laboratories often require only 10% to 25% of the volume they specify to complete analysis for specific suites of analytes, so they can often work with much smaller sample volumes that can easily be supplied by a HydraSleeve.

HydraSleeve Deployment

Information Required Before Deploying a HydraSleeve

Before installing a HydraSleeve in any well, you will need to know the following:

- The inside diameter of the well
- The length of the well screen
- The water level in the well
- The position of the well screen in the well
- The total depth of the well

The inside diameter of the well is used to determine the appropriate HydraSleeve diameter for use in the well. The other information is used to determine the proper placement of the HydraSleeve in the well to collect a representative sample from the screen (see HydraSleeve Placement, below), and to determine the appropriate length of tether to attach to the HydraSleeve to deploy it at the appropriate position in the well.

Most of this information (with the exception of the water level) should be available from the well log; if not, it will have to be collected by some other means. The inside diameter of the well can be measured at the top of the well casing, and the total depth of the well can be measured by sounding the bottom of the well with a weighted tape. The position and length of the well screen may have to be determined using a down-hole camera if a well log is not available. The water level in the well can be measured using any commonly available water-level gauge.

HydraSleeve Placement

The HydraSleeve is designed to collect a sample directly from the well screen, and it fills by pulling it up through the screen a distance equivalent to 1 to 1.5 times its length. This upward motion causes the top check valve to open, which allows the device to fill. To optimize sample recovery, it is recommended that the HydraSleeve be placed in the well so that the bottom weight rests on the bottom of the well and the top of the HydraSleeve is as close to the bottom of the well screen as possible. This should allow the sampler to fill before the top of the device reaches the top of the screen as it is pulled up through the water column, and ensure that only water from the screen is collected as the sample. In short-screen wells, or wells with a short water column, it may be necessary to use a top-weight on the HydraSleeve to compress it in the bottom of the well so that, when it is recovered, it has room to fill before it reaches the top of the screen.

Example

2" ID PVC well, 50' total depth, 10' screen at the bottom of the well, with water level above the screen (the entire screen contains water).

Correct Placement (figure 2): Using a standard HydraSleeve for a 2" well (2.6" flat width/1.5" filled OD x 30" long, 650 ml volume), deploy the sampler so the weight (an 8 oz., 4"-long weight with a 2"-long clip) rests at the bottom of the well. The top of the sleeve is thus set at about 36" above the bottom of the well. When the sampler is recovered, it will be pulled upward approximately 30" to 45" before it is filled; therefore, it is full (and the top check valve closes) at approximately 66" (5 ½ feet) to 81" (6 ¾ feet) above the bottom of the well, which is well before the sampler reaches the top of the screen. In this example, only water from the screen is collected as a sample.

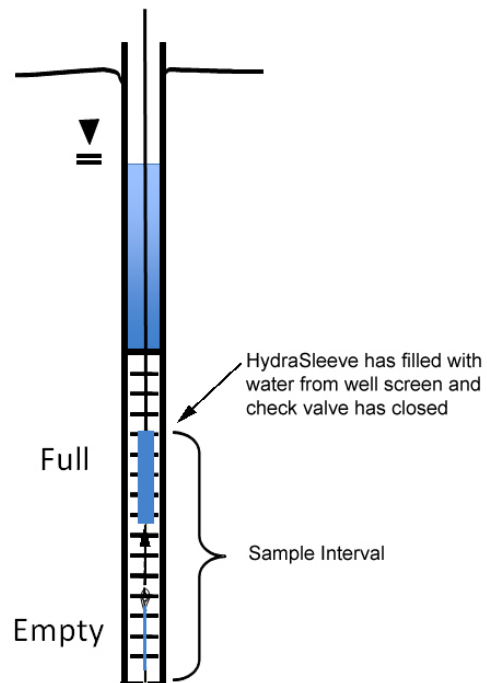


Figure 2. Correct placement of HydraSleeve.

Incorrect Placement (figure 3): If the well screen in this example was only 5' long, and the HydraSleeve was placed as above, it would not fill before the top of the device reached the top of the well screen, so the sample would include water from above the screen, which may not have the same chemistry.

The solution? Deploy the HydraSleeve with a top weight, so that it is collapsed to within 6" to 9" of the bottom of the well. When the HydraSleeve is recovered, it will fill within 39" (3 ¼ feet) to 54" (4 ½ feet) above the bottom of the well, or just before the sampler reaches the top of the screen, so it collects only water from the screen as the sample.

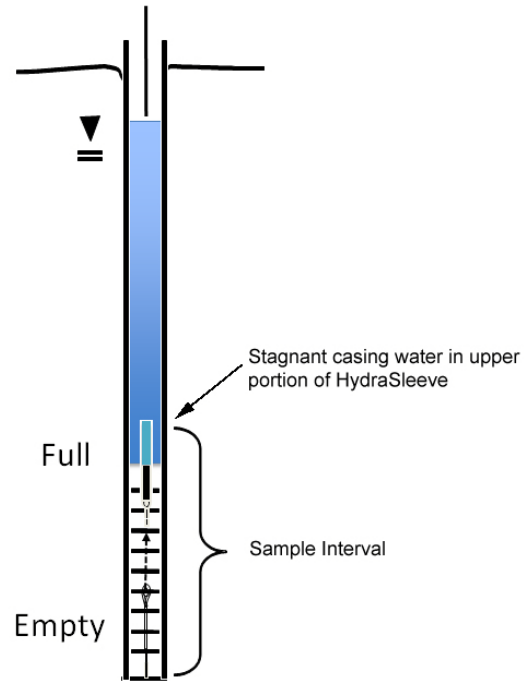


Figure 3. Incorrect placement of HydraSleeve.

This example illustrates one of many types of HydraSleeve placements. More complex placements are discussed in a later section.

Procedures for Sampling with the HydraSleeve

Collecting a ground-water sample with a HydraSleeve is a simple one-person operation.

Note: Before deploying the HydraSleeve in the well, collect the depth-to-water measurement that you will use to determine the preferred position of the HydraSleeve in the well. This measurement may also be used with measurements from other wells to create a ground-water contour map. If necessary, also measure the depth to the bottom of the well to verify actual well depth to confirm your decision on placement of the HydraSleeve in the water column.

Measure the correct amount of tether needed to suspend the HydraSleeve in the well so that the weight will rest on the bottom of the well (or at your preferred position in the well). Make sure to account for the need to leave a few feet of tether at the top of the well to allow recovery of the sleeve

Note: Always wear sterile gloves when handling and discharging the HydraSleeve.

I. Assembling the HydraSleeve

1. Remove the HydraSleeve from its packaging, unfold it, and hold it by its top.
2. Crimp the top of the HydraSleeve by folding the hard polyethylene reinforcing strips at the holes.
3. Attach the spring clip to the holes to ensure that the top will remain open until the sampler is retrieved.
4. Attach the tether to the spring clip by tying a knot in the tether.

Note: Alternatively, attach the tether to one (NOT both) of the holes at the top of the Hydrasleeve by tying a knot in the tether.

5. Fold the flaps with the two holes at the bottom of the HydraSleeve together and slide the weight clip through the holes.
6. Attach a weight to the bottom of the weight clip to ensure that the HydraSleeve will descend to the bottom of the well.

II. Deploying the HydraSleeve

1. Using the tether, carefully lower the HydraSleeve to the bottom of the well, or to your preferred depth in the water column

During installation, hydrostatic pressure in the water column will keep the self-sealing check valve at the top of the HydraSleeve closed, and ensure that it retains its flat, empty profile for an indefinite period prior to recovery.

Note: Make sure that it is not pulled upward at any time during its descent. If the HydraSleeve is pulled upward at a rate greater than 0.5'/second at any time prior to recovery, the top check valve will open and water will enter the HydraSleeve prematurely.

2. Secure the tether at the top of the well by placing the well cap on the top of the well casing and over the tether.

Note: Alternatively, you can tie the tether to a hook on the bottom of the well cap (you will need to leave a few inches of slack in the line to avoid pulling the sampler up as the cap is removed at the next sampling event).

III. Equilibrating the Well

The equilibration time is the time it takes for conditions in the water column (primarily flow dynamics and contaminant distribution) to restabilize after vertical mixing occurs (caused by installation of a sampling device in the well).

- Situation: The HydraSleeve is deployed for the first time or for only one time in a well

The HydraSleeve is very thin in cross section and displaces very little water (<100 ml) during deployment so, unlike most other sampling devices, it does not disturb the water column to the point at which long equilibration times are necessary to ensure recovery of a representative sample.

In most cases, the HydraSleeve can be recovered immediately (with no equilibration time) or within a few hours. In regulatory jurisdictions that impose specific requirements for equilibration times prior to recovery of no-purge sampling devices, these requirements should be followed.

- Situation: The HydraSleeve is being deployed for recovery during a future sampling event

In periodic (i.e., quarterly or semi-annual) sampling programs, the sampler for the current sampling event can be recovered and a new sampler (for the next sampling event)

deployed immediately thereafter, so the new sampler remains in the well until the next sampling event.

Thus, a long equilibration time is ensured and, at the next sampling event, the sampler can be recovered immediately. This means that separate mobilizations, to deploy and then to recover the sampler, are not required. HydraSleeves can be left in a well for an indefinite period of time without concern.

IV. HydraSleeve Recovery and Sample Collection

1. Hold on to the tether while removing the well cap.
2. Secure the tether at the top of the well while maintaining tension on the tether (but without pulling the tether upwards)
3. Measure the water level in the well.
4. In one smooth motion, pull the tether up between 30” to 45” (36” to 54” for the longer HydraSleeve) at a rate of about 1’ per second (or faster).

The motion will open the top check valve and allow the HydraSleeve to fill (it should fill in about 1 to 1.5 times the length of the HydraSleeve). This is analogous to coring the water column in the well from the bottom up.

When the HydraSleeve is full, the top check valve will close. You should begin to feel the weight of the HydraSleeve on the tether and it will begin to displace water. The closed check valve prevents loss of sample and entry of water from zones above the well screen as the HydraSleeve is recovered.

5. Continue pulling the tether upward until the HydraSleeve is at the top of the well.
6. Decant and discard the small volume of water trapped in the Hydrasleeve above the check valve by turning the sleeve over.

V. Sample Collection

Note: Sample collection should be done immediately after the HydraSleeve has been brought to the surface to preserve sample integrity.

1. Remove the discharge tube from its sleeve.
2. Hold the HydraSleeve at the check valve.
3. Puncture the HydraSleeve just below the check valve with the pointed end of the discharge tube
4. Discharge water from the HydraSleeve into your sample containers.

Control the discharge from the HydraSleeve by either raising the bottom of the sleeve, by squeezing it like a tube of toothpaste, or both.

5. Continue filling sample containers until all are full.

Measurement of Field Indicator Parameters

Field indicator parameter measurement is generally done during well purging and sampling to confirm when parameters are stable and sampling can begin. Because no-purge sampling does not require purging, field indicator parameter measurement is not necessary for the purpose of confirming when purging is complete.

If field indicator parameter measurement is required to meet a specific non-purging regulatory requirement, it can be done by taking measurements from water within a HydraSleeve that is not used for collecting a sample to submit for laboratory analysis (i.e., a second HydraSleeve installed in conjunction with the primary sample collection HydraSleeve [see Multiple Sampler Deployment below]).

Alternate Deployment Strategies

Deployment in Wells with Limited Water Columns

For wells in which only a limited water column exists to be sampled, the HydraSleeve can be deployed with an optional top weight instead of a bottom weight, which collapses the HydraSleeve to a very short (approximately 6” to 9”) length, and allows the HydraSleeve to fill in a water column only 36” to 45” in height.

Multiple Sampler Deployment

Multiple sampler deployment in a single well screen can accomplish two purposes:

- It can collect additional sample volume to satisfy site or laboratory-specific sample volume requirements.
- It can accommodate the need for collecting field indicator parameter measurements.
- It can be used to collect samples from multiple intervals in the screen to allow identification of possible contaminant stratification.

It is possible to use up to 3 standard 30” HydraSleeves deployed in series along a single tether to collect samples from a 10’ long well screen without collecting water from the interval above the screen.

The samplers must be attached to the tether at both the top and bottom of the sleeve. Attach the tether at the top with a stainless-steel clip (available from the manufacturer). Attach the tether at the bottom using a cable tie. The samplers must be attached as follows (figure 4):

- The first (attached to the tether as described above, with the weight at the bottom) at the bottom of the screen
- The second attached immediately above the first
- The third (attached the same as the second) immediately above the second

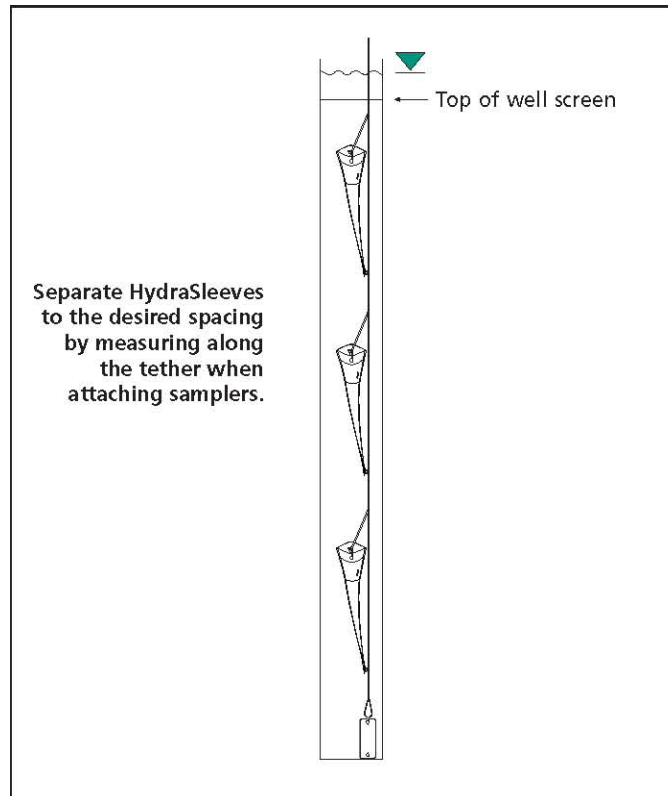


Figure 4. Multiple HydraSleeve deployment.

Alternately, the first sampler can be attached to the tether as described above, a second attached to the bottom of the first using a short length of tether (in place of the weight), and the third attached to the bottom of the second in the same manner, with the weight attached to the bottom of the third sampler (figure 5).

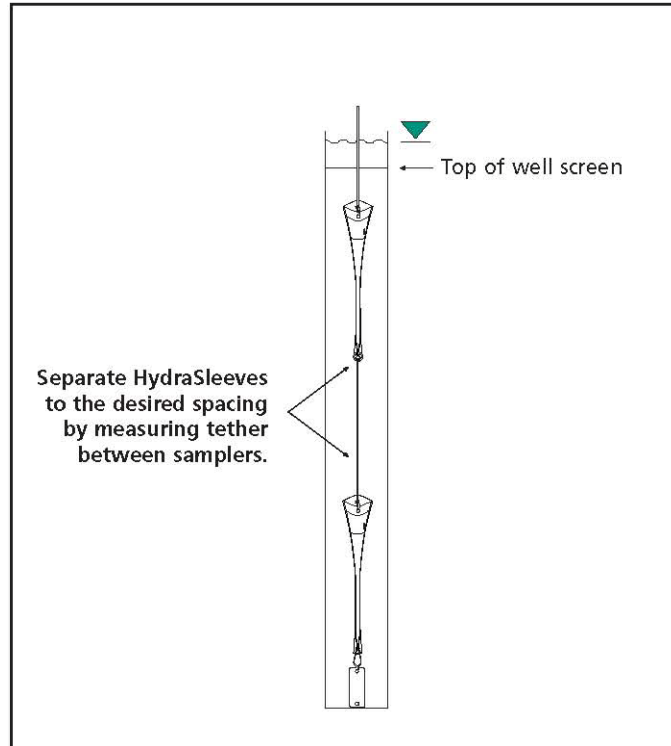


Figure 5. Alternative method for deploying multiple HydraSleeves.

In either case, when attaching multiple HydraSleeves in series, more weight may be required to hold the samplers in place in the well than would be required with a single sampler. Recovery of multiple samplers and collection of samples is done in the same manner as for single sampler deployments.

Post-Sampling Activities

The recovered HydraSleeve and the sample discharge tubing should be disposed as per the solid waste management plan for the site. To prepare for the next sampling event, a new HydraSleeve can be deployed in the well (as described previously) and left in the well until the next sampling event, at which time it can be recovered.

The weight and weight clip can be reused on this sampler after they have been thoroughly cleaned as per the site equipment decontamination plan. The tether may be dedicated to the well and reused or discarded at the discretion of sampling personnel.

References

McAlary, T. A. and J. F. Barker, 1987, Volatilization Losses of Organics During Ground-Water Sampling From Low-Permeability Materials, Ground-Water Monitoring Review, Vol. 7, No. 4, pp. 63-68

Parsons, 2005, Results Report for the Demonstration of No-Purge Ground-Water Sampling Devices at Former McClellan Air Force Base, California; Contract F44650-99-D-0005, Delivery Order DKO1, U.S. Army Corps of Engineers (Omaha District), U.S. Air Force Center for Environmental Excellence, and U.S. Air Force Real Property Agency

Robin, M. J. L. and R. W. Gillham, 1987, Field Evaluation of Well Purging Procedures, Ground-Water Monitoring Review, Vol. 7, No. 4, pp. 85-93

ATTACHMENT 2

Field Data Sheets



MW-11

Date	<u>09/21/2015</u>	Well Head Integrity	<u>Okay</u>	Pump Inlet Depth (ft)	<u> </u>
Project_Number	<u>09-88-646</u>	Well Head	<u> </u>	Well Diameter (in)	<u>4</u>
Location	<u>4280 Foothill, Oakland, CA</u>	Comments	<u> </u>	Initial DTW (ft)	<u> </u>
Weather Conditions	<u>Sunny</u>			Well Depth (ft)	<u> </u>
Waste Container	<u>Tank</u>				
Waste Location	<u>Off site</u>				
Sampler	<u>Alex Martinez</u>				

Field Parameters

Time	Purge Volume (L)	DTW (ft)	DO (mg/L)	Temp (C)	pH	Conductivity (uS/cm)	ORP (mV)	Turbidity (NTU)	Remarks
12:08	-		2.23	27.35	7.00	767	-117	0.0	1 liter purged via Hydrasleeve

Sampling Summary

Sample ID	<u>mw-11</u>	Purge Rate (LPM)	<u>-</u>
Sample Date	<u>09/21/2015</u>	VOA Preserved #	<u>5</u>
Sample Time	<u>12:10</u>	VOA Un-preserved #	<u> </u>
DTW at Sampling (ft)	<u>-</u>	Liter Amber #	<u> </u>
Sampled using	<u> </u>	Plastic Bottles #	<u> </u>
		Other	<u> </u>
		Remarks	<u> </u>

MW-3

Date	<u>09/21/2015</u>	Well Head Integrity	<u>Okay</u>	Pump Inlet Depth (ft)	<u> </u>
Project_Number	<u>09-88-646</u>	Well Head	<u> </u>	Well Diameter (in)	<u>4</u>
Location	<u>4280 Foothill, Oakland, CA</u>	Comments	<u> </u>	Initial DTW (ft)	<u> </u>
Weather Conditions	<u>Sunny</u>			Well Depth (ft)	<u> </u>
Waste Container	<u>Tank</u>				
Waste Location	<u>Off site</u>				
Sampler	<u>Alex Martinez</u>				

Field Parameters

Time	Purge Volume (L)	DTW (ft)	DO (mg/L)	Temp (C)	pH	Conductivity (uS/cm)	ORP (mV)	Turbidity (NTU)	Remarks
11:25	-		1.75	27.92	6.95	2920	192	21.2	1 liter purged via Hydrasleeve

Sampling Summary

Sample ID	<u>mw-3</u>	Purge Rate (LPM)	<u>-</u>
Sample Date	<u>09/21/2015</u>	VOA Preserved #	<u>3</u>
Sample Time	<u>11:20</u>	VOA Un-preserved #	<u> </u>
DTW at Sampling (ft)	<u>-</u>	Liter Amber #	<u> </u>
Sampled using	<u> </u>	Plastic Bottles #	<u> </u>
		Other	<u> </u>
		Remarks	<u> </u>

MW-4

Date	<u>09/21/2015</u>	Well Head Integrity	<u>Okay</u>	Pump Inlet Depth (ft)	<u> </u>
Project_Number	<u>09-88-646</u>	Well Head	<u> </u>	Well Diameter (in)	<u>4</u>
Location	<u>4280 Foothill, Oakland, CA</u>	Comments	<u> </u>	Initial DTW (ft)	<u> </u>
Weather Conditions	<u>Sunny</u>			Well Depth (ft)	<u> </u>
Waste Container	<u>Tank</u>				
Waste Location	<u>Off site</u>				
Sampler	<u>Alex Martinez</u>				

Field Parameters

Time	Purge Volume (L)	DTW (ft)	DO (mg/L)	Temp (C)	pH	Conductivity (uS/cm)	ORP (mV)	Turbidity (NTU)	Remarks
11:35			1.89	26.40	6.76	603	-214	0.0	1 liter purged and sampled via Hydrasleeve.

Sampling Summary

Sample ID	<u>mw-4</u>	Purge Rate (LPM)	<u>-</u>
Sample Date	<u>09/21/2015</u>	VOA Preserved #	<u>5</u>
Sample Time	<u>11:40</u>	VOA Un-preserved #	<u> </u>
DTW at Sampling (ft)	<u>-</u>	Liter Amber #	<u> </u>
Sampled using	<u> </u>	Plastic Bottles #	<u> </u>
		Other	<u> </u>
		Remarks	<u> </u>

MW-6

Date	<u>09/21/2015</u>	Well Head Integrity	<u>Okay</u>	Pump Inlet Depth (ft)	<u> </u>
Project_Number	<u>09-88-646</u>	Well Head	<u> </u>	Well Diameter (in)	<u>4</u>
Location	<u>4280 Foothill, Oakland, CA</u>	Comments	<u> </u>	Initial DTW (ft)	<u> </u>
Weather Conditions	<u>Sunny</u>			Well Depth (ft)	<u> </u>
Waste Container	<u>Tank</u>				
Waste Location	<u>Off site</u>				
Sampler	<u>Alex Martinez</u>				

Field Parameters

Time	Purge Volume (L)	DTW (ft)	DO (mg/L)	Temp (C)	pH	Conductivity (uS/cm)	ORP (mV)	Turbidity (NTU)	Remarks
10:47	-		2.29	25.91	6.91	2750	169	12.6	1 liter purge via Hydrasleeve

Sampling Summary

Sample ID	<u>mw-6</u>	Purge Rate (LPM)	<u> </u>
Sample Date	<u>09/21/2015</u>	VOA Preserved #	<u>3</u>
Sample Time	<u>11:00</u>	VOA Un-preserved #	<u> </u>
DTW at Sampling (ft)	<u> </u>	Liter Amber #	<u> </u>
Sampled using	<u> </u>	Plastic Bottles #	<u> </u>
		Other	<u> </u>
		Remarks	<u> </u>

MW-7

Date	<u>09/21/2015</u>	Well Head Integrity	<u>Okay</u>	Pump Inlet Depth (ft)	<u> </u>
Project_Number	<u>09-88-646</u>	Well Head	<u> </u>	Well Diameter (in)	<u> </u>
Location	<u>4280 Foothill, Oakland, CA</u>	Comments	<u> </u>	Initial DTW (ft)	<u> </u>
Weather Conditions	<u>Sunny</u>			Well Depth (ft)	<u> </u>
Waste Container	<u>Tank</u>				
Waste Location	<u>Off site</u>				
Sampler	<u>Alex Martinez</u>				

Field Parameters

Time	Purge Volume (L)	DTW (ft)	DO (mg/L)	Temp (C)	pH	Conductivity (uS/cm)	ORP (mV)	Turbidity (NTU)	Remarks
11:51			2.26	26.36	7.00	557	-101	0.0	1 liter purged and sampled via Hydrasleeve.

Sampling Summary

Sample ID	<u>mw-7</u>	Purge Rate (LPM)	<u>-</u>
Sample Date	<u>09/21/2015</u>	VOA Preserved #	<u> </u>
Sample Time	<u>12:00</u>	VOA Un-preserved #	<u> </u>
DTW at Sampling (ft)	<u>-</u>	Liter Amber #	<u> </u>
Sampled using	<u> </u>	Plastic Bottles #	<u> </u>
		Other	<u> </u>
		Remarks	<u> </u>

Gauging Data

Date	09/21/2015
Project_Number	09-88-646
Location	4280 Foothill, Oakland, CA
Sampler	Alex Martinez

Well	Date/Time	Well Depth (ft)	Depth To Water (ft)	Depth to LNAPL (ft)	Remarks
MW-10	09/21/2015 10:08		11.75		Strong hydrocarbon odor. Soakease present in well, but no LNAPL. Replaced soakease and no sample collection.
MW-11	09/21/2015 09:59	30.32	11.87		Moderate hydrocarbon odor
MW-12	09/21/2015 10:14		12.04		Strong hydrocarbon odor and soakease present. No LNAPL present. Replaced soakease and no sample collection,
MW-2	09/21/2015 09:32	13.26	-		Well dry
MW-3	09/21/2015 09:53	31.42	13.17		
MW-4	09/21/2015 09:56	26.80	18.45		
MW-5	09/21/2015 10:12		12.02		Very strong hydrocarbon odor. Soakease present and no LNAPL. Replaced soakease and no sample collection.
MW-6	09/21/2015 09:50	34.52	18.54		
MW-7	09/21/2015 09:46	33.39	13.52		
MW-8	09/21/2015 09:44	29.99	16.85		
MW-9	09/21/2015 09:40	29.49	13.41		

ATTACHMENT 3

Laboratory Report and Chain-of-Custody Documentation



October 01, 2015

ARCADIS US - San Francisco, CA

Sample Delivery Group: L789945
Samples Received: 09/22/2015
Project Number: GP09BPNA.C106
Description: CA-11109 - GP09BPNA.C106
Site: 11109
Report To: Hollis Phillips
100 Montgomery Street
Suite 300
San Francisco, CA 94104

Entire Report Reviewed By:



Jarred Willis
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



¹Cp: Cover Page	1
²Tc: Table of Contents	2
³Ss: Sample Summary	3
⁴Cn: Case Narrative	4
⁵Sr: Sample Results	5
MW-7 L789945-01	5
MW-11 L789945-02	6
MW-4 L789945-03	7
MW-3 L789945-04	8
MW-6 L789945-05	9
⁶Qc: Quality Control Summary	10
Volatile Organic Compounds (GC) by Method 8015B	10
Volatile Organic Compounds (GC/MS) by Method 8260B	12
⁷Gl: Glossary of Terms	19
⁸Al: Accreditations & Locations	20
⁹Sc: Chain of Custody	21



SAMPLE SUMMARY



MW-7 L789945-01 GW

Collected by
Alex Martinez Collected date/time
09/21/15 12:00 Received date/time
09/22/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Volatile Organic Compounds (GC) by Method 8015B	WG817156	1	09/24/15 11:21	09/24/15 11:21	MCB
Volatile Organic Compounds (GC/MS) by Method 8260B	WG817862	1	09/27/15 10:01	09/27/15 10:01	KLO
Volatile Organic Compounds (GC/MS) by Method 8260B	WG818546	1	09/30/15 09:55	09/30/15 09:55	KLO

1
Cp

2
Tc

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4
Cn

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Sr

6
Qc

7
Gl

8
Al

9
Sc

MW-11 L789945-02 GW

Collected by
Alex Martinez Collected date/time
09/21/15 12:10 Received date/time
09/22/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Volatile Organic Compounds (GC) by Method 8015B	WG817156	1	09/24/15 11:44	09/24/15 11:44	MCB
Volatile Organic Compounds (GC/MS) by Method 8260B	WG818023	1	09/29/15 17:09	09/29/15 17:09	KLO

MW-4 L789945-03 GW

Collected by
Alex Martinez Collected date/time
09/21/15 11:40 Received date/time
09/22/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Volatile Organic Compounds (GC) by Method 8015B	WG818472	1	10/01/15 12:29	10/01/15 12:29	MCB
Volatile Organic Compounds (GC/MS) by Method 8260B	WG818007	1	09/28/15 04:58	09/28/15 04:58	KLO

MW-3 L789945-04 GW

Collected by
Alex Martinez Collected date/time
09/21/15 11:20 Received date/time
09/22/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Volatile Organic Compounds (GC/MS) by Method 8260B	WG818007	1	09/28/15 05:15	09/28/15 05:15	KLO

MW-6 L789945-05 GW

Collected by
Alex Martinez Collected date/time
09/21/15 11:00 Received date/time
09/22/15 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analysis Analyst
Volatile Organic Compounds (GC/MS) by Method 8260B	WG818021	1	09/27/15 18:06	09/27/15 18:06	MCB



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Jarred Willis
Technical Service Representative

- ¹ Cp
- ² Tc
- ³ Ss
- ⁴ Cn
- ⁵ Sr
- ⁶ Qc
- ⁷ Gl
- ⁸ Al
- ⁹ Sc



Volatile Organic Compounds (GC) by Method 8015B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
TPHG C6 - C12	3120		31.6	100	1	09/24/2015 11:21	WG817156
(S) a,a,a-Trifluorotoluene(FID)	94.3			62.0-128		09/24/2015 11:21	WG817156

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Benzene	0.351	J	0.331	1.00	1	09/30/2015 09:55	WG818546
Ethylbenzene	U		0.384	1.00	1	09/27/2015 10:01	WG817862
Toluene	U		0.780	5.00	1	09/27/2015 10:01	WG817862
Xylenes, Total	U		1.06	3.00	1	09/27/2015 10:01	WG817862
1,2-Dibromoethane	U		0.381	1.00	1	09/27/2015 10:01	WG817862
1,2-Dichloroethane	U		0.361	1.00	1	09/27/2015 10:01	WG817862
Di-isopropyl ether	U		0.320	1.00	1	09/27/2015 10:01	WG817862
Ethanol	U		42.0	100	1	09/27/2015 10:01	WG817862
Ethyl tert-butyl ether	U		0.270	1.00	1	09/27/2015 10:01	WG817862
Methyl tert-butyl ether	2.29		0.367	1.00	1	09/27/2015 10:01	WG817862
tert-Butyl alcohol	8.53		2.40	5.00	1	09/30/2015 09:55	WG818546
tert-Amyl Methyl Ether	U		0.260	1.00	1	09/27/2015 10:01	WG817862
(S) Toluene-d8	105			90.0-115		09/27/2015 10:01	WG817862
(S) Dibromofluoromethane	101			79.0-121		09/27/2015 10:01	WG817862
(S) 4-Bromofluorobenzene	95.9			80.1-120		09/27/2015 10:01	WG817862

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (GC) by Method 8015B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
TPHG C6 - C12	8610		31.6	100	1	09/24/2015 11:44	WG817156
(S) a,a,a-Trifluorotoluene(FID) 117				62.0-128		09/24/2015 11:44	WG817156

1 Cp

2 Tc

3 Ss

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Benzene	155		0.331	1.00	1	09/29/2015 17:09	WG818023
Ethylbenzene	161		0.384	1.00	1	09/29/2015 17:09	WG818023
Toluene	75.1		0.780	5.00	1	09/29/2015 17:09	WG818023
Xylenes, Total	359		1.06	3.00	1	09/29/2015 17:09	WG818023
1,2-Dibromoethane	U		0.381	1.00	1	09/29/2015 17:09	WG818023
1,2-Dichloroethane	U		0.361	1.00	1	09/29/2015 17:09	WG818023
Di-isopropyl ether	U		0.320	1.00	1	09/29/2015 17:09	WG818023
Ethanol	U		42.0	100	1	09/29/2015 17:09	WG818023
Ethyl tert-butyl ether	U		0.270	1.00	1	09/29/2015 17:09	WG818023
Methyl tert-butyl ether	1.96		0.367	1.00	1	09/29/2015 17:09	WG818023
tert-Butyl alcohol	U		2.40	5.00	1	09/29/2015 17:09	WG818023
tert-Amyl Methyl Ether	U		0.260	1.00	1	09/29/2015 17:09	WG818023
(S) Toluene-d8	109			90.0-115		09/29/2015 17:09	WG818023
(S) Dibromofluoromethane	101			79.0-121		09/29/2015 17:09	WG818023
(S) 4-Bromofluorobenzene	92.6			80.1-120		09/29/2015 17:09	WG818023

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (GC) by Method 8015B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
TPHG C6 - C12	953		31.6	100	1	10/01/2015 12:29	WG818472
(S) a,a,a-Trifluorotoluene(FID)	98.6			62.0-128		10/01/2015 12:29	WG818472

1 Cp

2 Tc

3 Ss

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Methyl tert-butyl ether	17.8		0.367	1.00	1	09/28/2015 04:58	WG818007
(S) Toluene-d8	103			90.0-115		09/28/2015 04:58	WG818007
(S) Dibromofluoromethane	98.0			79.0-121		09/28/2015 04:58	WG818007
(S) 4-Bromofluorobenzene	93.1			80.1-120		09/28/2015 04:58	WG818007

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Methyl tert-butyl ether	3.49		0.367	1.00	1	09/28/2015 05:15	WG818007
(S) Toluene-d8	102			90.0-115		09/28/2015 05:15	WG818007
(S) Dibromofluoromethane	96.0			79.0-121		09/28/2015 05:15	WG818007
(S) 4-Bromofluorobenzene	97.5			80.1-120		09/28/2015 05:15	WG818007

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Methyl tert-butyl ether	1.88		0.367	1.00	1	09/27/2015 18:06	WG818021
(S) Toluene-d8	101			90.0-115		09/27/2015 18:06	WG818021
(S) Dibromofluoromethane	104			79.0-121		09/27/2015 18:06	WG818021
(S) 4-Bromofluorobenzene	91.7			80.1-120		09/27/2015 18:06	WG818021

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) 09/24/15 08:24

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
TPHG C6 - C12	U		0.0316	0.100
<i>(S) a,a,a-Trifluorotoluene(FID)</i>	101			62.0-128

1 Cp

2 Tc

3 Ss

4 Cn

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) 09/24/15 07:15 • (LCSD) 09/24/15 07:38

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
TPHG C6 - C12	5.50	5.66	5.29	103	96.2	66.0-123			6.77	20
<i>(S) a,a,a-Trifluorotoluene(FID)</i>				96.9	97.1	62.0-128				

5 Sr

6 Qc

L790122-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 09/29/15 23:21 • (MS) 09/29/15 18:06 • (MSD) 09/29/15 18:28

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
TPHG C6 - C12	5.50	59.1	276	303	79.0	88.6	50	47.5-136			9.16	20
<i>(S) a,a,a-Trifluorotoluene(FID)</i>					97.6	99.9		62.0-128				

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) 10/01/15 07:32

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
TPHG C6 - C12	U		0.0316	0.100
<i>(S) a,a,a-Trifluorotoluene(FID)</i>	99.7			62.0-128

1 Cp

2 Tc

3 Ss

4 Cn

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) 10/01/15 06:18 • (LCSD) 10/01/15 06:42

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
TPHG C6 - C12	5.50	4.85	4.82	88.1	87.7	66.0-123			0.450	20
<i>(S) a,a,a-Trifluorotoluene(FID)</i>				107	107	62.0-128				

5 Sr

6 Qc

L791329-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 10/01/15 09:36 • (MS) 10/01/15 08:21 • (MSD) 10/01/15 08:46

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
TPHG C6 - C12	5.50	2.60	6.02	6.32	62.2	67.7	1	47.5-136			4.90	20
<i>(S) a,a,a-Trifluorotoluene(FID)</i>					128	131		62.0-128		J1		

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) 09/27/15 05:20

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
1,2-Dibromoethane	U		0.000381	0.00100
1,2-Dichloroethane	U		0.000361	0.00100
Ethylbenzene	U		0.000384	0.00100
Di-isopropyl ether	U		0.000320	0.00100
Ethanol	U		0.0420	0.100
Methyl tert-butyl ether	U		0.000367	0.00100
Toluene	U		0.000780	0.00500
Xylenes, Total	U		0.00106	0.00300
tert-Amyl Methyl Ether	U		0.000260	0.00100
Ethyl tert-butyl ether	U		0.000270	0.00100
(S) Toluene-d8	104			90.0-115
(S) Dibromofluoromethane	102			79.0-121
(S) 4-Bromofluorobenzene	102			80.1-120

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) 09/27/15 03:44 • (LCSD) 09/27/15 04:03

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
1,2-Dibromoethane	0.0250	0.0258	0.0265	103	106	79.8-122			2.79	20
1,2-Dichloroethane	0.0250	0.0282	0.0282	113	113	65.3-126			0.0400	20
Ethylbenzene	0.0250	0.0240	0.0244	96.1	97.5	80.9-121			1.43	20
Di-isopropyl ether	0.0250	0.0277	0.0278	111	111	65.1-135			0.240	20
Methyl tert-butyl ether	0.0250	0.0272	0.0271	109	108	70.1-125			0.220	20
Toluene	0.0250	0.0240	0.0247	96.0	98.7	77.9-116			2.76	20
Xylenes, Total	0.0750	0.0709	0.0728	94.5	97.1	79.2-122			2.71	20
(S) Toluene-d8				104	105	90.0-115				
(S) Dibromofluoromethane				103	103	79.0-121				
(S) 4-Bromofluorobenzene				102	102	80.1-120				

L790226-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 09/27/15 09:03 • (MS) 09/27/15 07:27 • (MSD) 09/27/15 07:46

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
1,2-Dibromoethane	0.0250	ND	0.0263	0.0273	105	109	1	73.8-131			3.75	20



L790226-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 09/27/15 09:03 • (MS) 09/27/15 07:27 • (MSD) 09/27/15 07:46

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
1,2-Dichloroethane	0.0250	ND	0.0281	0.0283	113	113	1	60.7-132			0.600	20
Ethylbenzene	0.0250	ND	0.0248	0.0255	99.1	102	1	62.7-136			2.81	20
Di-isopropyl ether	0.0250	ND	0.0277	0.0280	111	112	1	59.9-140			1.10	20
Methyl tert-butyl ether	0.0250	ND	0.0274	0.0272	110	109	1	61.4-136			1.01	20
Toluene	0.0250	ND	0.0244	0.0251	97.5	100	1	67.8-124			3.03	20
Xylenes, Total	0.0750	ND	0.0724	0.0744	96.6	99.2	1	65.6-133			2.66	20
<i>(S) Toluene-d8</i>					105	107		90.0-115				
<i>(S) Dibromofluoromethane</i>					104	104		79.0-121				
<i>(S) 4-Bromofluorobenzene</i>					102	102		80.1-120				

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



Method Blank (MB)

(MB) 09/27/15 23:11

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Methyl tert-butyl ether	U		0.000367	0.00100
(S) Toluene-d8	101			90.0-115
(S) Dibromofluoromethane	95.8			79.0-121
(S) 4-Bromofluorobenzene	98.7			80.1-120

1 Cp

2 Tc

3 Ss

4 Cn

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) 09/27/15 22:02 • (LCSD) 09/27/15 22:19

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Methyl tert-butyl ether	0.0250	0.0221	0.0207	88.6	83.0	70.1-125			6.52	20
(S) Toluene-d8				101	103	90.0-115				
(S) Dibromofluoromethane				96.0	95.7	79.0-121				
(S) 4-Bromofluorobenzene				96.7	94.2	80.1-120				

5 Sr

6 Qc

7 Gl

8 Al

L789915-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 09/28/15 00:38 • (MS) 09/27/15 23:28 • (MSD) 09/27/15 23:46

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Methyl tert-butyl ether	0.0250	0.0116	0.0351	0.0342	93.9	90.4	1	61.4-136			2.54	20
(S) Toluene-d8					102	102		90.0-115				
(S) Dibromofluoromethane					99.3	97.5		79.0-121				
(S) 4-Bromofluorobenzene					95.6	94.1		80.1-120				

9 Sc



Method Blank (MB)

(MB) 09/27/15 16:23

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Methyl tert-butyl ether	U		0.000367	0.00100
(S) Toluene-d8	101			90.0-115
(S) Dibromofluoromethane	102			79.0-121
(S) 4-Bromofluorobenzene	92.2			80.1-120

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) 09/27/15 15:03 • (LCSD) 09/27/15 15:23

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Methyl tert-butyl ether	0.0250	0.0270	0.0260	108	104	70.1-125			3.82	20
(S) Toluene-d8				102	102	90.0-115				
(S) Dibromofluoromethane				103	101	79.0-121				
(S) 4-Bromofluorobenzene				93.3	90.7	80.1-120				

L789945-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 09/27/15 18:06 • (MS) 09/27/15 17:06 • (MSD) 09/27/15 17:26

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Methyl tert-butyl ether	0.0250	0.00188	0.0282	0.0277	105	103	1	61.4-136			1.80	20
(S) Toluene-d8					102	101		90.0-115				
(S) Dibromofluoromethane					102	99.7		79.0-121				
(S) 4-Bromofluorobenzene					92.3	95.9		80.1-120				



Method Blank (MB)

(MB) 09/29/15 13:23

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
Benzene	U		0.000331	0.00100
1,2-Dibromoethane	U		0.000381	0.00100
1,2-Dichloroethane	U		0.000361	0.00100
Di-isopropyl ether	U		0.000320	0.00100
Ethylbenzene	U		0.000384	0.00100
Ethanol	U		0.0420	0.100
Methyl tert-butyl ether	U		0.000367	0.00100
Toluene	U		0.000780	0.00500
Xylenes, Total	U		0.00106	0.00300
tert-Amyl Methyl Ether	U		0.000260	0.00100
Ethyl tert-butyl ether	U		0.000270	0.00100
tert-Butyl alcohol	U		0.00240	0.00500
<i>(S) Toluene-d8</i>	103			90.0-115
<i>(S) Dibromofluoromethane</i>	98.5			79.0-121
<i>(S) 4-Bromofluorobenzene</i>	104			80.1-120

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) 09/29/15 11:08 • (LCSD) 09/29/15 11:30

Analyte	Spike Amount mg/l	LCS Result mg/l	LCSD Result mg/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	0.0250	0.0222	0.0246	88.8	98.3	73.0-122			10.2	20
1,2-Dibromoethane	0.0250	0.0231	0.0253	92.3	101	79.8-122			9.12	20
1,2-Dichloroethane	0.0250	0.0195	0.0224	78.2	89.7	65.3-126			13.8	20
Di-isopropyl ether	0.0250	0.0213	0.0239	85.1	95.5	65.1-135			11.6	20
Ethylbenzene	0.0250	0.0236	0.0257	94.2	103	80.9-121			8.68	20
Methyl tert-butyl ether	0.0250	0.0219	0.0240	87.7	96.1	70.1-125			9.17	20
Toluene	0.0250	0.0224	0.0247	89.7	98.7	77.9-116			9.60	20
Xylenes, Total	0.0750	0.0693	0.0761	92.4	102	79.2-122			9.44	20
<i>(S) Toluene-d8</i>				105	104	90.0-115				
<i>(S) Dibromofluoromethane</i>				98.6	98.7	79.0-121				
<i>(S) 4-Bromofluorobenzene</i>				106	104	80.1-120				



L789975-12 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 09/29/15 15:38 • (MS) 09/29/15 16:01 • (MSD) 09/29/15 16:24

Analyte	Spike Amount mg/l	Original Result mg/l	MS Result mg/l	MSD Result mg/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Benzene	0.0250	ND	0.0244	0.0241	97.4	96.3	1	58.6-133			1.10	20
1,2-Dibromoethane	0.0250	ND	0.0240	0.0252	95.8	101	1	73.8-131			5.04	20
1,2-Dichloroethane	0.0250	ND	0.0216	0.0217	86.5	86.8	1	60.7-132			0.420	20
Di-isopropyl ether	0.0250	ND	0.0233	0.0232	93.2	92.8	1	59.9-140			0.500	20
Ethylbenzene	0.0250	ND	0.0244	0.0247	97.7	98.8	1	62.7-136			1.12	20
Methyl tert-butyl ether	0.0250	ND	0.0239	0.0240	95.6	96.0	1	61.4-136			0.490	20
Toluene	0.0250	ND	0.0242	0.0242	96.8	96.7	1	67.8-124			0.0400	20
Xylenes, Total	0.0750	ND	0.0724	0.0732	96.6	97.6	1	65.6-133			1.00	20
<i>(S) Toluene-d8</i>					105	106		90.0-115				
<i>(S) Dibromofluoromethane</i>					99.4	99.8		79.0-121				
<i>(S) 4-Bromofluorobenzene</i>					103	106		80.1-120				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc



Method Blank (MB)

(MB) 09/30/15 02:41

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	mg/l		mg/l	mg/l
Benzene	U		0.000331	0.00100
tert-Butyl alcohol	U		0.00240	0.00500

1 Cp

2 Tc

3 Ss

4 Cn

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) 09/30/15 01:04 • (LCSD) 09/30/15 01:23

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	%	%	%			%	%
Benzene	0.0250	0.0250	0.0254	100	102	73.0-122			1.57	20

5 Sr

6 Qc

L789900-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) 09/30/15 07:01 • (MS) 09/30/15 04:03 • (MSD) 09/30/15 04:22

Analyte	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
	mg/l	mg/l	mg/l	mg/l	%	%		%			%	%
Benzene	0.0250	ND	0.0248	0.0256	99.1	102	1	58.6-133			3.28	20

7 Gl

8 Al

9 Sc



Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND,U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
Rec.	Recovery.
SDL	Sample Detection Limit.
MQL	Method Quantitation Limit.
Unadj. MQL	Unadjusted Method Quantitation Limit.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J1	Surrogate recovery limits have been exceeded; values are outside upper control limits.

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE**.



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Georgia	NELAP	North Dakota	R-140
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Kentucky ²	16	Tennessee ¹⁴	2006
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Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

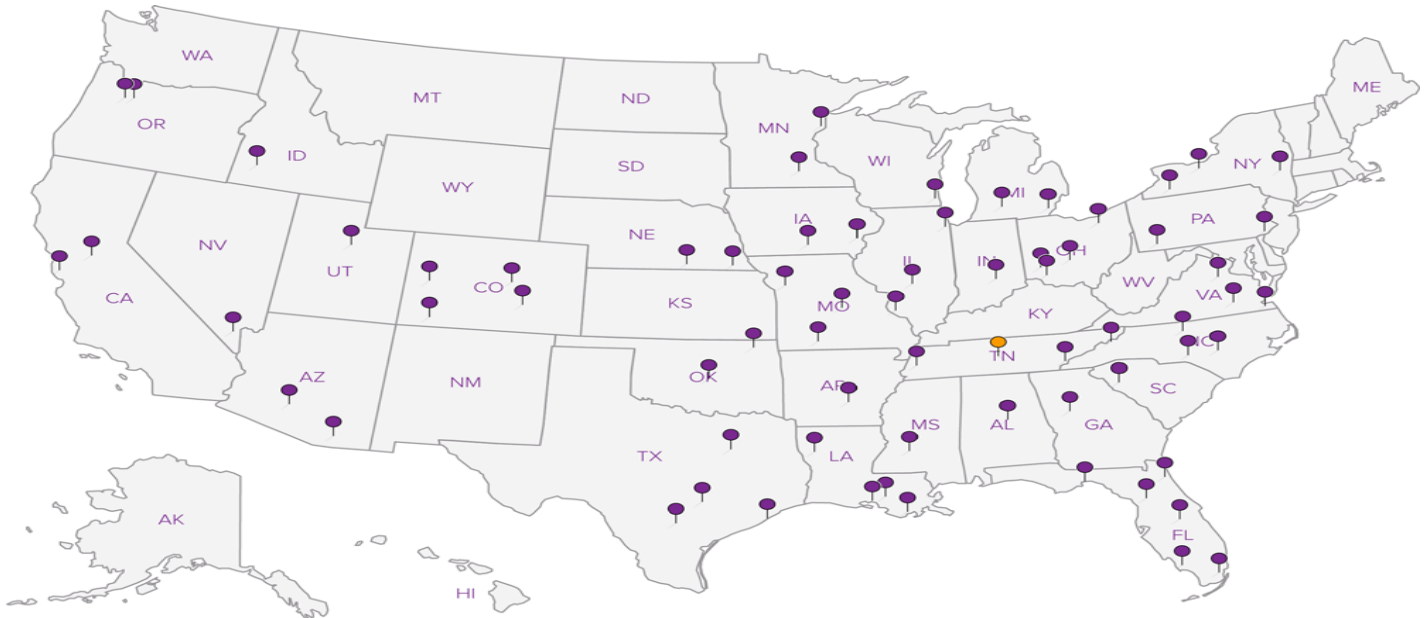
¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ^{n/a} Accreditation not applicable

Third Party & Federal Accreditations

A2LA – ISO 17025	1461.01	AIHA	100789
Canada	1461.01	DOD	1461.01
EPA–Crypto	TN00003	USDA	S-67674

Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



ARCADIS US - San Francisco, CA

100 Montgomery Street
Suite 300
San Francisco, CA 94104

Billing Information:
Attn: Accounts Payable
630 Plaza Drive, Suite 600
Highlands Ranch, CO 80129

Report to:
Hollis Phillips

Email To: Hollis.Phillips@arcadis-us.com;
jamey.peterson@arcadis-us.com;

Project
Description: **CA-11109 - GP09BPNA.C106**

City/State
Collected: **Oakland, CA**

Phone: 415-432-6903
Fax: 720-344-0486

Client Project #
GP09BPNA.C106

Lab Project #
ARCADISBP-CA11109

Collected by (print):
Alex Martinez

Site/Facility ID #
11109

P.O. #
GP09BPNA.C106

Collected by (signature):
Alex Martinez

Rush? (Lab MUST Be Notified)
 Same Day200%
 Next Day100%
 Two Day50%
 Three Day25%

Date Results Needed

Email? No Yes
 FAX? No Yes

Immediately Packed on Ice N Y

No. of
Cntrs

Analysis / Container / Preservative

Chain of Custody Page 1 of 1



YOUR LAB OF CHOICE

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L# **789945**

A074

Acctnum: **ARCADISBP**

Template: **T105687**

Prelogin: **P524858**

TSR: **358 - Jarred Willis**

PB: **91618**

Shipped Via: **FedEx Standard**

Rem./Contaminant Sample # (lab only)

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	GRO 8015 40m/Amb HCl	MTBE 8260 40m/Amb HCl	VOCs 8260 with olys 40m/Amb HCl									
MW-5	-	GW	-	-	-	5	X	X										
MW-7	Grab	GW	-	9/21/15	1200	5	X	X										-01
MW-10	-	GW	-	-	-	5	X	X										
MW-11	Grab	GW	-	9/21/15	1210	5	X	X										-02
MW-12	-	GW	-	-	-	5	X	X										
MW-4	Grab	GW	-	9/21/15	1140	5	X	X										-03
MW-3	Grab	GW	-	↓	1120	3		X										-04
MW-6	Grab	GW	-	↓	1100	3		X										-05
		GW	-			5	X	X										
TB-11109-09212015	-	OT	-	-	-	1												-06 F

* Matrix: SS - Soil GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other Trip Blank - on hold

Remarks: **VOCs= BTEX, EDB, EDC, Oxygenates, Ethanol**

pH _____ Temp _____
 Flow _____ Other _____

Relinquished by: (Signature)
Alex Martinez

Date: **9/21/15**
 Time: **1700**

Received by: (Signature)
[Signature]

Samples returned via: UPS
 FedEx Courier _____

Condition: (lab use only)
OK **GR10**

Relinquished by: (Signature)

Date:

Received by: (Signature)

Temp: **32** °C Bottles Received: **22**

COC Seal Intact: Y N NA

Relinquished by: (Signature)

Date:

Received for lab by: (Signature)
[Signature]

Date: **9/22/15** Time: **900**

pH Checked: _____ NCF: _____

STATE WATER RESOURCES CONTROL BOARD
GEOTRACKER ESI

UPLOADING A GEO_REPORT FILE

SUCCESS

Your GEO_REPORT file has been successfully submitted!

<u>Submittal Type:</u>	GEO_REPORT
<u>Report Title:</u>	Second Quarter 2015 and Third Quarter 2015 Semi-Annual Groundwater 120915
<u>Report Type:</u>	Monitoring Report - Semi-Annually
<u>Report Date:</u>	12/9/2015
<u>Facility Global ID:</u>	T0600100217
<u>Facility Name:</u>	BP #11109
<u>File Name:</u>	CA 11109 151209 BP - 2Q15-3Q15 SAGWMR.pdf
<u>Organization Name:</u>	ARCADIS
<u>Username:</u>	ARCADISBP
<u>IP Address:</u>	108.171.135.188
<u>Submittal Date/Time:</u>	12/9/2015 4:24:33 PM
<u>Confirmation Number:</u>	7652216315

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