



Ms. Vivian Gomez-Latino
Mr. Ben Heningburg
State Water Resources Control Board
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Sacramento, CA 95812
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ENVIRONMENT

Subject:

**Comment Letter – ARCO Station No. 6185 Proposed Case Closure
(Response to City and County of San Francisco Department of Public Health
LOP Comment Letter, Dated October 11, 2013)**

ARCO Service Station No. 6185
5898 Mission Street, San Francisco, California
LOP Site Number 10056

Date:
November 1, 2013

Contact:
David Evans

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Email:
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Our ref:
GP09BPNA.C147

Dear Ms. Gomez-Latino and Mr. Heningburg:

ARCADIS has prepared this letter to respond to concerns and comments from the City and County of San Francisco, Department of Public Health, Local Oversight Program (DPH LOP), regarding the above referenced site. Concerns and comments from the DPH LOP were included within their Comment Letter to the State Water Resources Control Board (SWRCB), dated October 11, 2013.

Response to Concerns and Comments

Concerns and comments from the DPH LOP are included in ***bold italics*** below. A response follows each comment.

Total Petroleum Hydrocarbons as gasoline (GRO) concentrations ranged from 62 micrograms per liter (µg/L) (S-15) to 7100 µg/L in A-1R; an increase over the previous maximum of 3500 µg/L in A-1R.

The values referenced in the comment above are from the groundwater sampling event conducted on March 19, 2013. The GRO concentration from the groundwater sample collected from monitoring well A-1R shows a *decrease* in value from the previous monitoring event conducted on September 18, 2012 (9,000 µg/L). The “previous maximum of 3500 µg/L” referred to in the above statement is from data

Imagine the result

reported from the April 3, 2012 sampling event. Historically, GRO concentrations have been detected as high as 24,000 µg/L within monitoring well A-1R. As shown within Attachment 2 of this letter, a significant decreasing trend is identified for GRO within monitoring well A-1R, when analyzing the entire site's historical data.

Benzene ranged from below detection limits (ND) (A-3, A-4) to 2600 µg/L (A-1R). Well S-16 contained 1700 µg/L benzene. The maximum benzene concentrations increased over the previous maximum benzene value of 792 µg/L (A1-R).

The values referenced in the comment above are from the groundwater sampling event conducted on March 19, 2013. The benzene concentration within the groundwater sample collected from monitoring well A-1R shows a *decrease* in value from the previous monitoring event conducted on September 18, 2012 (3,200 µg/L). The "previous maximum benzene value of 792 µg/L" referred to in the above statement is from data reported from the April 3, 2012 sampling event. Historically, benzene concentrations have been detected as high as 4,300 µg/L within monitoring well A-1R. As shown within Attachment 2 of this letter, a stable or reducing trend is identified for benzene within monitoring well A-1R when analyzing the entire site's historical data.

Soil samples were collected from the deeper borings at 2 or 5 and 10ft bgs only. Soil samples were not collected from the co-located shallow borings.

In a letter dated April 29, 2013, the LOP approved the proposed workplan for the subsurface investigation and associated soil sampling. Within the approval letter, an ARCADIS letter (*Response to the SF DPH LOP Letter Dated March 25, 2013*), dated April 12, 2013, was referenced. The April 12, 2013 letter included the following text:

- *As requested, ARCADIS will submit two soil samples from each of the two proposed boring locations (HP-1 and HP-2) for laboratory analysis, for a total of four samples.*
- *One soil sample will be submitted for laboratory analysis from each interval: 0 to 5 feet below ground surface (bgs) and 5 feet and 10 feet bgs. These intervals were selected to satisfy LTCP requirements. The soil sample from each interval with the highest PID reading will be submitted for analysis. If the PID reading is 0.0 ppm for soil screened in an interval, the sample will be collected at 5 and 10 feet bgs.*

Because of the close proximity of the soil borings to the temporary monitoring well locations, ARCADIS proposed the collection of soil samples from each location, rather than each boring. There were no deviations from the LOP-approved workplan during the subsurface investigation.

Date for the April 2013 shows that benzene concentration in some wells is increasing.

There were no data collected from the site during April 2013. As previously mentioned above, the March 2013 data continue to show a *decreasing* trend in concentrations for GRO and benzene within site monitoring wells. Linear regression analyses, presented in Attachment 2, identify primarily a significant decreasing trend of COC concentrations within site monitoring wells. No monitoring wells are exhibiting an increasing concentration trend for any COC.

...the project is not progressing based on a lack of responsiveness by Arcadis/ARCO to repeated specific requests from the LOP.

As stated in a letter from ARCADIS to the DPH LOP dated April 2, 2013, the soil vapor extraction (SVE) system has been offline since May 24, 2012. Additionally, as stated in a letter from ARCADIS to the DPH LOP dated August 28, 2012, ARCADIS does not intend to restart the SVE system. The data indicate that site soils have been remediated to the extent practicable, and further operation of the remedial system is providing no additional value. Prior to its shut down on May 24, 2012, the SVE system was removing 0.84 pound per day (lb/day) of GRO, and benzene removal rates had decreased from <0.06 lb/day to 0.00 lb/day by the time the SVE system was shut down.

All semi-annual groundwater sampling and reporting have been conducted and completed as requested. Multiple letters of correspondence have been sent by ARCADIS to the LOP describing and explaining the rationale for not re-activating the SVE/AS system.

The site does not meet the groundwater specific criteria of the LTCP per the analysis of the LOP and the SWRCB.

Groundwater at the site is in accordance with Criteria 1a through 1c of the groundwater section of the media-specific criteria (SWRCB 2012), as presented below:

- (a) *The contaminant plume that exceeds water quality objectives is less than 100 feet in length.*

The point of release from the source (the former USTs) is identified to be well A-1R. Figures 9 and 10 present concentration contour maps for the COCs which exhibit the longest downgradient plume lengths (GRO and benzene). The maximum plume length based on the respective WQOs for GRO, benzene, MTBE, and TBA is 83 feet (benzene), when compared to the ESLs in Table F-1b of RWQCB ESLs (RWQCB 2013), where groundwater is not a current or potential drinking water resource.

- (b) *There is no free product.*

Free product has not been detected at the site.

- (c) *The nearest existing water supply well or surface water body is greater than 250 feet from the defined plume boundary.*

The nearest existing water supply well or surface-water body is greater than 250 feet from the defined plume boundary. The nearest surface-water body is approximately 1.9 miles from the site, and no water supply wells were identified within a one-mile radius of the site.

The general criteria have not been met in that an additional secondary source may have been identified and the plume has not been defined towards Sickles Avenue...The Shell Station across Mission Street at 5897 Mission, contains free product on the groundwater and is being assessed under the LOP program. It is possible that some of the measured contamination on 5898 Mission may originate at 5897 Mission. However, the high groundwater concentrations around HP-2 suggest an onsite source is also contributing to the observed concentrations...DPH LOP respectfully requests that the case not be closed at this time and that SWRCB support additional investigation in Sickles Avenue to define the plume.

Recent data collected from HP-2 indicate that elevated concentrations of hydrocarbons (up to 19,000 µg/L benzene) are present in the western portion of the site. These new data for the site source area do not significantly change the site conceptual model, or the comparison of the site condition against LTC Criteria #1. Historical and recent groundwater monitoring data indicate that groundwater impacts

are limited to the western portion of the site, where the three former USTs and a former pump island were located. Concentration trends within monitoring wells A-1R and A-2R indicate generally stable or decreasing concentrations for constituents at the site wells. As stated within the comment above, free product is present within the offsite shallow aquifer, hydraulically upgradient of the subject site, possibly contributing to the impacts within the deeper/regional aquifer onsite. In addition, field observations collected at HP-2 contradict the laboratory results. No elevated PID readings were recorded throughout the soil boring, no hydrocarbon odor was identified within the soil samples or groundwater sample, and no visible sheen or free product was observed during groundwater sampling at HP-2.

Rationale for Closure

General Criteria

The site qualifies for closure as a low-risk fuel site as described in the Low-Threat Policy (SWRCB 2012). The Low-Threat Policy was issued to address low-risk site closures. There are eight general criteria in addition to media-specific criteria used to assess whether low-risk fuel sites for soil or groundwater cases are candidates for closure. This site is eligible for closure because it meets each of the general criteria summarized below:

- *Criteria A – The unauthorized release is located within the service area of a public water system.* The site is located within San Francisco city limits. An existing public water supply system draws water from watersheds and reservoirs located at least 6.5 miles from the site. Installation of new groundwater water supply wells near the site or within the plume is not likely. There are currently no wells within a 1-mile radius of the site.
- *Criteria B – The unauthorized release consists only of petroleum.* In 1989, the UST complex consisted of two 8,000-gallon USTs and one 6,000-gallon UST containing unleaded and super unleaded gasoline products, and one 550-gallon waste oil UST. The USTs were removed and soil in the area around the USTs was over-excavated. Removal of the USTs was witnessed by a SFPHD representative (GeoStrategies 1989).
- *Criteria C – The unauthorized release has been stopped.* Four USTs were removed from the site in 1989. The second generation (1989 to 2004) USTs were placed in approximately the same locations as the first generation USTs.

Inspection of these USTs upon removal indicated that the USTs were in good condition. Currently, the site contains three 10,000-gallon fiberglass gasoline USTs, one 550-gallon used oil UST, and three product islands with dispensers.

- *Criteria D – Free product has been removed to the maximum extent practicable.*

There is no evidence of free product accumulation in site groundwater monitoring wells, which are regularly monitored and sampled. Free product has not been observed in site groundwater monitoring wells to date.

- *Criteria E – A CSM has been developed.* A CSM has been developed for the site and is included within the *Amended LTC Request*, dated August 23, 2013.
- *Criteria F – Secondary source removal has been addressed.* In addition to active remediation performed on-site, the identified source areas were over-excavated in June 2004. These areas included the former UST areas in the northwest corner of the site, former waste oil UST cavity, former clarifier area, and former dispensers #5 and #8 along Mission Street. The soil volumes removed and confirmation sample results are as follows:
 - *UST areas.* Initial over-excavation of an area approximately 10 feet square to a maximum depth of 20 feet bgs in the southeast corner of the former UST cavity; removed 20 cubic yards (cy) of soil. Confirmation soil samples were taken in the floors and sidewalls of the over-excavations. T3-S-OE, a sample taken from the UST area, had a maximum concentration of 0.14 milligrams per kilogram (mg/kg) GRO at a depth of 20 feet bgs.
 - *Waste oil UST cavity.* Over-excavation to a depth to 6 feet bgs. Approximately 10 cy of soil were removed from the east end of the former waste oil UST cavity due to elevated lead levels. Over-excavation sample WO-OE-6 had a DRO concentration of 27 mg/kg at a depth of 6 feet bgs.
 - *Clarifier area.* Over-excavation to a depth to 6 feet bgs; removed approximately 10 cy of soil. Over-excavation sample C-OE-6 had a DRO concentration of 160 mg/kg at a depth of 6 feet bgs.
 - *Dispensers #5 and #8.* Over-excavation of an area roughly 6 by 10 feet; removed approximately 10 cy of soil from dispenser #5 and approximately 17 cy were removed in a 10-foot square to 5 feet bgs at dispenser #8. Dispenser

island over-excavation samples DS-5-OE and DS-8-OE had DRO concentrations of 160 and 1.4 mg/kg, respectively, at a depth of 5 feet bgs.

In addition to soil removal, an AS/SVE system was installed in the western portion of the site. The system was started on July 27, 2011. Due to asymptotic conditions for mass removal, the SVE system was shut down May 24, 2012. The SVE system removed a total of 749 lbs of VOCs between July 27, 2011 and May 24, 2012.

- *Criteria G – Soil and groundwater have been tested for MTBE and results reported in accordance with Health and Safety Code Section 25296.15. Soil samples collected and analyzed for MTBE were reported in accordance with Health and Safety Code Section 25296.15.*

Groundwater monitoring wells at the site have been monitored for MTBE since 1996 and the results were reported in accordance with Health and Safety Code Section 25296.15.

- *Criteria H – Nuisance as defined by Water Code Section 13050 does not exist at the site. Based on site information available to date, the petroleum release is not injurious to health, indecent or offensive to the senses, or an obstruction to the free use of property so as to interfere with the comfortable enjoyment of life or property.*

The petroleum hydrocarbon release does not affect an entire community or neighborhood, or considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal.

In addition, the petroleum hydrocarbon release did not occur during, or as a result of, the treatment or disposal of wastes.

Media-Specific Criteria

This section summarizes how the site meets the media-specific requirement for groundwater, soil, and vapor as outlined in the Low-Threat Policy (SWRCB 2012).

Groundwater-Specific Criteria

Groundwater at the site is in accordance with Criteria 1a through 1c of the groundwater section of the media-specific criteria (SWRCB 2012), as presented below:

- (a) *The contaminant plume that exceeds water quality objectives is less than 100 feet in length.*

The point of release from the source (the former USTs) is identified to be well A-1R. Figures 9 and 10 present concentration contour maps for the COCs (GRO and benzene) which exhibit the longest downgradient plume length. The maximum plume length based on the respective WQOs for GRO, benzene, MTBE, and TBA is 83 feet (benzene), as compared to the ESLs in Table F-1b of RWQCB ESLs (RWQCB 2013), where groundwater is not a current or potential drinking water resource.

- (b) *There is no free product.*

Free product has not been detected at the site.

- (c) *The nearest existing water supply well or surface water body is greater than 250 feet from the defined plume boundary.*

The nearest existing water supply well or surface-water body is greater than 250 feet from the defined plume boundary. The nearest surface-water body is approximately 1.9 miles from the site, and no water supply wells were identified within a one-mile radius of the site.

Petroleum Vapor Intrusion to Indoor Air

The site is an active commercial petroleum fueling facility and release characteristics can be reasonably believed to not pose an unacceptable health risk. Under the Low-Threat Policy (SWRCB 2012), active commercial service stations are not required to meet vapor intrusion criteria unless underground releases can reasonably be believed to pose unacceptable risk, which is not the case for the site.

Additionally, results from a soil vapor investigation performed in 2010 indicate the risks associated with the site are well within acceptable levels and appear to pose little to no risk to human health and/or the environment, as compared with the Soil Gas Criteria Table in Appendix 4 of the Low-Threat Policy (SWRCB 2012). The maximum benzene and ethylbenzene concentrations detected were 35 and 140 micrograms per cubic meter, respectively. Naphthalene concentrations for the samples were below method detection limits. The concentrations were well below the soil gas criteria for benzene, ethylbenzene, and naphthalene for both residential and commercial zones, for sites

without a bioattenuation zone, as described in Appendix 4, Scenario 4 of the Low-Threat Policy (SWRCB 2012).

Direct Contact and Outdoor Air Exposure

As described in the LTC Policy, sites will meet the media-specific criteria for direct contact with impacted soil or inhalation of constituents volatilized to outdoor air if any of the following are met:

- The maximum COC concentrations in soil are less than or equal to those listed in Table 1 of the LTC Policy (shown below)
- A site-specific risk assessment shows that COCs present in soil will not adversely affect human health
- Exposure to COPCs is mitigated through engineering controls

This site meets the first criteria as listed below:

Constituent	Commercial/Industrial ¹				Utility Worker ¹	
	0 to 5 feet bgs (mg/kg)		Volatilization to outdoor air (5 to 10 feet bgs) (mg/kg)		0 to 10 feet bgs (mg/kg)	
	LTC Policy Table 1	Site Maximum (0-5 feet bgs)	LTC Policy Table 1	Site Maximum (5-10 feet bgs)	LTC Policy Table 1	Site Maximum (0-10 feet bgs)
Benzene	8.2	0.05 (A-D-4.5)	12	0.05 (A-C-10)	14	0.05
Ethylbenzene	89	0.30 (A-D-4.5)	134	0.10 (A-C-10)	314	0.30
Naphthalene	45	<0.05 (HP-2-2)	45	<0.005 (HP-1-10)	219	<0.05
PAH ²	0.68	0.0056 (HP-2-2)	NA	<0.005 (HP-1-10)	4.5	0.0056

Notes:

1. As defined in Table 1 of the LTC Policy (SWRCB 2012).
2. Based on the seven carcinogenic PAHs as benzo(a)pyrene toxicity equivalent (BaPe).
3. NA = not applicable
4. < = Constituent not detected at or above the laboratory reporting limit shown.

Fifty-one shallow soil samples, between 0 and 10 feet bgs, were collected across the Site between 1989 and 2013 and analyzed for benzene and ethylbenzene. Four of those samples were also analyzed for naphthalene and PAHs. As shown in the table

above, benzene, ethylbenzene, and naphthalene were reported at maximum concentrations of 0.05, 0.30, and <0.05 mg/kg, respectively in soil samples collected from 0 to 10 feet bgs. Maximum concentrations are below the No Significant Risk Values (NSRVs; Table 1, SWRCB 2012) for the direct contact pathway for a residential, commercial/industrial, and utility worker receptor. In addition, the soil concentrations were below the NSRVs for volatilization to outdoor air for the resident and commercial/industrial worker.

Four soil samples collected from two soil borings (HP-1 and HP-2) during the June 2013 investigation were analyzed for the seven carcinogenic PAHs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene (Table 1D). Reported concentrations for all PAHs were below laboratory reporting limits with the exception of benzo(b)fluoranthene in the sample collected at 2 feet bgs from boring HP-2 (0.056 mg/kg). The data were used to calculate the benzo(a)pyrene toxicity equivalent (BaP TEQ) for each sample. The BaP TEQ for sample HP-2 at 2 feet bgs is 0.0056 µg/kg. This value is below the NSRVs presented in Table 1D for the resident, commercial/ industrial worker, and utility worker.

In addition, over-excavation of the former waste oil tank occurred to a depth of 6 feet bgs. Approximately 10 cy of soil were removed from the east end of the former waste oil UST cavity due to elevated lead levels. Over-excavation sample WO-OE-6 had a DRO concentration of 27 mg/kg at a depth of 6 feet bgs. Based on the above comparison with the soil data from 0 to 10 feet bgs to Tables 1A through 1D of the LTC Policy, the site meets the media-specific criteria for direct contact with impacted soil or inhalation of constituents volatilized to outdoor air.

Conclusion

Based on the information presented in this letter and the *Amended LTC Request*, dated August 23, 2013, this site meets the general and media-specific criteria established in the Low-Threat Policy (SWRCB 2012); poses a low threat to human health, safety, and the environment; satisfies the case closure requirements of Health and Safety Code Section 25296.10; and case closure is consistent with SWRCB Resolution 92-49, which requires meeting cleanup goals and objectives within a reasonable time frame.

If you have any questions or comments regarding the information presented in this letter, please contact David Evans at 713.953.4854.

ARCADIS

Ms. Vivian Gomez-Latino
Mr. Ben Heningburg
October 23, 2013

Sincerely,

ARCADIS U.S., Inc.



David M. Evans
Certified Project Manager



Megan E. Smoley, P.G. (No. 8614)
Senior Geologist

Enclosures:

Attachment 1 – Historical Groundwater Monitoring and Analytical Data

Attachment 2 – Linear Regression Package

Attachment 3 – Figures: Groundwater Elevation Contour and Flow Direction for the Perched/Shallow and Deep/Regional groundwater bearing units (Figures 7A and 7B) and GRO and Benzene Iso-concentration maps (Figures 9 and 10)



Attachment 1

Table 2 - Historical Groundwater
Monitoring and Analytical Data

Table-2
Historical Groundwater Monitoring and Analytical Data
CA-06185
5898 Mission St, San Francisco, CA 94112

Well ID	Date	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)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
A-1	1/24/1996	314.67	37.85	--	276.82	110	29	<0.5	<2.5	1.7	--	--	--	--	--	--	--	--	--	--
A-1	4/23/1996	314.67	37.56	--	277.11	120	56	<0.5	<0.5	3.2	--	--	--	--	--	--	--	--	--	--
A-1	7/11/1996	314.67	37.55	--	277.12	210	81	<0.6	<2.5	3.2	<10	--	--	--	--	--	--	--	--	--
A-1	10/10/1996	314.67	37.50	--	277.17	180	50	<90	<2.5	3.3	<450	--	--	--	--	--	--	--	--	--
A-1	3/28/1997	314.67	38.70	--	275.97	<50	<0.5	<0.5	<2.5	<0.5	<2.5	--	--	--	--	--	--	--	--	--
A-1	6/13/1997	314.67	37.08	--	277.59	110	26	<0.5	<0.5	3	<2.5	--	--	--	--	--	--	--	--	--
A-1	9/2/1997	314.67	37.20	--	277.47	2,400	620	<5.0	<10	45	<10	--	--	--	--	--	--	--	--	--
A-1	10/31/1997	314.67	37.38	--	277.29	2,200	760	<10	<0.5	57	13	--	--	--	--	--	--	--	--	--
A-1	3/25/1998	314.67	36.64	--	278.03	3,200	960	<10	<10	66	<60	--	--	--	--	--	--	--	--	--
A-1	6/11/1998	314.67	36.16	--	278.51	1,700	580	<10	<10	45	<60	--	--	--	--	--	--	--	--	--
A-1	8/31/1998	314.67	36.00	--	278.67	3,000	1,400	<20	<20	<20	<120	--	--	--	--	--	--	--	--	--
A-1	12/7/1998	314.67	36.42	--	278.25	1,000	350	<5.0	<5.0	28	<30	--	--	--	--	--	--	--	--	--
A-1	2/8/1999	314.67	35.96	--	278.71	170	47	<0.5	<0.5	4.6	<3.0	--	--	--	--	--	--	--	--	--
A-1	5/12/1999	314.67	35.85	--	278.82	1,420	405	<5.0	<5.0	35	<50	--	--	--	--	--	--	--	--	--
A-1	7/22/1999	314.67	35.91	--	278.76	4,200	2,000	6	<2.5	120	16	--	--	--	--	--	--	--	--	--
A-1	12/6/1999	314.67	35.75	--	278.92	1,700	630	4.4	<2.0	47	19	--	--	--	--	--	--	--	--	--
A-1	3/15/2000	314.67	35.65	--	279.02	3,700	1,300	5.6	1.3	76	11	--	--	--	--	--	--	--	--	--
A-1	4/26/2000	314.67	36.51	--	278.16	970	290	2.1	<0.5	2.4	6	--	--	--	--	--	--	--	--	--
A-1	7/28/2000	314.67	35.59	--	279.08	710	190	<0.5	<0.5	18	<3.0	--	--	--	--	--	--	--	--	--
A-1	11/16/2000	314.67	35.66	--	279.01	2,830	903	<10	<10	40	<100	--	--	--	--	--	--	--	--	--
A-1	2/14/2001	314.67	35.72	--	278.95	114	6.2	<0.5	<0.5	0.78	4.8	--	--	--	--	--	--	--	--	--
A-1	6/26/2001	314.67	35.60	--	279.07	1,500	300	<5.0	<5.0	17	<50	--	--	--	--	--	--	--	--	--
A-1	9/20/2001	314.67	35.57	--	279.10	14,000	4,500	84	<50	440	<500	--	--	--	--	--	--	--	--	--
A-1	12/28/2001	314.67	38.57	--	276.10	<50	0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	--
A-1	1/23/2002	314.67	35.72	--	278.95	5,700	1,100	<5.0	<5.0	94	40	--	--	--	--	--	--	--	--	--
A-1	6/18/2002	314.67	35.00	--	279.67	210	14	<5.0	<5.0	1.3	12	--	--	--	--	--	--	--	--	--
A-1	9/24/2002	314.67	35.40	--	279.27	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	2.8	--
A-1	12/17/2002	314.67	35.51	--	279.16	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	4.6	--
A-1	3/18/2003	314.67	35.65	--	279.02	<50	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	<100	--	--	1.8	--
A-1	6/24/2003	314.67	35.32	--	279.35	<50	1.1	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	<100	1	<0.5	4.9	--
A-1	9/16/2003	314.67	35.45	--	279.22	<50	0.64	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<0.5	<100	--	--	1.6	--
A-1	12/23/2003	314.67	35.30	--	279.37	<50	0.55	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	1.6	<0.5	2.8	--	--
A-1	3/2/2004	314.67	35.04	--	279.63	610	130	<2.5	<2.5	6.1	<2.5	<100	<2.5	<2.5	<2.5	<500	25	<2.5	3.6	--
A-1R	9/21/2004	317.60	37.05	--	280.55	17,000	2,700	220	92	2,500	79	<1,000	<25	<25	<25	<5,000	240	<25	0.8	--
A-1R	12/28/2004	317.60	37.05	--	280.55	24,000	3,600	2,100	360	3,900	91	<2,000	<50	<50	<50	<10,000	250	<50	1.5	--
A-1R	3/8/2005	317.60	37.22	--	280.38	22,000	3,300	2,000	780	4,200	99	250	<10	<10	<10	<2,000	93	<10	3.8	--
A-1R	6/14/2005	317.60	36.78	--	280.82	16,000	1,600	140	300	2,100	62	<400	<10	<10	<10	<2,000	88	<10	0.7	--
A-1R	9/13/2005	317.60	36.88	--	280.72	13,000	3,000	56	240	870	56	<1,000	<25	<25	<25	<5,000	120	<25	0.9	--
A-1R	12/13/2005	317.60	37.15	--	280.45	9,500	1,500	38	88	80	<25	<1,000	<25	<25	<25	<5,000	230	<25	1.0	--
A-1R	3/21/2006	317.60	36.91	--	280.69	8,200	2,000	47	240	230	22	<500	<12	<12	<12	<7,500	170	<12	1.1	--
A-1R	6/27/2006	317.60	36.63	--	280.97	6,400	2,000	16	170	33	48	<500	<12	<12	<12	<7,500	77	<12	1.6	--
A-1R	9/26/2006	317.60	36.76	--	280.84	4,500	1,000	27	35	47	22	<400	<10	<10	<10	<6,000	71	<10	1.7	--
A-1R	12/19/2006	317.60	36.76	--	280.84	5,500	1,700	<25	280	<25	32	<1,000	<25	<25	<25	<15,000	62	<25	1.0	--
A-1R	3/27/2007	317.60	36.63	--	280.97	7,400	2,200	28	160	36	32	<1,000	<25	<25	<25	<15,000	100	<25	0.8	--
A-1R	6/19/2007	317.54	36.72	--	280.82	23,000(N)	2,000	<50	99	<50	<50	<2,000	<50	<50	<50	<30,000	87	<50	3.6	--
A-1R	9/20/2007	317.54	36.74	--	280.80	11,000	4,100	99	240	76	<50	<2,000	<50	<50	<50	<30,000	170	<50	0.9	--
A-1R	12/18/2007	317.54	36.87	--	280.67	7,500	2,500	90	170	74	<25	<1,000	<25	<25	<25	<15,000	130	<25	0.4	--
A-1R	3/4/2008	317.54	37.05	--	280.49	6,300	3,400	110	170	130	<20	<400	<20	<20	<20	<12,000	170	<20	1.3	--
A-1R	6/3/2008	317.54	37.00	--	280.54	9,800	2,900	<100	150	<100	<100	<2,000	<100	<100	<100	<60,000	<100	<100	1.7	--
A-1R	9/2/2008	317.54	37.12	--	280.42	8,000	2,700	150	140	120	<100	<2,000	<100	<100	<100	<60,000	<100	<100	1.7	--
A-1R	12/2/2008	317.54	37.40	--	280.14	15,000	4,300	360	310	350	<100	<2,000	<100	<100	<100	<60,000	<100	<100	1.6	--
A-1R	3/17/2009	317.54	37.26	--	280.28	4,700	2,500	140	110	<100	<100	<2,000	<100	<100	<100	<60,000	140	<100	1.6	--
A-1R	5/19/2009	317.54	37.18	--	280.36	5,000	2,400	170	140	160	<40	<800	<40	<40	<40	<24,000	130	<40	1.7	--
A-1R	12/2/2009	317.54	37.55	--	279.99	--	--	--	--	--	--	--	--	--	--	--	--	--	1.52	--

**Table-2
Historical Groundwater Monitoring and Analytical Data
CA-06185
5898 Mission St, San Francisco, CA 94112**

Well ID	Date	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)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
A-1R	12/8/2009	--	--	--	--	5,300	3,100	200	150	200	<40	<800	<40	<40	<40	<24,000	170	<40	2.39	
A-1R	6/8/2010	317.54	37.40	--	280.14	5,400	2,100	110	110	170	<1.0	<50	0.90(J)	<1.0	<1.0	<100	28	<1.0	0.82	
A-1R	11/23/2010	317.54	37.61	--	279.93	960	480	<100	<20	<60	<20	<1,000	<20	<20	<20	<2,000	--	--	3.35	
A-1R	5/10/2011	317.54	37.37	--	280.17	<100	5.4	<25	<5.0	<15	<5.0	<250	<5.0	<5.0	<5.0	<500	<5.0	<5.0	--	
A-1R	11/1/2011	317.54	37.27	--	280.27	3,400	1,100	4.4(J)	30	<30	5.0(J)	<500	<10	<10	<10	<1,000	58	<10	--	
A-1R	4/3/2012	317.54	37.27	--	280.27	3,500	792	7.8	14.4	12.5	1.84	<5.00	1.2	<1.00	<1.00	<100	43.3	<1.00	--	
A-1R	9/18/2012	317.54	37.45	--	280.09	9,000	3,200	33.8	111	231	1.07	47.5	2.69	<1.00	<1.00	<100	77.9	<1.00	0.43	
A-1R	3/19/2013	317.54	37.39	--	280.15	7,100	2,600	29.6(J)	85.2	282	<25.0	<125	<25.0	<25.0	<25.0	<2,500	36.6	<25.0	--	
A-2	1/24/1996	313.61	37.95	--	275.66	2,200	960	<10	<10	<10	--	--	--	--	--	--	--	--	--	
A-2	4/23/1996	313.61	37.70	--	275.91	1,500	1,100	<10	<10	37	--	--	--	--	--	--	--	--	--	
A-2	7/11/1996	313.61	37.59	--	276.02	1,800	1,100	<9.9	<9.9	<20	14	--	--	--	--	--	--	--	--	
A-2	10/10/1996	313.61	37.55	--	276.06	2,400	1,100	<10	<10	17	<50	--	--	--	--	--	--	--	--	
A-2	3/28/1997	313.61	50.83	--	262.78	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-2	6/13/1997	313.61	37.26	--	276.35	130	200	<0.5	<0.5	2	8.5	--	--	--	--	--	--	--	--	
A-2	9/2/1997	313.61	37.25	--	276.36	5,700	2,100	<20	<20	30	<100	--	--	--	--	--	--	--	--	
A-2	10/31/1997	313.61	37.38	--	276.23	5,000	2,300	<20	<20	29	77	--	--	--	--	--	--	--	--	
A-2	3/25/1998	313.61	36.81	--	276.80	4,600	1,900	<20	<20	<20	<120	--	--	--	--	--	--	--	--	
A-2	6/11/1998	313.61	36.15	--	277.46	<2,000	920	<20	<20	<20	<120	--	--	--	--	--	--	--	--	
A-2	8/31/1998	313.61	36.22	--	277.39	130	<0.5	0.6	<0.5	6.6	14	--	--	--	--	--	--	--	--	
A-2	12/7/1998	313.61	36.43	--	277.18	4,400	1,900	<20	<20	<20	<120	--	--	--	--	--	--	--	--	
A-2	2/8/1999	313.61	35.99	--	277.62	2,300	1,200	<20	<20	<20	<120	--	--	--	--	--	--	--	--	
A-2	5/12/1999	313.61	36.80	--	276.81	1,280	535	<5.0	<5.0	<5.0	<50	--	--	--	--	--	--	--	--	
A-2	7/22/1999	313.61	35.99	--	277.62	250	97	<0.5	<0.5	0.6	11	--	--	--	--	--	--	--	--	
A-2	12/6/1999	313.61	36.54	--	277.07	410	160	<0.5	<0.5	<0.5	12	--	--	--	--	--	--	--	--	
A-2	3/15/2000	313.61	35.88	--	277.73	240	110	0.6	<0.5	<1.0	13	--	--	--	--	--	--	--	--	
A-2	4/26/2000	313.61	43.21	--	270.40	86	1.3	5.9	1.1	7.9	<3.0	--	--	--	--	--	--	--	--	
A-2	7/28/2000	313.61	35.60	--	278.01	110	57	<0.5	<0.5	<1.0	13	--	--	--	--	--	--	--	--	
A-2	11/16/2000	313.61	35.75	--	277.86	1,060	565	<5.0	<5.0	<5.0	<50	--	--	--	--	--	--	--	--	
A-2	2/14/2001	313.61	35.82	--	277.79	51	17	<0.5	<0.5	<0.5	5.5	--	--	--	--	--	--	--	--	
A-2	6/26/2001	313.61	35.60	--	278.01	1,400	480	<10	<10	<10	<100	--	--	--	--	--	--	--	--	
A-2	9/20/2001	313.61	35.57	--	278.04	640	230	<2.5	<2.5	<2.5	<25	--	--	--	--	--	--	--	--	
A-2	12/28/2001	313.61	35.44	--	278.17	72	27	<0.5	<0.5	<0.5	7.2	--	--	--	--	--	--	--	--	
A-2	1/23/2002	313.61	35.74	--	277.87	59	18	<0.5	<0.5	0.59	11	--	--	--	--	--	--	--	--	
A-2	6/18/2002	313.61	35.38	--	278.23	1,200	630	<0.5	<0.5	<0.5	<25	--	--	--	--	--	--	--	--	
A-2	9/24/2002	313.61	35.39	--	278.22	<50	0.76	<0.5	<0.5	<0.5	7.4	--	--	--	--	--	--	--	1.2	
A-2	12/17/2002	313.61	35.58	--	278.03	<50	13	<0.5	<0.5	<0.5	8.3	--	--	--	--	--	--	--	1.5	
A-2	3/18/2003	313.61	37.20	--	276.41	420	170	<2.5	<2.5	<2.5	16	<20	<0.5	<0.5	<0.5	<100	--	--	2.8	
A-2	6/24/2003	313.61	36.45	--	277.16	<500	140	<5.0	<5.0	<5.0	10	<200	<5.0	<5.0	<5.0	<1,000	24	<5.0	1.3	
A-2	9/16/2003	313.61	35.81	--	277.80	270	96	<2.5	<2.5	<2.5	12	<100	<2.5	<2.5	<2.5	<500	--	--	2.1	
A-2	12/23/2003	313.61	36.20	--	277.41	320	130	<2.5	<2.5	<2.5	10	<100	<2.5	<2.5	<2.5	<500	26	<2.5	--	
A-2	3/2/2004	313.61	36.07	--	277.54	310	100	<2.5	<2.5	4.6	9.9	<100	<2.5	<2.5	<2.5	<500	18	<2.5	1.3	
A-2R	9/21/2004	318.29	37.84	--	280.45	9,300	4,000	190	<25	560	46	<1,000	<25	<25	<25	<5,000	270	<25	1.5	
A-2R	12/28/2004	318.29	37.63	--	280.66	14,000	5,600	380	70	950	55	<2,000	<50	<50	<50	<10,000	280	<50	0.9	
A-2R	3/8/2005	318.29	37.73	--	280.56	10,000	5,000	450	190	860	48	<500	<25	<25	<25	<5,000	210	<25	2.8	
A-2R	6/14/2005	318.29	37.46	--	280.83	14,000	5,800	150	250	670	<100	<4,000	<100	<100	<100	<20,000	180	<100	1.0	
A-2R	9/13/2005	318.29	37.52	--	280.77	9,500	5,400	98	250	440	57	<2,000	<50	<50	<50	<10,000	180	<50	1.1	
A-2R	12/13/2005	318.29	37.58	--	280.71	9,700	5,200	<50	260	220	50	<2,000	<50	<50	<50	<10,000	170	<50	0.9	
A-2R	3/21/2006	318.29	37.68	--	280.61	3,600	2,600	<25	110	37	38	<1,000	<25	<25	<25	<15,000	150	<25	0.9	
A-2R	6/27/2006	318.29	37.20	--	281.09	6,400	3,800	<25	140	86	41	<1,000	<25	<25	<25	<15,000	130	<25	1.8	
A-2R	9/26/2006	318.29	37.37	--	280.92	6,200	3,400	<50	350	130	<50	<2,000	<50	<50	<50	<30,000	120	<50	1.4	
A-2R	12/19/2006	318.29	37.44	--	280.85	7,400	3,300	<50	190	110	<50	<2,000	<50	<50	<50	<30,000	160	<50	0.3	
A-2R	3/27/2007	318.29	37.53	--	280.76	2,900	1,300	<50	80	<50	<50	<2,000	<50	<50	<50	<30,000	86	<50	1.6	
A-2R	6/19/2007	318.29	37.47	--	280.82	10,000(N)	5,000	<25	1,200	41	130	<1,000	<25	<25	<25	<15,000	190	<25	4.5	

Table-2
Historical Groundwater Monitoring and Analytical Data
CA-06185
5898 Mission St, San Francisco, CA 94112

Well ID	Date	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)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes	
A-2R	9/20/2007	318.29	37.68	--	280.61	2,400	770	<10	79	<10	35	<400	<10	<10	<10	<6,000	75	<10	0.6		
A-2R	12/18/2007	318.29	37.58	--	280.71	4,200	1,300	<25	250	28	46	<1,000	<25	<25	<25	<15,000	56	<25	0.7		
A-2R	3/4/2008	318.29	37.71	--	280.58	2,100	320	<5.0	140	<5.0	34	<100	<5.0	<5.0	<5.0	<3,000	62	<5.0	0.9		
A-2R	6/3/2008	318.29	37.70	--	280.59	1,900(N)	230	<5.0	240	<5.0	33	110	<5.0	<5.0	<5.0	<3,000	66	<5.0	1.8		
A-2R	9/2/2008	318.29	37.70	--	280.59	1,800	110	<5.0	160	<5.0	39	110	<5.0	<5.0	<5.0	<3,000	45	<5.0	1.6		
A-2R	12/2/2008	318.29	38.03	--	280.26	810	49	<1.0	45	<1.0	32	71	1.1	<1.0	<1.0	<600	46	<1.0	1.1		
A-2R	3/17/2009	318.29	38.04	--	280.25	770	39	<1.0	17	<1.0	33	90	1.4	<1.0	<1.0	<600	58	<1.0	1.1		
A-2R	5/19/2009	318.29	37.87	--	280.42	740	120	<1.0	2.4	1	25	48	1.9	<1.0	<1.0	<600	76	<1.0	1.2		
A-2R	12/2/2009	318.29	38.21	--	280.08	--	--	--	--	--	--	--	--	--	--	--	--	--	1.58		
A-2R	12/8/2009	--	--	--	--	450	33	<2.5	<2.5	<2.5	16	<50	<2.5	<2.5	<2.5	<1,500	63	<2.5	1.57		
A-2R	6/8/2010	318.29	38.02	--	280.27	170	21	<5.0	<1.0	<3.0	8.8	<50	1.5	<1.0	<1.0	<100	60	<1.0	0.54		
A-2R	11/23/2010	318.29	38.30	--	279.99	68(J)	9.4	<5.0	<1.0	<3.0	18	<50	<1.0	<1.0	<1.0	<100	--	--	0.31		
A-2R	5/10/2011	318.29	38.07	Sheen	280.22	200	3.1	<5.0	<1.0	<3.0	20	21(J)	<1.0	<1.0	<1.0	<100	13	<1.0	--		
A-2R	11/1/2011	318.29	38.10	--	280.19	570	71	<5.0	<1.0	<3.0	13	28(J)	0.87(J)	<1.0	<1.0	<100	36	<1.0	--		
A-2R	4/3/2012	318.29	38.12	--	280.17	450	51.4	<5.00	<1.00	<3.00	11.6	11.8	0.562(J)	<1.00	<1.00	<100	25.1	<1.00	--		
A-2R	9/18/2012	318.29	38.27	--	280.02	490	120	<5.00	<1.00	1.74(J)	10.8	16	1.14	<1.00	<1.00	<100	43.8	<1.00	0.27		
A-2R	3/19/2013	318.29	38.31	--	279.98	440	162(V)	<5.00	<1.00	1.27(J)	8.06	13.7	1.75	<1.00	<1.00	<100	59.6	<1.00	--		
A-3	1/24/1996	316.91	43.52	--	273.39	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
A-3	4/23/1996	316.91	46.10	--	270.81	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	--	
A-3	7/11/1996	316.91	46.11	--	270.80	<50	<0.5	<0.3	<0.3	<0.6	<10	--	--	--	--	--	--	--	--	--	
A-3	10/10/1996	316.91	45.28	--	271.63	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	--	
A-3	3/28/1997	316.91	45.50	--	271.41	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	--	
A-3	6/13/1997	316.91	45.72	--	271.19	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	--	
A-3	9/2/1997	316.91	45.70	--	271.21	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	--	
A-3	10/31/1997	316.91	45.93	--	270.98	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	--	
A-3	3/25/1998	316.91	44.62	--	272.29	<50	<0.5	<0.5	<0.5	<0.5	<3.0	--	--	--	--	--	--	--	--	--	
A-3	6/11/1998	316.91	43.87	--	273.04	<50	<0.5	<0.5	<0.5	<0.5	<3.0	--	--	--	--	--	--	--	--	--	
A-3	8/31/1998	316.91	43.97	--	272.94	<50	1.8	<0.5	<0.5	<0.5	<3.0	--	--	--	--	--	--	--	--	--	
A-3	12/7/1998	316.91	44.35	--	272.56	<50	2.1	<0.5	<0.5	<0.5	<3.0	--	--	--	--	--	--	--	--	--	
A-3	2/8/1999	316.91	44.11	--	272.80	<50	<0.5	<0.5	<0.5	<0.5	<3.0	--	--	--	--	--	--	--	--	--	
A-3	5/12/1999	316.91	48.70	--	268.21	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	--	
A-3	7/22/1999	316.91	43.81	--	273.10	<50	<0.5	<0.5	<0.5	<0.5	<3.0	--	--	--	--	--	--	--	--	--	
A-3	12/6/1999	316.91	43.84	--	273.07	<50	<0.5	<0.5	<0.5	<0.5	<3.0	--	--	--	--	--	--	--	--	--	
A-3	3/15/2000	316.91	43.60	--	273.31	<50	<0.5	<0.5	<0.5	<1.0	<3.0	--	--	--	--	--	--	--	--	--	
A-3	4/26/2000	316.91	43.39	--	273.52	<50	<0.5	1.1	<0.5	1.2	<3.0	--	--	--	--	--	--	--	--	--	
A-3	7/28/2000	316.91	43.49	--	273.42	<50	<0.5	4.5	0.8	4.4	<3.0	--	--	--	--	--	--	--	--	--	
A-3	11/16/2000	316.91	43.68	--	273.23	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	--	
A-3	2/14/2001	316.91	43.81	--	273.10	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	--	
A-3	6/26/2001	316.91	43.68	--	273.23	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	--	
A-3	9/20/2001	316.91	43.75	--	273.16	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	--	
A-3	12/28/2001	316.91	43.69	--	273.22	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	--	
A-3	1/23/2002	316.91	43.75	--	273.16	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	--	
A-3	6/18/2002	316.91	43.42	--	273.49	<50	<0.5	<0.5	<0.5	<0.5	4	--	--	--	--	--	--	--	--	--	
A-3	9/24/2002	316.91	43.51	--	273.40	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	1.2	
A-3	12/17/2002	316.91	43.62	--	273.29	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	1.7	
A-3	3/18/2003	316.91	43.72	--	273.19	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	--	--	1.7		
A-3	6/24/2003	316.91	43.36	--	273.55	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	<0.5	<0.5	0.7		
A-3	9/16/2003	316.91	43.64	--	273.27	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	--	--	3.1		
A-3	12/23/2003	316.91	43.51	--	273.40	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	<0.5	<0.5	2.6		
A-3	3/2/2004	316.91	43.44	--	273.47	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	<0.5	<0.5	1.0		
A-3	9/21/2004	318.96	43.97	--	274.99	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	<0.5	<0.5	2.2		
A-3	12/28/2004	318.96	43.56	--	275.40	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	<0.5	<0.5	1.4		
A-3	3/8/2005	318.96	43.70	--	275.26	<100	<0.5	<0.5	<0.5	<4.0	<0.5	<10	<0.5	<0.5	<0.5	<100	<0.5	<0.5	4.8		
A-3	6/14/2005	318.96	43.06	--	275.90	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	<0.5	<0.5	1.1		

Table-2
Historical Groundwater Monitoring and Analytical Data
CA-06185
5898 Mission St, San Francisco, CA 94112

Well ID	Date	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)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes
A-3	9/13/2005	318.96	43.40	--	275.56	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	<0.5	<0.5	1.2	
A-3	12/13/2005	318.96	43.52	--	275.44	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	<0.5	<0.5	2.3	
A-3	3/21/2006	318.96	43.12	--	275.84	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<300	<0.5	<0.5	1.8	
A-3	6/27/2006	318.96	42.48	--	276.48	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<300	<0.5	<0.5	1.4	
A-3	9/26/2006	318.96	42.90	--	276.06	<50	<0.5	<0.5	<0.5	1.1	<0.5	<20	<0.5	<0.5	<0.5	<300	<0.5	<0.5	1.5	
A-3	12/19/2006	318.96	42.99	--	275.97	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<300	<0.5	<0.5	3.0	
A-3	3/27/2007	318.96	43.09	--	275.87	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<300	<0.5	<0.5	1.7	
A-3	6/19/2007	318.96	43.04	--	275.92	<50	0.51	<0.5	<0.5	<0.5	<0.5	<20	0.55	<0.5	<0.5	<300	12	<0.5	6.4	
A-3	9/20/2007	318.96	43.19	--	275.77	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<300	2	<0.5	0.7	
A-3	12/18/2007	318.96	43.28	--	275.68	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<300	<0.5	<0.5	1.3	
A-3	3/4/2008	318.96	43.25	--	275.71	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<300	<0.5	<0.5	1.2	
A-3	6/3/2008	318.96	43.15	--	275.81	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<300	<0.5	<0.5	1.6	
A-3	9/2/2008	318.96	43.55	--	275.41	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<300	1.1	<0.5	1.5	
A-3	12/2/2008	318.96	43.89	--	275.07	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<300	0.65	<0.5	1.5	
A-3	3/17/2009	318.96	43.95	--	275.01	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<300	<0.5	<0.5	1.6	
A-3	5/19/2009	318.96	43.74	--	275.22	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<300	<0.5	<0.5	1.5	
A-3	12/2/2009	318.96	44.21	--	274.75	--	--	--	--	--	--	--	--	--	--	--	--	--	2.17	
A-3	12/8/2009	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	<0.50	<0.50	1.82	
A-3	6/8/2010	318.96	43.86	--	275.10	<100	<1.0	<5.0	<1.0	<3.0	<1.0	<50	<1.0	<1.0	<1.0	<100	0.41(J)	<1.0	2.34	
A-3	11/23/2010	318.96	44.00	--	274.96	<100	<1.0	<5.0	<1.0	<3.0	<1.0	<50	<1.0	<1.0	<1.0	<100	--	--	1.38	
A-3	5/10/2011	318.96	43.45	--	275.51	<100	<1.0	<5.0	<1.0	<3.0	<1.0	<50	<1.0	<1.0	<1.0	<100	0.97(J)	<1.0	--	
A-3	11/1/2011	318.96	43.64	--	275.32	<100	<1.0	<5.0	<1.0	<3.0	<1.0	<50	0.32(J)	<1.0	<1.0	<100	19	<1.0	--	
A-3	4/3/2012	318.96	43.90	--	275.06	<100	<1.00	<5.00	<1.00	<3.00	<1.00	<5.00	<1.00	<1.00	<1.00	<100	1.62	<1.00	--	
A-3	9/18/2012	318.96	43.63	--	275.33	42(J)	0.635(J)	<5.00	<1.00	<3.00	<1.00	<5.00	0.398(J)	<1.00	<1.00	<100	18	<1.00	0.63	
A-3	3/19/2013	318.96	43.75	--	275.21	130	<1.00	<5.00	<1.00	<3.00	<1.00	<5.00	0.583(J)	<1.00	<1.00	<100	26.4	<1.00	--	
A-4	1/24/1996	291.07	20.20	--	270.87	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
A-4	4/23/1996	291.07	19.65	--	271.42	<50	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--	--	--	
A-4	7/11/1996	291.07	19.39	--	271.68	<50	<0.3	<0.3	<0.3	<0.6	<10	--	--	--	--	--	--	--	--	
A-4	10/10/1996	291.07	19.71	--	271.36	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-4	3/28/1997	291.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-4	6/13/1997	291.07	18.92	--	272.15	<50	<0.5	<0.5	<0.5	<0.5	4.5	--	--	--	--	--	--	--	--	
A-4	9/2/1997	291.07	18.77	--	272.30	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-4	10/31/1997	291.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-4	3/25/1998	291.07	16.93	--	274.14	<50	<0.5	<0.5	<0.5	<0.5	<3.0	--	--	--	--	--	--	--	--	
A-4	6/11/1998	291.07	16.51	--	274.56	<50	<0.5	<0.5	<0.5	<0.5	<3.0	--	--	--	--	--	--	--	--	
A-4	8/31/1998	291.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-4	12/7/1998	291.07	17.84	--	273.23	<50	<0.5	<0.5	<0.5	<0.5	<3.0	--	--	--	--	--	--	--	--	
A-4	2/8/1999	291.07	17.03	--	274.04	<50	<0.5	<0.5	<0.5	<0.5	<3.0	--	--	--	--	--	--	--	--	
A-4	5/12/1999	291.07	16.50	--	274.57	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	
A-4	7/22/1999	291.07	16.63	--	274.44	<50	<0.5	<0.5	<0.5	<0.5	<3.0	--	--	--	--	--	--	--	--	
A-4	12/6/1999	291.07	17.46	--	273.61	<50	<0.5	<0.5	<0.5	<0.5	<3.0	--	--	--	--	--	--	--	--	
A-4	3/15/2000	291.07	16.35	--	274.72	<50	<0.5	<0.5	<0.5	<1.0	<3.0	--	--	--	--	--	--	--	--	
A-4	4/26/2000	291.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-4	7/28/2000	291.07	16.58	--	274.49	<50	<0.5	<0.5	<0.5	<1.0	<3.0	--	--	--	--	--	--	--	--	
A-4	11/16/2000	291.07	16.88	--	274.19	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	
A-4	2/14/2001	291.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-4	6/26/2001	291.07	16.87	--	274.20	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	
A-4	9/20/2001	291.07	17.46	--	273.61	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	--	--	--	--	--	--	
A-4	12/28/2001	291.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-4	1/23/2002	291.07	16.98	--	274.09	<50	<0.5	<0.5	<0.5	<0.5	71	--	--	--	--	--	--	--	--	
A-4	6/18/2002	291.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-4	9/24/2002	291.07	17.13	--	273.94	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	4.8	
A-4	12/17/2002	291.07	16.88	--	274.19	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	4.1	
A-4	3/18/2003	291.07	17.03	--	274.04	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	--	--	3.2	

Table-2
Historical Groundwater Monitoring and Analytical Data
CA-06185
5898 Mission St, San Francisco, CA 94112

Well ID	Date	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)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes	
A-4	6/24/2003	291.07	17.00	--	274.07	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	<0.5	<0.5	4.6		
A-4	9/16/2003	291.07	16.89	--	274.18	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	--	--	5.0		
A-4	12/23/2003	291.07	16.65	--	274.42	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	<0.5	<0.5	2.8		
A-4	3/2/2004	291.07	16.65	--	274.42	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	<0.5	<0.5	7.8		
A-4	9/21/2004	293.20	17.15	--	276.05	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	<0.5	<0.5	2.8		
A-4	12/28/2004	293.20	16.88	--	276.32	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	<0.5	<0.5	4.4		
A-4	3/8/2005	293.20	16.71	--	276.49	<100	<0.5	<0.5	<0.5	<4.0	<0.5	<10	<0.5	<0.5	<0.5	<100	<0.5	<0.5	11.7		
A-4	6/14/2005	293.20	16.24	--	276.96	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	<0.5	<0.5	4.8		
A-4	9/13/2005	293.20	16.36	--	276.84	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	<0.5	<0.5	3.8		
A-4	12/13/2005	293.20	17.02	--	276.18	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<100	<0.5	<0.5	4.4		
A-4	3/21/2006	293.20	15.29	--	277.91	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<300	<0.5	<0.5	4.5		
A-4	6/27/2006	293.20	15.87	--	277.33	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<300	<0.5	<0.5	4.5		
A-4	9/26/2006	293.20	16.12	--	277.08	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<300	<0.5	<0.5	3.9		
A-4	12/19/2006	293.20	16.09	--	277.11	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<300	<0.5	<0.5	3.6		
A-4	3/27/2007	293.20	16.31	--	276.89	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<300	<0.5	<0.5	3.9		
A-4	6/19/2007	293.20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-4	9/20/2007	293.20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-4	12/18/2007	293.20	16.53	--	276.67	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<20	<0.5	<0.5	<0.5	<300	<0.5	<0.5	1.1		
A-4	3/4/2008	293.20	16.46	--	276.74	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<300	<0.5	<0.5	3.8		
A-4	6/3/2008	293.20	16.95	--	276.25	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<300	<0.5	<0.5	1.1		
A-4	9/2/2008	293.20	17.65	--	275.55	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<300	<0.5	<0.5	1.1		
A-4	12/2/2008	293.20	18.15	--	275.05	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<300	<0.5	<0.5	1.57		
A-4	3/17/2009	293.20	18.04	--	275.16	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<300	<0.5	<0.5	1.6		
A-4	5/19/2009	293.20	18.19	--	275.01	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<300	<0.5	<0.5	1.6		
A-4	12/2/2009	293.20	18.17	--	275.03	--	--	--	--	--	--	--	--	--	--	--	--	--	4.36		
A-4	12/8/2009	--	--	--	--	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	<0.50	<0.50	8.23		
A-4	6/8/2010	293.20	17.16	--	276.04	<100	<1.0	<5.0	<1.0	<3.0	<1.0	<50	<1.0	<1.0	<1.0	<100	<1.0	<1.0	2.51		
A-4	11/23/2010	293.20	17.48	--	275.72	<100	<1.0	<5.0	<1.0	<3.0	<1.0	<50	<1.0	<1.0	<1.0	<100	--	--	3.21	well damage	
A-4	5/10/2011	293.20	16.74	--	276.46	<100	<1.0	<5.0	<1.0	<3.0	<1.0	<50	<1.0	<1.0	<1.0	<100	<1.0	<1.0	--		
A-4	11/1/2011	293.20	16.71	--	276.49	<100	<1.0	<5.0	<1.0	<3.0	<1.0	<50	<1.0	<1.0	<1.0	<100	<1.0	<1.0	--		
A-4	4/3/2012	293.20	16.98	--	276.22	<100	<1.00	<5.00	<1.00	<3.00	<1.00	<50.00	<1.00	<1.00	<1.00	<100	<1.00	<1.00	--		
A-4	9/18/2012	293.20	16.96	--	276.24	<100	<1.00	<5.00	<1.00	<3.00	<1.00	<50.00	<1.00	<1.00	<1.00	<100	<1.00	<1.00	3.16		
A-4	3/19/2013	293.20	16.81	--	276.39	89(J)	<1.00	<5.00	<1.00	<3.00	<1.00	<50.00	<1.00	<1.00	<1.00	<100	<1.00	<1.00	--		
SB-1	4/15/2010	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<2	--	--	--	--	--	--	--	--	
SB-2	4/15/2010	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<2	--	--	--	--	--	--	--	--	
SB-3	4/15/2010	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<2	--	--	--	--	--	--	--	--	
SB-4	4/15/2010	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<2	--	--	--	--	--	--	--	--	
SB-5	4/16/2010	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<2	--	--	--	--	--	--	--	--	
SB-5	4/16/2010	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<2	--	--	--	--	--	--	--	--	Dup
SB-7	4/16/2010	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<2	--	--	--	--	--	--	--	--	
HP-1	6/12/2013	--	38.52	--	--	260	17	<0.5	<0.5	<1.0	9.2	28	--	--	--	--	--	--	2.14		
HP-1	6/12/2013	--	38.52	--	--	260	17	<0.5	<0.5	<1.0	9.0	29	--	--	--	--	--	--	2.14	Dup	
HP-2	6/11/2013	--	40.90	--	--	110,000	19,000	22,000	3,500	19,000	<10	<80	--	--	--	--	--	--	1.75		
S-15	1/24/1996	317.85	47.17	--	270.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	4/23/1996	317.85	46.92	--	270.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	7/11/1996	317.85	46.85	--	271.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table-2
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Well ID	Date	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)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes	
S-15	10/10/1996	317.85	46.94	--	270.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	3/28/1997	317.85	46.25	--	271.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	6/13/1997	317.85	46.43	--	271.42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	9/2/1997	317.85	46.00	--	271.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	10/31/1997	317.85	46.70	--	271.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	3/25/1998	317.85	45.43	--	272.42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	6/11/1998	317.85	44.68	--	273.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	8/31/1998	317.85	44.75	--	273.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	12/7/1998	317.85	45.20	--	272.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	2/8/1999	317.85	44.86	--	272.99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	5/12/1999	317.85	44.48	--	273.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	7/22/1999	317.85	44.53	--	273.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	12/6/1999	317.85	44.56	--	273.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	3/15/2000	317.85	44.41	--	273.44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	4/26/2000	317.85	44.14	--	273.71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	7/28/2000	317.85	44.25	--	273.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	11/16/2000	317.85	44.39	--	273.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	2/14/2001	317.85	44.27	--	273.58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	6/26/2001	317.85	44.40	--	273.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	9/20/2001	317.85	44.45	--	273.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	12/28/2001	317.85	44.48	--	273.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	1/23/2002	317.85	44.50	--	273.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	6/18/2002	317.85	44.00	--	273.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	9/24/2002	317.85	44.32	--	273.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	12/17/2002	317.85	44.53	--	273.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	3/18/2003	317.85	44.38	--	273.47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	6/24/2003	317.85	44.12	--	273.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	9/16/2003	317.85	44.33	--	273.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	12/23/2003	317.85	44.11	--	273.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	3/2/2004	317.85	44.31	--	273.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	9/21/2004	317.85	44.68	--	273.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	12/28/2004	317.85	44.34	--	273.51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	3/8/2005	317.85	44.98	--	272.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	6/14/2005	317.85	43.85	--	274.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	9/13/2005	317.85	44.08	--	273.77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	12/13/2005	317.85	44.20	--	273.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	3/21/2006	317.85	43.95	--	273.90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	6/27/2006	317.85	43.34	--	274.51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	9/26/2006	317.85	43.91	--	273.94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	12/19/2006	317.85	43.81	--	274.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	3/27/2007	317.85	43.79	--	274.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	6/19/2007	318.86	43.82	--	275.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	9/20/2007	318.86	43.94	--	274.92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	12/18/2007	318.86	44.05	--	274.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	3/4/2008	318.86	44.20	--	274.66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	6/3/2008	318.86	44.05	--	274.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	9/2/2008	318.86	44.27	--	274.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	12/2/2008	318.86	44.57	--	274.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	3/17/2009	318.86	44.71	--	274.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	5/19/2009	318.86	44.53	--	274.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	12/2/2009	318.86	45.01	--	273.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	6/8/2010	318.86	44.69	--	274.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	11/23/2010	318.86	44.78	--	274.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	5/10/2011	318.86	44.33	--	274.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-15	11/1/2011	318.86	44.40	--	274.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

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Well ID	Date	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)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes	
S-15	4/3/2012	318.86	44.65	--	274.21	<100	<1.00	<5.00	<1.00	<3.00	<1.00	<5.00	<1.00	<1.00	<1.00	<100	<1.00	<1.00	--		
S-15	9/18/2012	318.86	44.59	--	274.27	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<10	<0.50	<0.50	<0.50	<150	--	--	--	Shell Reported	
S-15	3/19/2013	318.86	44.52	--	274.34	62	0.68	0.61	<0.50	1.4	<0.50	--	--	--	--	--	--	--	--	Shell Reported	
S-16	1/24/1996	319.01	42.00	--	277.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	4/23/1996	319.01	40.97	--	278.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	7/11/1996	319.01	41.63	--	277.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	10/10/1996	319.01	41.08	--	277.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	3/28/1997	319.01	41.16	--	277.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	6/13/1997	319.01	38.71	--	280.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	9/2/1997	319.01	41.04	--	277.97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	10/31/1997	319.01	41.05	--	277.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	3/25/1998	319.01	40.21	--	278.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	6/11/1998	319.01	39.35	--	279.66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	8/31/1998	319.01	39.48	--	279.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	12/7/1998	319.01	39.56	--	279.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	2/8/1999	319.01	39.16	--	279.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	5/12/1999	319.01	39.10	--	279.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	7/22/1999	319.01	39.18	--	279.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	12/6/1999	319.01	39.68	--	279.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	3/15/2000	319.01	38.65	--	280.36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	4/26/2000	319.01	39.62	--	279.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	7/28/2000	319.01	38.61	--	280.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	11/16/2000	319.01	38.56	--	280.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	2/14/2001	319.01	38.51	--	280.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	6/26/2001	319.01	38.28	--	280.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	9/20/2001	319.01	38.32	--	280.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	12/28/2001	319.01	38.49	--	280.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	1/23/2002	319.01	38.68	--	280.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	6/18/2002	319.01	38.40	--	280.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	9/24/2002	319.01	38.45	--	280.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	12/17/2002	319.01	38.29	--	280.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	3/18/2003	319.01	38.44	--	280.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	6/24/2003	319.01	38.57	--	280.44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	9/16/2003	319.01	35.51	--	283.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	12/23/2003	319.01	35.37	--	283.64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	3/2/2004	319.01	38.32	--	280.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	9/21/2004	319.01	38.73	--	280.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	12/28/2004	319.01	38.27	--	280.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	3/8/2005	319.01	38.45	--	280.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	6/14/2005	319.01	38.20	--	280.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	9/13/2005	319.01	38.18	--	280.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	12/13/2005	319.01	38.31	--	280.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	3/21/2006	319.01	38.28	--	280.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	6/27/2006	319.01	39.54	--	279.47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	9/26/2006	319.01	38.05	--	280.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	12/19/2006	319.01	38.12	--	280.89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	3/27/2007	319.01	38.12	--	280.89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	6/19/2007	320.86	38.03	--	282.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	9/20/2007	320.86	38.01	--	282.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	12/18/2007	320.86	45.18	--	275.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	3/4/2008	320.86	38.32	--	282.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	6/3/2008	320.86	38.30	--	282.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	9/2/2008	320.86	38.30	--	282.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	12/2/2008	320.86	38.51	--	282.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

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CA-06185
5898 Mission St, San Francisco, CA 94112

Well ID	Date	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)	1,2-DCA (µg/L)	EDB (µg/L)	DO (mg/L)	Notes	
S-16	3/17/2009	320.86	38.73	--	282.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	5/19/2009	320.86	38.52	--	282.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	12/2/2009	320.86	38.65	--	282.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	6/8/2010	320.86	38.66	--	282.20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	11/23/2010	320.86	38.58	--	282.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	5/10/2011	320.86	38.70	--	282.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	11/1/2011	320.86	38.57	--	282.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
S-16	4/3/2012	320.86	39.01	--	281.85	2,800	581	40.2	32.7	129	<1.00	13.6	0.936(J)	<1.00	<1.00	<100	10.2	<1.00	--		
S-16	9/18/2012	320.86	38.38	--	282.48	1,200	420	34	33	63	<2.5	<50	<2.5	<2.5	<2.5	<750	--	--	--	Shell Reported	
S-16	3/19/2013	320.86	38.35	--	282.51	2,700	1,700	63	82	190	<0.50	--	--	--	--	--	--	--	--	--	Shell Reported

Notes:

TOC = Top of casing (surveyed)

DTW = Depth to water

LNAPL = Light non-aqueous phase liquid (LPH)

GW Elev. = Calculated groundwater elevation = TOC - depth to water + 0.75*(measured LPH thickness); assuming a specific gravity of 0.75 for LPH

GRO = Gasoline range organics

B = benzene

T = Toluene

E = Ethylbenzene

X = Total xylenes

MTBE = Methyl tert-butyl ether

TBA = Tert-butyl alcohol

DIPE = Di-isopropyl ether

ETBE = Ethyl tert-butyl ether

TAME = Tert-amyl methyl ether

1,2-DCA = 1,2-Dichloroethane

EDB = 1,2-Dibromoethane

D.O. = Dissolved Oxygen

ft msl = Feet above mean sea level

µg/L = Micrograms per liter

mg/L = Milligrams per liter

< = Analyte was not detected above the specified laboratory reporting limit

-- = Not measured or analyzed

J = Estimated value; denotes a value between the method detection limit and reporting limit

Dup = Duplicate sample

V = The sample concentration was too high to evaluate accurate spike recoveries

The values for DO were obtained through field measurements

The data within this table collected prior to July 2006 was provided to Secor by RM and their previous consultants; Secor has not verified the accuracy of this information

Samples were analyzed using EPA Method 8260

Beginning in the Fourth Quarter 2003, the laboratory modified the reported analyte list; TPHg was changed to GRO; the resulting data may be impacted by the potential of non-TPHg analytes within the requested fuel range resulting in a higher concentration being reported

Beginning in the Second Quarter 2004, the carbon range for GRO was changed from C6-C10 to C4-C12

Wells were surveyed on September 21, 2004 to NAD '83 and NAVD '88 datums

Beginning in the First Quarter 2008, the carbon range for GRO was changed from C4-C12 to C6-C12



Attachment 2

Linear Regression Package

Analysis of Petroleum Constituent Concentration Trends

To evaluate trends in the concentrations of petroleum hydrocarbon constituents in groundwater at the site over time, concentration versus time graphs were prepared (Attachment A). Statistical analyses were then performed for wells at which petroleum hydrocarbon constituents have been measured above the California Regional Water Quality Control Board, San Francisco Bay Region Environmental Screening Levels (ESLs) for sites where groundwater is a potential source of drinking water (SF Bay RWQCB 2008; Table F-1a). The petroleum hydrocarbon constituents evaluated include total petroleum hydrocarbons gasoline range organics (GRO); benzene, toluene, ethylbenzene, and total xylenes (collectively known as BTEX); methyl tert-butyl ether (MTBE); and tert-butyl alcohol (TBA). The following ESLs were applied for each constituent:

- GRO – 100 micrograms per liter ($\mu\text{g/L}$)
- Benzene – 1 $\mu\text{g/L}$
- Toluene – 40 $\mu\text{g/L}$
- Ethylbenzene – 30 $\mu\text{g/L}$
- Total Xylenes – 20 $\mu\text{g/L}$
- MTBE – 5 $\mu\text{g/L}$
- TBA – 12 $\mu\text{g/L}$

Groundwater analytical data are available at the site from January 1996 through March 2013 for monitoring wells A-1 through A-4. Monitoring wells A-1 and A-2 were abandoned in March 2004 and replaced by A-1R and A-2R; groundwater analytical data are available for these two replacement wells from September 2004 through March 2013. Analytical data are also available in April 2012 for two monitoring wells, S-15 and S-16, associated with a neighboring Shell Station, but these data were not considered as the wells do not belong to the on-site monitoring network and are located crossgradient of the historical source area. Of the four monitoring wells included in the on-site monitoring network, two downgradient wells (A-3 and A-4) have been non-detect or below ESLs with respect to petroleum hydrocarbon constituents for at least 25% of the past sampling events. The remaining two wells (A-1R and A-2R) have indicated groundwater concentrations at or above the screening level for at least one of the petroleum hydrocarbon constituents listed above throughout the monitoring record; these wells were evaluated with respect to the statistical significance of the concentration trends and attenuation of the observed groundwater impacts at the site.

To facilitate evaluation of concentration trends under natural conditions as a requirement for low-threat closure status, groundwater concentration trends were analyzed using two different scenarios: 1) full data sets (i.e., the entire monitoring record through March 2013); and 2) data sets excluding the results that were potentially affected by active site remediation. (The one exception for the first criterion is TBA groundwater concentrations at A-2R; the concentration trend was analyzed using data starting in June 2008, when TBA was first detected at this location.) Two data points from samples collected in November 2010 and May 2011 (potentially related to HydraSleeve sampling activities) were also excluded from the second set of regression analyses for all wells analyzed, as these results were an order of magnitude less than the previous analytical data at times, and could bias results of the trend analyses. The letter to the regulator, submitted by ARCADIS on September 22, 2011, entitled *Response to SF DPH-LP Letter Dated August 11, 2011* addressed the use of HydraSleeve methods for groundwater sampling and suggested

proceeding with standard purge and sample methods (ARCADIS 2011). The standard purge method has been used to collect groundwater samples during the sampling events that occurred after the May 2011 event.

Statistical analysis of the groundwater concentration trends at A-1R and A-2R was performed using a linear regression trend test for the petroleum hydrocarbon constituents at each well that fulfilled two criteria:

- Constituents have exceeded their respective ESLs
- At least 75% of the historical data indicate constituent concentrations above the reporting limit

It should be noted that in March 2013, GRO in groundwater at monitoring well A-3 was detected at a concentration of 130 µg/L, just above the ESL of 100 µg/L. However, GRO has been detected in groundwater only two times at monitoring well A-3, therefore no linear regression analysis was performed for GRO at A-3.

Linear regression analyses using natural log (ln) normalized concentration data were conducted to estimate trend direction, attenuation rates, and approximate time to reach the screening levels (as noted above) at wells with decreasing groundwater concentration trends (USEPA, 2002). The correlation coefficient, R^2 , is a measure of how well the linear regression fits the site data; values close to one are considered to be a good fit, while values close to zero are considered a poor fit. The p-value of the correlation measures the level of significance of the statistical test. Correlations with p-values of less than or equal to 0.05 were accepted as significant. The concentrations of non-detect values, where present, were assumed to be equal to the laboratory reporting limit. Use of the reporting limits for concentrations that were below the detection limit provides a conservative estimate for evaluating the concentration trends over time. The results of the linear regression analyses, including correlation coefficients, p-value of the correlation, and trend direction, are summarized in Table 1, with the analyses included as Attachment A.

Results

GRO

Results of the linear regression analyses for groundwater GRO concentrations indicate statistically significant decreasing trends at plume monitoring wells A-1R and A-2R. The significant decreasing trends are observed for both scenarios detailed above. Groundwater GRO concentrations are projected to reach the ESL of 100 µg/L by approximately 2026 to 2048 at monitoring well A-1R, and in the near future (estimated to be approximately 2013 to 2014) at monitoring well A-2R (the March 2013 GRO concentration at well A-2R was 440 µg/L).

BTEX

Groundwater BTEX concentrations were evaluated at monitoring well A-1R. The results of the linear regression analyses using full data sets indicate statistically significant decreasing concentration trends for toluene, ethylbenzene, and xylenes, and a non-statistically significant decreasing concentration trend for benzene. Toluene has been below the ESL of 40 µg/L since May 2011, while ethylbenzene and xylenes are projected to reach their respective ESLs in the near future (2013 and 2014, respectively). The March 2013 ethylbenzene and xylenes concentrations were 85.2 µg/L and 282 µg/L, respectively. Results

from linear regression analyses excluding data collected during or after active remediation indicate non-statistically significant decreasing concentration trends for toluene, ethylbenzene, and xylenes, and no trend is apparent for benzene at well A-1R; concentrations appear to be stable for benzene at A-1R.

Benzene was evaluated at well A-2R. The result of the linear regression analysis using the full data set indicates that the benzene concentration is statistically significantly decreasing. The benzene concentration at well A-2R is projected to reach the ESL of 1 µg/L in 2016. Results from the linear regression analysis excluding data from collected during or after active remediation also indicate a statistically significantly decreasing concentration trend for benzene at well A-2R, projected to reach the ESL in 2017.

MTBE

Results of linear regression analyses performed for MTBE at well A-2R indicate statistically significantly decreasing groundwater concentration trends for both data scenarios. MTBE is projected to reach the ESL of 5 µg/L by approximately 2015 to 2016.

TBA

Results of linear regression analyses performed for TBA at well A-2R indicate statistically significantly decreasing groundwater concentration trends for both data scenarios. TBA is projected to reach the ESL of 12 µg/L in the near future (estimated to be approximately 2013) at monitoring well A-2R (the March 2013 TBA concentration at well A-2R was 13.7 µg/L).

Geochemical Indicators of Biodegradation

While stable or decreasing trends in petroleum hydrocarbon constituent concentrations represent the primary line of evidence for attenuation of groundwater impacts at the site, geochemical indicator parameters can provide an additional line of evidence to document favorable groundwater conditions for ongoing potential attenuation mechanisms. Biodegradation of petroleum hydrocarbon constituents can proceed via aerobic or anaerobic microbial processes, with naturally-occurring bacteria using these constituents as sources of carbon and/or energy. Bacteria obtain energy for cell production and maintenance by facilitating reduction-oxidation (redox) reactions involving the transfer of electrons from electron donors (e.g., hydrocarbon constituents) to available electron acceptors. Electron acceptors in groundwater systems include oxygen, nitrate, manganese, ferric iron, sulfate, and carbon dioxide. When sufficient oxygen is present in groundwater, biodegradation is primarily aerobic. When oxygen becomes less available, conditions will become reducing as anaerobic microorganisms consume electron acceptors in the following order of preference: nitrate (nitrate reduction), manganese (manganese (IV) reduction), ferric iron (ferric iron reduction), sulfate (sulfate reduction), and carbon dioxide (methanogenesis).

Geochemical parameters, including nitrate, ferrous iron, sulfate, and methane were analyzed in groundwater samples collected as a subset of site monitoring wells in April 2012. Geochemical parameter results are included in Table 2. In general, the geochemical data suggest at least mildly reducing conditions within the area of impacted groundwater, with lowest nitrate concentrations measured at wells A-1R and A-2R, and detections of reduced ferrous iron (byproduct of ferric iron reduction). In addition, groundwater results for well A-1R indicate measureable methane concentrations (produced during methanogenesis) and the lowest

sulfate concentration at the site. These results suggest increased microbial activity within the plume, resulting in consumption of nitrate and sulfate and production of ferrous iron and methane, likely contributing to degradation of hydrocarbon constituents in groundwater.

Summary

Although GRO was detected slightly above the ESL at downgradient monitoring well A-3 in March 2013, GRO has been non-detect or below ESLs in groundwater for more than half of the past sampling events. Additionally, in March 2013, BTEX compounds, MTBE, and TBA were non-detect in groundwater at A-3. Downgradient monitoring well A-4 has remained non-detect or below ESLs with respect to petroleum hydrocarbon constituents in groundwater for more than half of the past sampling events. The remaining two site monitoring wells, A-1R and A-2R were evaluated with respect to the petroleum hydrocarbon constituents at each location that have historically exceeded the applicable groundwater screening levels (where at least 75% of the historical data were above the reporting limit).

Of the petroleum constituents evaluated at the site, current data indicate that the toluene concentration has decreased below the screening level at well A-1R. Of the petroleum constituents that currently exceed groundwater ESLs at the site (GRO, benzene, ethylbenzene, and total xylenes at A-1R; GRO, benzene, MTBE, and TBA at A-2R), statistically significant decreasing concentration trends were observed for all linear regression analyses with exception to benzene (non-statistically significantly decreasing) at A-1R where the full historical data set was used. In the analyses where data potentially affected by remediation activities were removed, statistically significant decreasing concentration trends are indicated at well A-1R for GRO, and at well A-2R for GRO, benzene, MTBE, and TBA. Non-statistically significant trends are indicated at well A-1R for toluene, ethylbenzene, and total xylenes, and no trend is indicated at well A-1R for benzene.

Based on the linear regression analyses, groundwater concentrations are projected to reach their respective screening levels for GRO, benzene, and MTBE between 2013 and 2048. Overall, the linear regression analyses and available geochemical data indicate ongoing attenuation of hydrocarbon impacts in site groundwater and a decreasing or stable plume.

References

ARCADIS, U.S., Inc. 2011. Response to SF DPH-LP Letter Dated August 11, 2011. September 2011.

California Regional Water Quality Control Board (RWQCB) San Francisco Bay Region. 2008. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, May 2008.

U.S. Environmental Protection Agency (USEPA). 2002. Calculation and Use of First-Order Rate Constants for Monitored Natural Attenuation Studies, November 2002.

Table 1
Statistical Analysis of Groundwater Analytical Data
ARCO Service Station No. 6185
5898 Mission St., San Francisco, CA 94112

Constituent	Well	Cleanup Goal/Screening Level/Remediation Goal (µg/L) ¹	Data Range						Linear Regression Analysis					
			Minimum Concentration (µg/L)	Maximum Concentration (µg/L)	Concentration Measured Most Recently (µg/L)	% of Data Above Laboratory Reporting Limit	Start Date	End Date	Coefficient of Determination, R ²	p-value of Correlation (Significance of Slope)	Attenuation Half-life (days)	Trend Direction	Significance of Trend ²	Projected Year to Screening Level
GRO	A-1R	100	100	24,000	7,100	96	9/21/2004	3/19/2013	3.03E-01	2.41E-03	1,065	Decreasing	Significant	2026
GRO	A-1R	100	4,500	24,000	7,100	100	9/21/2004	3/19/2013	2.34E-01	1.94E-02	2,263	Decreasing	Significant	2048
Benzene	A-1R	1	5.4	4,300	2,600	100	9/21/2004	3/19/2013	9.68E-02	1.07E-01	1,626	Decreasing	NS	NA
Benzene	A-1R	1	1,000	4,300	2,600	100	9/21/2004	3/19/2013	4.98E-02	3.06E-01	NA	No Trend	NS	NA
Toluene	A-1R	40	4.4	2,100	29.6	82	9/21/2004	3/19/2013	1.99E-01	1.73E-02	1,018	Decreasing	Significant	BSL since 05/2011
Toluene	A-1R	40	16	2,100	29.6	87	9/21/2004	3/19/2013	6.68E-02	2.34E-01	1,776	Decreasing	NS	BSL since 05/2011
Ethylbenzene	A-1R	30	5	780	85.2	93	9/21/2004	3/19/2013	3.61E-01	7.26E-04	978	Decreasing	Significant	2013
Ethylbenzene	A-1R	30	35	780	85.2	100	9/21/2004	3/19/2013	1.37E-01	8.26E-02	2,477	Decreasing	NS	NA
Xylenes	A-1R	20	12.5	4,200	282	75	9/21/2004	3/19/2013	2.38E-01	8.51E-03	810	Decreasing	Significant	2014
Xylenes	A-1R	20	25	4,200	282	83	9/21/2004	3/19/2013	9.58E-02	1.51E-01	1,241	Decreasing	NS	NA
GRO	A-2R	100	68	14,000	440	100	9/21/2004	3/19/2013	7.85E-01	3.70E-10	470	Decreasing	Significant	2013
GRO	A-2R	100	170	14,000	440	100	9/21/2004	3/19/2013	8.02E-01	7.93E-09	492	Decreasing	Significant	2014
Benzene	A-2R	1	3.1	5,800	162	100	9/21/2004	3/19/2013	6.97E-01	3.31E-08	328	Decreasing	Significant	2016
Benzene	A-2R	1	21	5,800	162	100	9/21/2004	3/19/2013	6.62E-01	2.31E-06	356	Decreasing	Significant	2017
MTBE	A-2R	5	8.06	130	8.06	86	9/21/2004	3/19/2013	7.40E-01	4.35E-09	1,052	Decreasing	Significant	2016
MTBE	A-2R	5	8.06	130	8.06	83	9/21/2004	3/19/2013	6.86E-01	1.07E-06	1,032	Decreasing	Significant	2015
TBA	A-2R	12	11.8	110	13.7	77	6/3/2008	3/19/2013	8.97E-01	9.11E-07	556	Decreasing	Significant	2013
TBA	A-2R	12	13.7	110	13.7	78	6/3/2008	3/19/2013	9.46E-01	1.06E-05	592	Decreasing	Significant	2013

Notes, Abbreviations and Assumptions:

µg/L = micrograms per liter

NS = not significant

NA = not applicable due to increasing trend or non-significant trend

¹ RWQCB San Francisco Bay Area ESLs

² Statistically significant trend defined as having p-value ≤ 0.05

ND taken at reporting limit/reported value

Qualified data converted to reported value

Represents regression where data that may bias regression results removed

Table 2
Geochemical Parameter Results
ARCO Service Station No. 6185
5898 Mission Street, San Francisco, CA 94112

Well ID	Date	1,2-Dibromoethane (µg/L)	1,2-Dichloroethane (µg/L)	Ethanol (µg/L)	Iron (Ferrous) (µg/L)	Methane (µg/L)	Nitrate-N (µg/L)	Sulfate (µg/L)
A-1R	4/3/2012	<1	43.3	<100	530T8	5.7J	1,200	10,000
A-2R	4/3/2012	<1	25.1	<100	190T8	<10	850	120,000
A-4	4/3/2012	<1	<1	<100	1,100T8	<10	9,700	19,000
S-15	4/3/2012	<1	<1	<100	35JT8	<10	6,600	41,000
S-16	4/3/2012	<1	10.2	<100	500T8	27	11,000	32,000

Notes:

µg/L = Micrograms per liter

J = Estimated value; denotes a value between the method detection limit and reporting limit

< = Analyte was not detected above the specified laboratory reporting limit

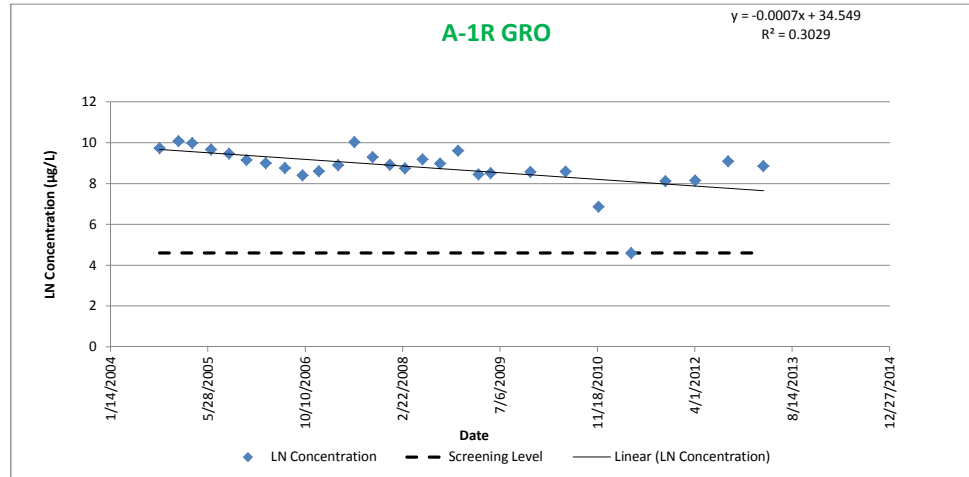
T8= samples received past/too close to holding time expiration

Sample Information
 Sample Location
 Constituent

A-1R
 GRO

Sample Date	Concentration (ug/L)	LN Concentration
9/21/2004	17,000	9.74
12/28/2004	24,000	10.09
3/8/2005	22,000	10.00
6/14/2005	16,000	9.68
9/13/2005	13,000	9.47
12/13/2005	9,500	9.16
3/21/2006	8,200	9.01
6/27/2006	6,400	8.76
9/26/2006	4,500	8.41
12/19/2006	5,500	8.61
3/27/2007	7,400	8.91
6/19/2007	23,000	10.04
9/20/2007	11,000	9.31
12/18/2007	7,500	8.92
3/4/2008	6,300	8.75
6/3/2008	9,800	9.19
9/2/2008	8,000	8.99
12/2/2008	15,000	9.62
3/17/2009	4,700	8.46
5/19/2009	5,000	8.52
12/8/2009	5,300	8.58
6/8/2010	5,400	8.59
11/23/2010	960	6.87
5/10/2011	100	4.61
11/1/2011	3,400	8.13
4/3/2012	3,500	8.16
9/18/2012	9,000	9.10
3/19/2013	7,100	8.87

N Qualifier



Notes:

ND taken at reporting limit/reported value

Analytical data collected during or immediately after active remediation.

Low analytical results which may bias regression result. Low data could be due to previous air sparge installation activities.

Data quality

Total # of data points used in regression	28
# of nondetects	1
% of data as detects	96

Results

Coefficient of Determination (R^2) =	0.3029
p-Value =	2.41E-03
Attenuation Rate in Groundwater (K) =	0.0007 days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0004 days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	1.07E+03 days

Date Screening Level Reached

Screening Level	100
LN Screening Level	4.6
Intercept	34.549
Slope	-0.0007
Date to Screening Level	1/16/2026

Abbreviations and Notes

ug/l = micrograms per liter
 LN = Natural Logarithm

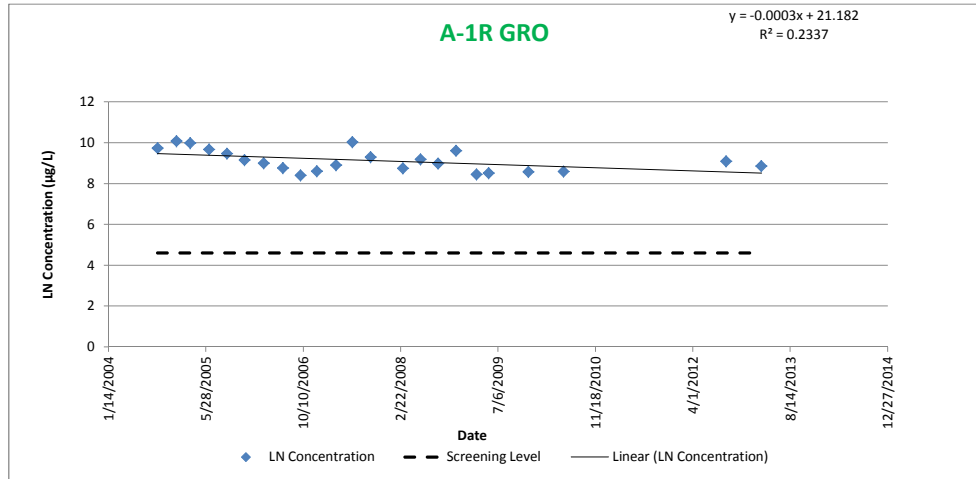
GRO = Gasoline Range Organics

Sample Information
 Sample Location
 Constituent

A-1R
 GRO

Sample Date	Concentration (ug/L)	LN Concentration
9/21/2004	17,000	9.74
12/28/2004	24,000	10.09
3/8/2005	22,000	10.00
6/14/2005	16,000	9.68
9/13/2005	13,000	9.47
12/13/2005	9,500	9.16
3/21/2006	8,200	9.01
6/27/2006	6,400	8.76
9/26/2006	4,500	8.41
12/19/2006	5,500	8.61
3/27/2007	7,400	8.91
6/19/2007	23,000	10.04
9/20/2007	11,000	9.31
3/4/2008	6,300	8.75
6/3/2008	9,800	9.19
9/2/2008	8,000	8.99
12/2/2008	15,000	9.62
3/17/2009	4,700	8.46
5/19/2009	5,000	8.52
12/8/2009	5,300	8.58
6/8/2010	5,400	8.59
9/18/2012	9,000	9.10
3/19/2013	7,100	8.87

N Qualifier



Notes:

Data quality	
Total # of data points used in regression	23
# of nondetects	0
% of data as detects	100

Results		
Coefficient of Determination (R^2) =	0.2337	
p-Value =	1.94E-02	
Attenuation Rate in Groundwater (K) =	0.0003	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0001	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	2.26E+03	days

Date Screening Level Reached	
Screening Level	100
LN Screening Level	4.6
Intercept	21.182
Slope	-0.0003
Date to Screening Level	3/24/2048

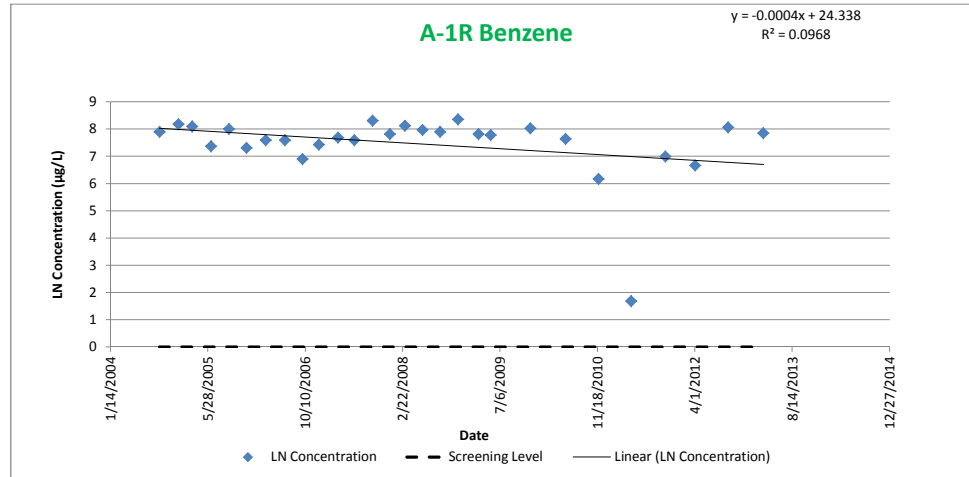
Abbreviations and Notes
 ug/l = micrograms per liter
 LN = Natural Logarithm

GRO = Gasoline Range Organics

Sample Information
 Sample Location
 Constituent

A-1R
 Benzene

Sample Date	Concentration (ug/L)	LN Concentration
9/21/2004	2,700	7.90
12/28/2004	3,600	8.19
3/8/2005	3,300	8.10
6/14/2005	1,600	7.38
9/13/2005	3,000	8.01
12/13/2005	1,500	7.31
3/21/2006	2,000	7.60
6/27/2006	2,000	7.60
9/26/2006	1,000	6.91
12/19/2006	1,700	7.44
3/27/2007	2,200	7.70
6/19/2007	2,000	7.60
9/20/2007	4,100	8.32
12/18/2007	2,500	7.82
3/4/2008	3,400	8.13
6/3/2008	2,900	7.97
9/2/2008	2,700	7.90
12/2/2008	4,300	8.37
3/17/2009	2,500	7.82
5/19/2009	2,400	7.78
12/8/2009	3,100	8.04
6/8/2010	2,100	7.65
11/23/2010	480	6.17
5/10/2011	5.4	1.69
11/1/2011	1,100	7.00
4/3/2012	792	6.67
9/18/2012	3,200	8.07
3/19/2013	2,600	7.86



Notes:

- Analytical data collected during or immediately after active remediation.
- Low analytical results which may bias regression result. Low data could be due to previous air sparge installation activities.

Data quality	
Total # of data points used in regression	28
# of nondetects	0
% of data as detects	100

Results		
Coefficient of Determination (R ²) =	0.0968	
p-Value =	1.07E-01	
Attenuation Rate in Groundwater (K) =	0.0004	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0001	days ⁻¹
Chemical Half Life in Groundwater (t _{1/2}) =	1.63E+03	days

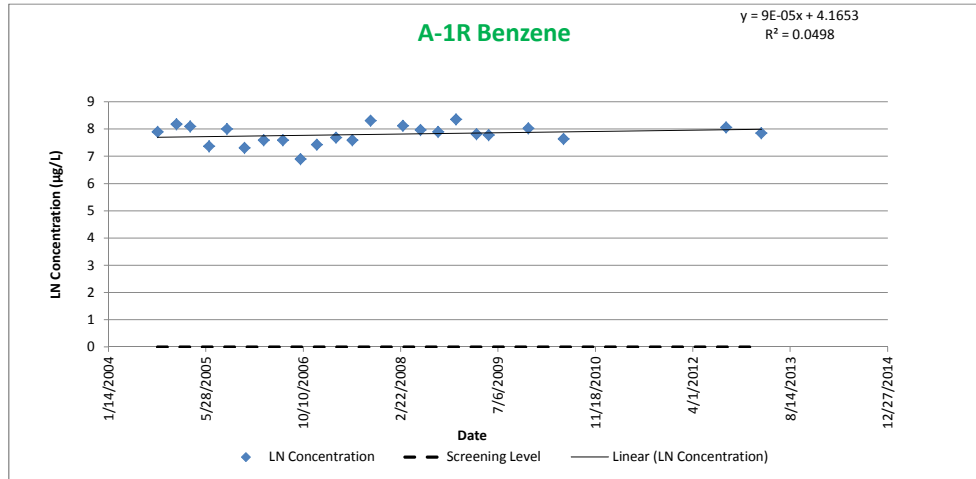
Date Screening Level Reached	
Screening Level	1
LN Screening Level	0.0
Intercept	24.338
Slope	-0.0004
Date to Screening Level	NA

Abbreviations and Notes
 ug/l = micrograms per liter
 LN = Natural Logarithm

Sample Information
 Sample Location
 Constituent

A-1R
 Benzene

Sample Date	Concentration (ug/L)	LN Concentration
9/21/2004	2,700	7.90
12/28/2004	3,600	8.19
3/8/2005	3,300	8.10
6/14/2005	1,600	7.38
9/13/2005	3,000	8.01
12/13/2005	1,500	7.31
3/21/2006	2,000	7.60
6/27/2006	2,000	7.60
9/26/2006	1,000	6.91
12/19/2006	1,700	7.44
3/27/2007	2,200	7.70
6/19/2007	2,000	7.60
9/20/2007	4,100	8.32
3/4/2008	3,400	8.13
6/3/2008	2,900	7.97
9/2/2008	2,700	7.90
12/2/2008	4,300	8.37
3/17/2009	2,500	7.82
5/19/2009	2,400	7.78
12/8/2009	3,100	8.04
6/8/2010	2,100	7.65
9/18/2012	3,200	8.07
3/19/2013	2,600	7.86



Notes:

Data quality	
Total # of data points used in regression	23
# of nondetects	0
% of data as detects	100

Results		
Coefficient of Determination (R^2) =	0.0498	
p-Value =	3.06E-01	
Attenuation Rate in Groundwater (K) =	-0.0001	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	-0.0002	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	NA	days

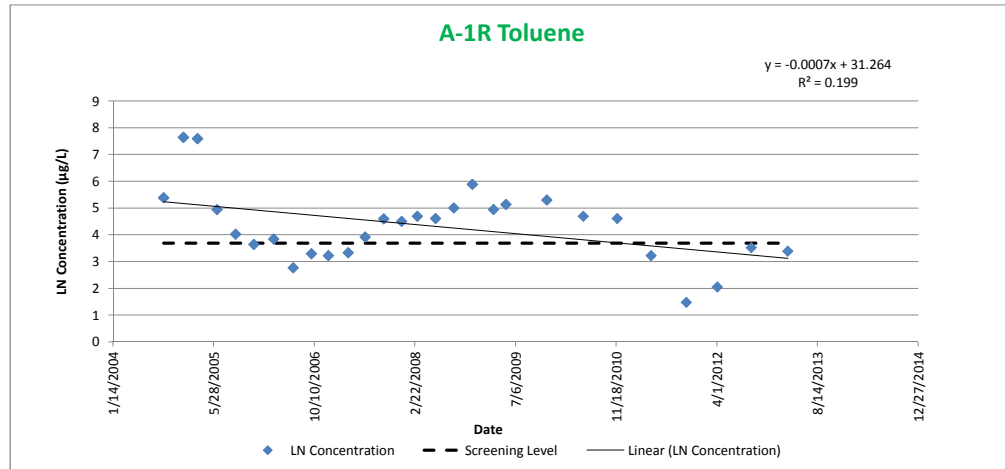
Date Screening Level Reached	
Screening Level	1
LN Screening Level	0.0
Intercept	4.165
Slope	0.0001
Date to Screening Level	NA

Abbreviations and Notes
 ug/l = micrograms per liter
 LN = Natural Logarithm

Sample Information
 Sample Location
 Constituent

A-1R
 Toluene

Sample Date	Concentration (ug/L)	LN Concentration
9/21/2004	220	5.39
12/28/2004	2,100	7.65
3/8/2005	2,000	7.60
6/14/2005	140	4.94
9/13/2005	56	4.03
12/13/2005	38	3.64
3/21/2006	47	3.85
6/27/2006	16	2.77
9/26/2006	27	3.30
12/19/2006	25	3.22
3/27/2007	28	3.33
6/19/2007	50	3.91
9/20/2007	99	4.60
12/18/2007	90	4.50
3/4/2008	110	4.70
6/3/2008	100	4.61
9/2/2008	150	5.01
12/2/2008	360	5.89
3/17/2009	140	4.94
5/19/2009	170	5.14
12/8/2009	200	5.30
6/8/2010	110	4.70
11/23/2010	100	4.61
5/10/2011	25	3.22
11/1/2011	4.4	1.48
4/3/2012	7.8	2.05
9/18/2012	33.8	3.52
3/19/2013	29.6	3.39



Notes:

ND taken at reporting limit/reported value
 Qualified data converted to reported value

Analytical data collected during or immediately after active remediation.
 Low analytical results which may bias regression result. Low data could be due to previous air sparge installation activities.

Data quality

Total # of data points used in regression	28
# of nondetects	5
% of data as detects	82

Results

Coefficient of Determination (R^2) =	0.1990
p-Value =	1.73E-02
Attenuation Rate in Groundwater (K) =	0.0007 days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0003 days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	1.02E+03 days

Date Screening Level Reached

Screening Level	40
LN Screening Level	3.7
Intercept	31.264
Slope	-0.0007
Date to Screening Level	BSL since 05/2011

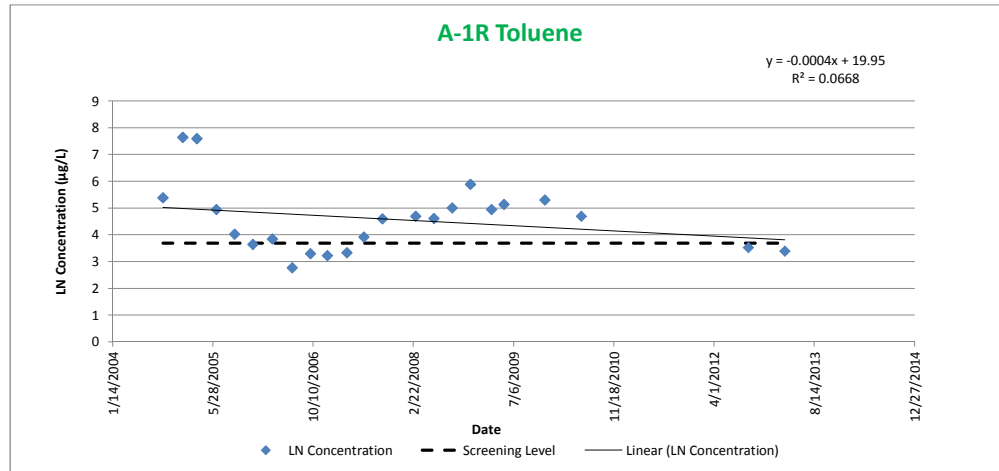
Abbreviations and Notes

ug/l = micrograms per liter
 LN = Natural Logarithm

Sample Information
 Sample Location
 Constituent

A-1R
 Toluene

Sample Date	Concentration (ug/L)	LN Concentration
9/21/2004	220	5.39
12/28/2004	2,100	7.65
3/8/2005	2,000	7.60
6/14/2005	140	4.94
9/13/2005	56	4.03
12/13/2005	38	3.64
3/21/2006	47	3.85
6/27/2006	16	2.77
9/26/2006	27	3.30
12/19/2006	25	3.22
3/27/2007	28	3.33
6/19/2007	50	3.91
9/20/2007	99	4.60
3/4/2008	110	4.70
6/3/2008	100	4.61
9/2/2008	150	5.01
12/2/2008	360	5.89
3/17/2009	140	4.94
5/19/2009	170	5.14
12/8/2009	200	5.30
6/8/2010	110	4.70
9/18/2012	33.8	3.52
3/19/2013	29.6	3.39



Notes:

ND taken at reporting limit/reported value
 Qualified data converted to reported value

Data quality	
Total # of data points used in regression	23
# of nondetects	3
% of data as detects	87

Results		
Coefficient of Determination (R^2) =	0.0668	
p-Value =	2.34E-01	
Attenuation Rate in Groundwater (K) =	0.0004	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0000	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	1.78E+03	days

Date Screening Level Reached	
Screening Level	40
LN Screening Level	3.7
Intercept	19.950
Slope	-0.0004
Date to Screening Level	BSL since 05/2011

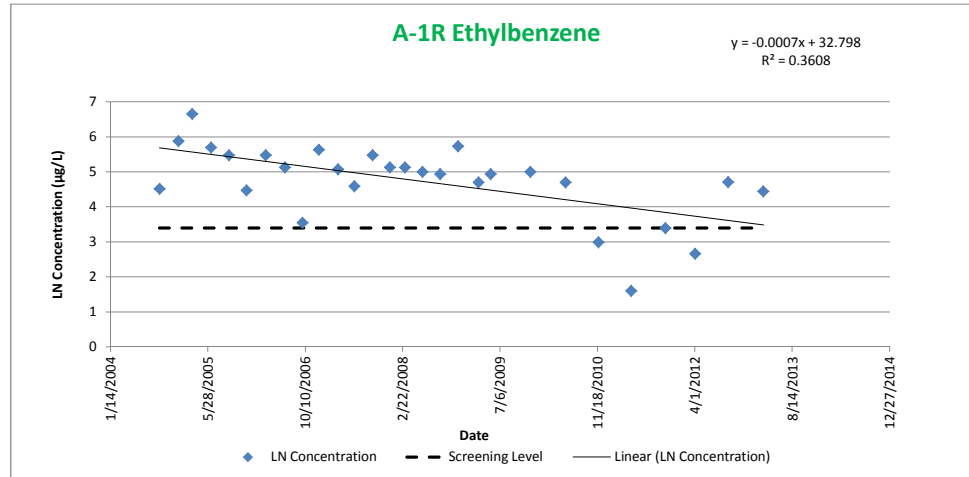
Abbreviations and Notes

ug/l = micrograms per liter
 LN = Natural Logarithm

Sample Information
 Sample Location
 Constituent

A-1R
 Ethylbenzene

Sample Date	Concentration (ug/L)	LN Concentration
9/21/2004	92	4.52
12/28/2004	360	5.89
3/8/2005	780	6.66
6/14/2005	300	5.70
9/13/2005	240	5.48
12/13/2005	88	4.48
3/21/2006	240	5.48
6/27/2006	170	5.14
9/26/2006	35	3.56
12/19/2006	280	5.63
3/27/2007	160	5.08
6/19/2007	99	4.60
9/20/2007	240	5.48
12/18/2007	170	5.14
3/4/2008	170	5.14
6/3/2008	150	5.01
9/2/2008	140	4.94
12/2/2008	310	5.74
3/17/2009	110	4.70
5/19/2009	140	4.94
12/8/2009	150	5.01
6/8/2010	110	4.70
11/23/2010	20	3.00
5/10/2011	5	1.61
11/1/2011	30	3.40
4/3/2012	14.4	2.67
9/18/2012	111	4.71
3/19/2013	85.2	4.45



Notes:

ND taken at reporting limit/reported value

Analytical data collected during or immediately after active remediation.

Low analytical results which may bias regression result. Low data could be due to previous air sparge installation activities.

Data quality

Total # of data points used in regression	28
# of nondetects	2
% of data as detects	93

Results

Coefficient of Determination (R^2) =	0.3608
p-Value =	7.26E-04
Attenuation Rate in Groundwater (K) =	0.0007 days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0005 days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	9.78E+02 days

Date Screening Level Reached

Screening Level	30
LN Screening Level	3.4
Intercept	32.798
Slope	-0.0007
Date to Screening Level	7/20/2013

Abbreviations and Notes

ug/l = micrograms per liter
 LN = Natural Logarithm

Sample Information

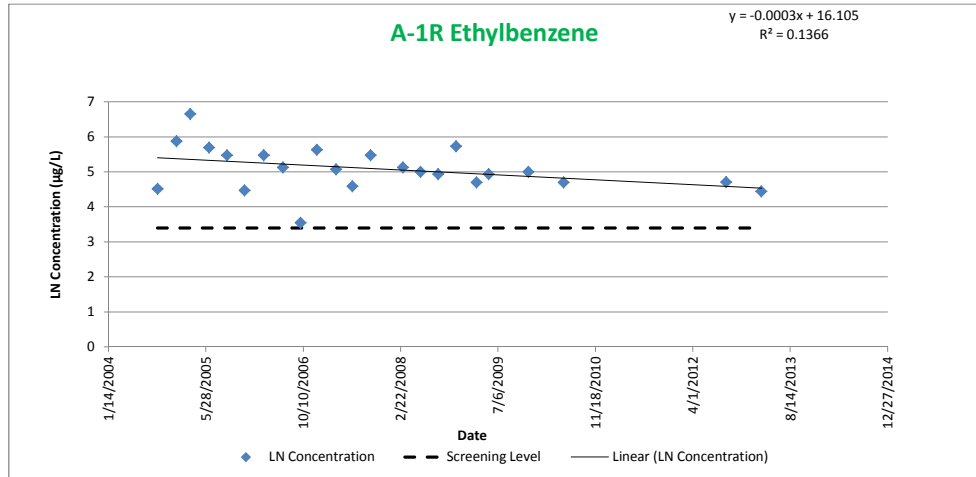
Sample Location

Constituent

A-1R

Ethylbenzene

Data		
Sample Date	Concentration (ug/L)	LN Concentration
9/21/2004	92	4.52
12/28/2004	360	5.89
3/8/2005	780	6.66
6/14/2005	300	5.70
9/13/2005	240	5.48
12/13/2005	88	4.48
3/21/2006	240	5.48
6/27/2006	170	5.14
9/26/2006	35	3.56
12/19/2006	280	5.63
3/27/2007	160	5.08
6/19/2007	99	4.60
9/20/2007	240	5.48
3/4/2008	170	5.14
6/3/2008	150	5.01
9/2/2008	140	4.94
12/2/2008	310	5.74
3/17/2009	110	4.70
5/19/2009	140	4.94
12/8/2009	150	5.01
6/8/2010	110	4.70
9/18/2012	111	4.71
3/19/2013	85.2	4.45



Notes:

Data quality	
Total # of data points used in regression	23
# of nondetects	0
% of data as detects	100

Results		
Coefficient of Determination (R^2) =	0.1366	
p-Value =	8.26E-02	
Attenuation Rate in Groundwater (K) =	0.0003	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0001	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	2.48E+03	days

Date Screening Level Reached	
Screening Level	30
LN Screening Level	3.4
Intercept	16.105
Slope	-0.0003
Date to Screening Level	NA

Abbreviations and Notes

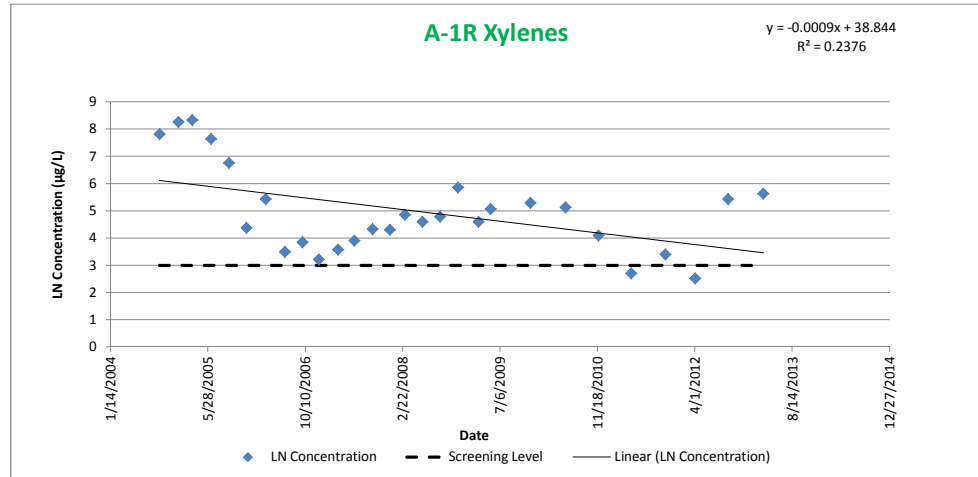
ug/l = micrograms per liter

LN = Natural Logarithm

Sample Information
 Sample Location
 Constituent

A-1R
 Xylenes

Data		
Sample Date	Concentration (ug/L)	LN Concentration
9/21/2004	2,500	7.82
12/28/2004	3,900	8.27
3/8/2005	4,200	8.34
6/14/2005	2,100	7.65
9/13/2005	870	6.77
12/13/2005	80	4.38
3/21/2006	230	5.44
6/27/2006	33	3.50
9/26/2006	47	3.85
12/19/2006	25	3.22
3/27/2007	36	3.58
6/19/2007	50	3.91
9/20/2007	76	4.33
12/18/2007	74	4.30
3/4/2008	130	4.87
6/3/2008	100	4.61
9/2/2008	120	4.79
12/2/2008	350	5.86
3/17/2009	100	4.61
5/19/2009	160	5.08
12/8/2009	200	5.30
6/8/2010	170	5.14
11/23/2010	60	4.09
5/10/2011	15	2.71
11/1/2011	30	3.40
4/3/2012	12.5	2.53
9/18/2012	231	5.44
3/19/2013	282	5.64



Notes:

ND taken at reporting limit/reported value

Analytical data collected during or immediately after active remediation.

Low analytical results which may bias regression result. Low data could be due to previous air sparge installation activities.

Data quality

Total # of data points used in regression	28
# of nondetects	7
% of data as detects	75

Results

Coefficient of Determination (R^2) =	0.2376
p-Value =	8.51E-03
Attenuation Rate in Groundwater (K) =	0.0009 days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0005 days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	8.10E+02 days

Date Screening Level Reached

Screening Level	20
LN Screening Level	3.0
Intercept	38.844
Slope	-0.0009
Date to Screening Level	9/17/2014

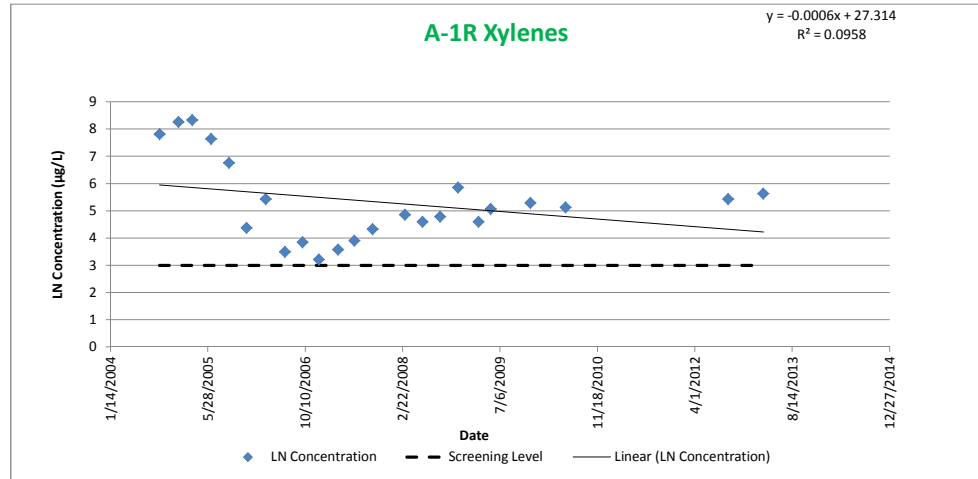
Abbreviations and Notes

ug/l = micrograms per liter
 LN = Natural Logarithm

Sample Information
 Sample Location
 Constituent

A-1R
 Xylenes

Sample Date	Concentration (ug/L)	LN Concentration
9/21/2004	2,500	7.82
12/28/2004	3,900	8.27
3/8/2005	4,200	8.34
6/14/2005	2,100	7.65
9/13/2005	870	6.77
12/13/2005	80	4.38
3/21/2006	230	5.44
6/27/2006	33	3.50
9/26/2006	47	3.85
12/19/2006	25	3.22
3/27/2007	36	3.58
6/19/2007	50	3.91
9/20/2007	76	4.33
3/4/2008	130	4.87
6/3/2008	100	4.61
9/2/2008	120	4.79
12/2/2008	350	5.86
3/17/2009	100	4.61
5/19/2009	160	5.08
12/8/2009	200	5.30
6/8/2010	170	5.14
9/18/2012	231	5.44
3/19/2013	282	5.64



Notes:
 ND taken at reporting limit/reported value

Data quality	
Total # of data points used in regression	23
# of nondetects	4
% of data as detects	83

Results		
Coefficient of Determination (R^2) =	0.0958	
p-Value =	1.51E-01	
Attenuation Rate in Groundwater (K) =	0.0006	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0001	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	1.24E+03	days

Date Screening Level Reached	
Screening Level	20
LN Screening Level	3.0
Intercept	27.314
Slope	-0.0006
Date to Screening Level	NA

Abbreviations and Notes
 ug/l = micrograms per liter
 LN = Natural Logarithm

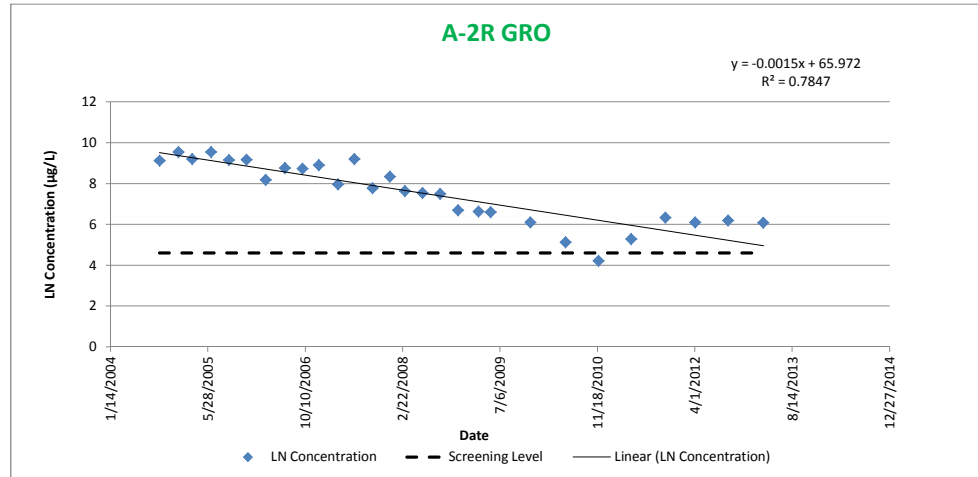
Sample Information
 Sample Location
 Constituent

A-2R
 GRO

Sample Date	Concentration (ug/L)	LN Concentration
9/21/2004	9,300	9.14
12/28/2004	14,000	9.55
3/8/2005	10,000	9.21
6/14/2005	14,000	9.55
9/13/2005	9,500	9.16
12/13/2005	9,700	9.18
3/21/2006	3,600	8.19
6/27/2006	6,400	8.76
9/26/2006	6,200	8.73
12/19/2006	7,400	8.91
3/27/2007	2,900	7.97
6/19/2007	10,000	9.21
9/20/2007	2,400	7.78
12/18/2007	4,200	8.34
3/4/2008	2,100	7.65
6/3/2008	1,900	7.55
9/2/2008	1,800	7.50
12/2/2008	810	6.70
3/17/2009	770	6.65
5/19/2009	740	6.61
12/8/2009	450	6.11
6/8/2010	170	5.14
11/23/2010	68	4.22
5/10/2011	200	5.30
11/1/2011	570	6.35
4/3/2012	450	6.11
9/18/2012	490	6.19
3/19/2013	440	6.09

Qualified with "N"

Qualified with "N"



Notes:

- ND taken at reporting limit/reported value
- Qualified data converted to reported value
- Analytical data collected during or immediately after active remediation.
- Low analytical results which may bias regression result. Low data could be due to previous air sparge installation activities.

Data quality	
Total # of data points used in regression	28
# of nondetects	0
% of data as detects	100

Results		
Coefficient of Determination (R ²) =	0.7847	
p-Value =	3.70E-10	
Attenuation Rate in Groundwater (K) =	0.0015	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0013	days ⁻¹
Chemical Half Life in Groundwater (t _{1/2}) =	4.70E+02	days

Date Screening Level Reached	
Screening Level	100
LN Screening Level	4.6
Intercept	65.972
Slope	-0.0015
Date to Screening Level	11/8/2013

Abbreviations and Notes

ug/l = micrograms per liter
 LN = Natural Logarithm
 GRO = Gasoline Range Organics

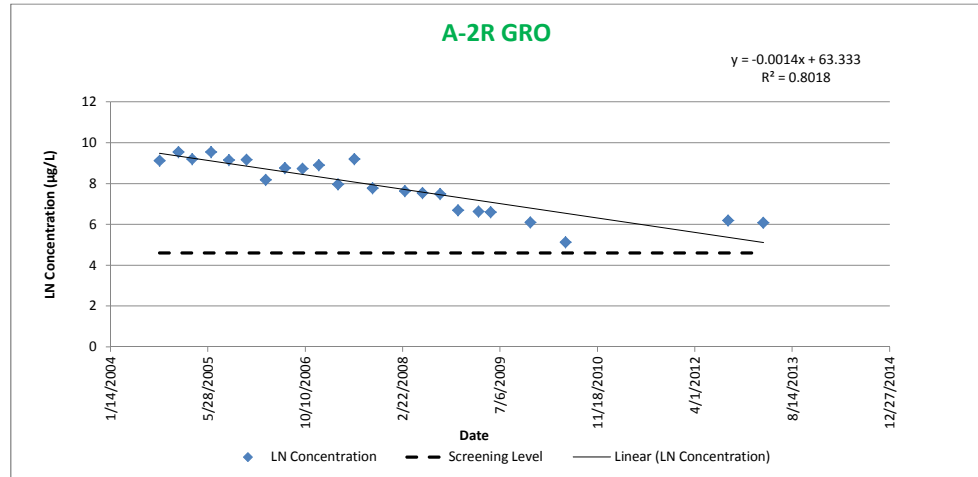
Sample Information
 Sample Location
 Constituent

A-2R
 GRO

Sample Date	Concentration (ug/L)	LN Concentration
9/21/2004	9,300	9.14
12/28/2004	14,000	9.55
3/8/2005	10,000	9.21
6/14/2005	14,000	9.55
9/13/2005	9,500	9.16
12/13/2005	9,700	9.18
3/21/2006	3,600	8.19
6/27/2006	6,400	8.76
9/26/2006	6,200	8.73
12/19/2006	7,400	8.91
3/27/2007	2,900	7.97
6/19/2007	10,000	9.21
9/20/2007	2,400	7.78
3/4/2008	2,100	7.65
6/3/2008	1,900	7.55
9/2/2008	1,800	7.50
12/2/2008	810	6.70
3/17/2009	770	6.65
5/19/2009	740	6.61
12/8/2009	450	6.11
6/8/2010	170	5.14
9/18/2012	490	6.19
3/19/2013	440	6.09

"N" Qualifier

"N" Qualifier



Notes:

Data quality	
Total # of data points used in regression	23
# of nondetects	0
% of data as detects	100

Results		
Coefficient of Determination (R^2) =	0.8018	
p-Value =	7.93E-09	
Attenuation Rate in Groundwater (K) =	0.0014	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0012	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	4.92E+02	days

Date Screening Level Reached	
Screening Level	100
LN Screening Level	4.6
Intercept	63.333
Slope	-0.0014
Date to Screening Level	3/19/2014

Abbreviations and Notes
 ug/l = micrograms per liter
 LN = Natural Logarithm

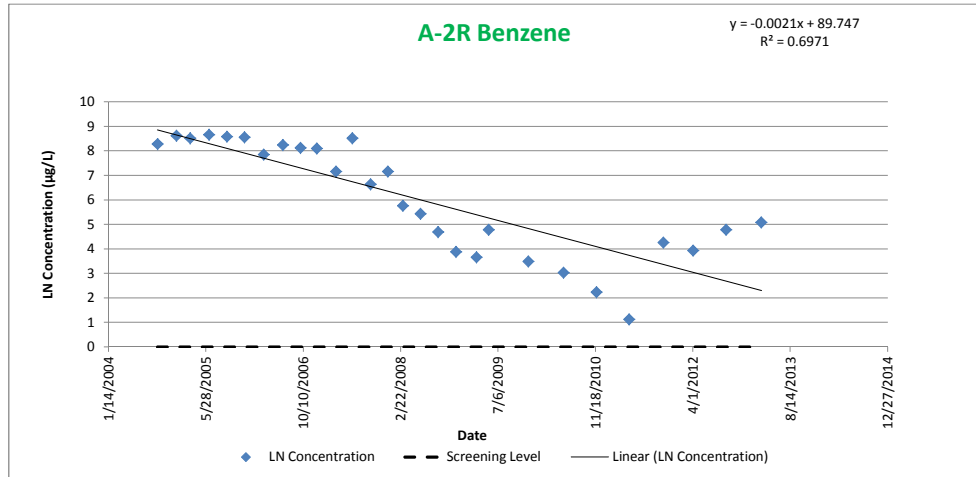
GRO = Gasoline Range Organics

Sample Information
 Sample Location
 Constituent

A-2R
 Benzene

Data	Sample Date	Concentration (ug/L)	LN Concentration
	9/21/2004	4,000	8.29
	12/28/2004	5,600	8.63
	3/8/2005	5,000	8.52
	6/14/2005	5,800	8.67
	9/13/2005	5,400	8.59
	12/13/2005	5,200	8.56
	3/21/2006	2,600	7.86
	6/27/2006	3,800	8.24
	9/26/2006	3,400	8.13
	12/19/2006	3,300	8.10
	3/27/2007	1,300	7.17
	6/19/2007	5,000	8.52
	9/20/2007	770	6.65
	12/18/2007	1,300	7.17
	3/4/2008	320	5.77
	6/3/2008	230	5.44
	9/2/2008	110	4.70
	12/2/2008	49	3.89
	3/17/2009	39	3.66
	5/19/2009	120	4.79
	12/8/2009	33	3.50
	6/8/2010	21	3.04
	11/23/2010	9.4	2.24
	5/10/2011	3.1	1.13
	11/1/2011	71	4.26
	4/3/2012	51.4	3.94
	9/18/2012	120	4.79
	3/19/2013	162	5.09

"V" qualifier



Notes:

- Analytical data collected during or immediately after active remediation.
- Low analytical results which may bias regression result. Low data could be due to previous air sparge installation activities.

Data quality	
Total # of data points used in regression	28
# of nondetects	0
% of data as detects	100

Results		
Coefficient of Determination (R^2) =	0.6971	
p-Value =	3.31E-08	
Attenuation Rate in Groundwater (K) =	0.0021	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0018	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	3.28E+02	days

Date Screening Level Reached	
Screening Level	1
LN Screening Level	0.0
Intercept	89.747
Slope	-0.0021
Date to Screening Level	3/11/2016

Abbreviations and Notes
 ug/l = micrograms per liter
 LN = Natural Logarithm

Sample Information

Sample Location

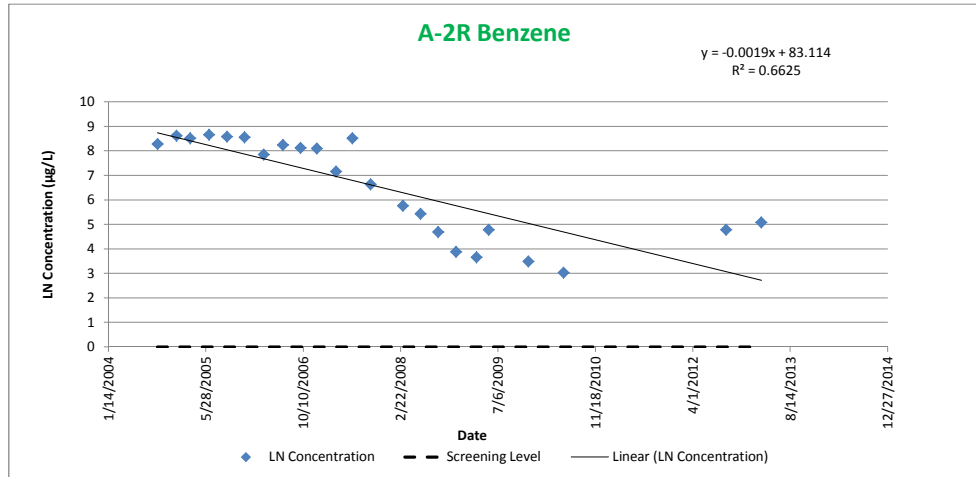
Constituent

A-2R

Benzene

Data		
Sample Date	Concentration (ug/L)	LN Concentration
9/21/2004	4,000	8.29
12/28/2004	5,600	8.63
3/8/2005	5,000	8.52
6/14/2005	5,800	8.67
9/13/2005	5,400	8.59
12/13/2005	5,200	8.56
3/21/2006	2,600	7.86
6/27/2006	3,800	8.24
9/26/2006	3,400	8.13
12/19/2006	3,300	8.10
3/27/2007	1,300	7.17
6/19/2007	5,000	8.52
9/20/2007	770	6.65
3/4/2008	320	5.77
6/3/2008	230	5.44
9/2/2008	110	4.70
12/2/2008	49	3.89
3/17/2009	39	3.66
5/19/2009	120	4.79
12/8/2009	33	3.50
6/8/2010	21	3.04
9/18/2012	120	4.79
3/19/2013	162	5.09

"V" qualifier



Notes:

Data quality	
Total # of data points used in regression	23
# of nondetects	0
% of data as detects	100

Results		
Coefficient of Determination (R^2) =	0.6625	
p-Value =	2.31E-06	
Attenuation Rate in Groundwater (K) =	0.0019	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0015	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	3.56E+02	days

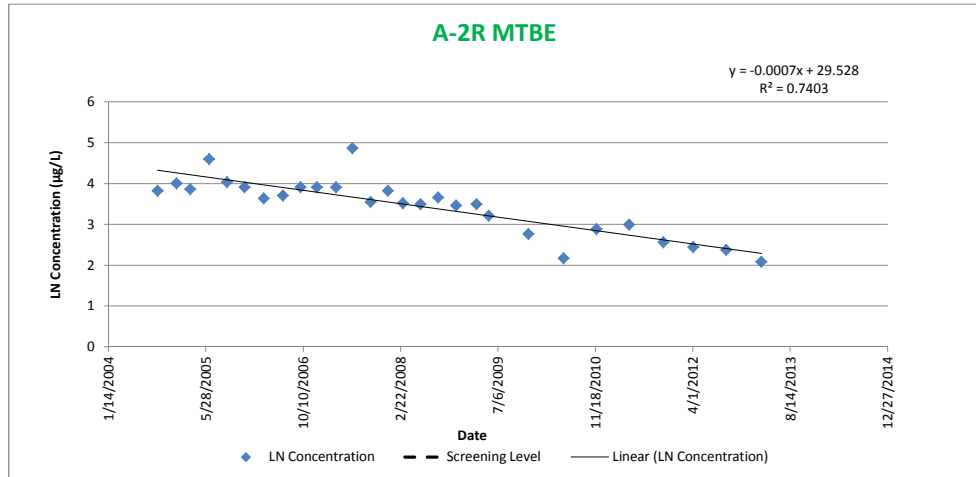
Date Screening Level Reached	
Screening Level	1
LN Screening Level	0.0
Intercept	83.114
Slope	-0.0019
Date to Screening Level	1/15/2017

Abbreviations and Notes

ug/l = micrograms per liter
LN = Natural Logarithm

Sample Information
 Sample Location A-2R
 Constituent MTBE

Sample Date	Concentration (ug/L)	LN Concentration
9/21/2004	46	3.83
12/28/2004	55	4.01
3/8/2005	48	3.87
6/14/2005	100	4.61
9/13/2005	57	4.04
12/13/2005	50	3.91
3/21/2006	38	3.64
6/27/2006	41	3.71
9/26/2006	50	3.91
12/19/2006	50	3.91
3/27/2007	50	3.91
6/19/2007	130	4.87
9/20/2007	35	3.56
12/18/2007	46	3.83
3/4/2008	34	3.53
6/3/2008	33	3.50
9/2/2008	39	3.66
12/2/2008	32	3.47
3/17/2009	33	3.50
5/19/2009	25	3.22
12/8/2009	16	2.77
6/8/2010	8.8	2.17
11/23/2010	18	2.89
5/10/2011	20	3.00
11/1/2011	13	2.56
4/3/2012	11.6	2.45
9/18/2012	10.8	2.38
3/19/2013	8.06	2.09



Notes:

ND taken at reporting limit/reported value

Analytical data collected during or immediately after active remediation.

Low analytical results which may bias regression result. Low data could be due to previous air sparge installation activities.

Data quality

Total # of data points used in regression	28
# of nondetects	4
% of data as detects	86

Results

Coefficient of Determination (R^2) =	0.7403
p-Value =	4.35E-09
Attenuation Rate in Groundwater (K) =	0.0007 days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0006 days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	1.05E+03 days

Date Screening Level Reached

Screening Level	5
LN Screening Level	1.6
Intercept	29.528
Slope	-0.0007
Date to Screening Level	1/16/2016

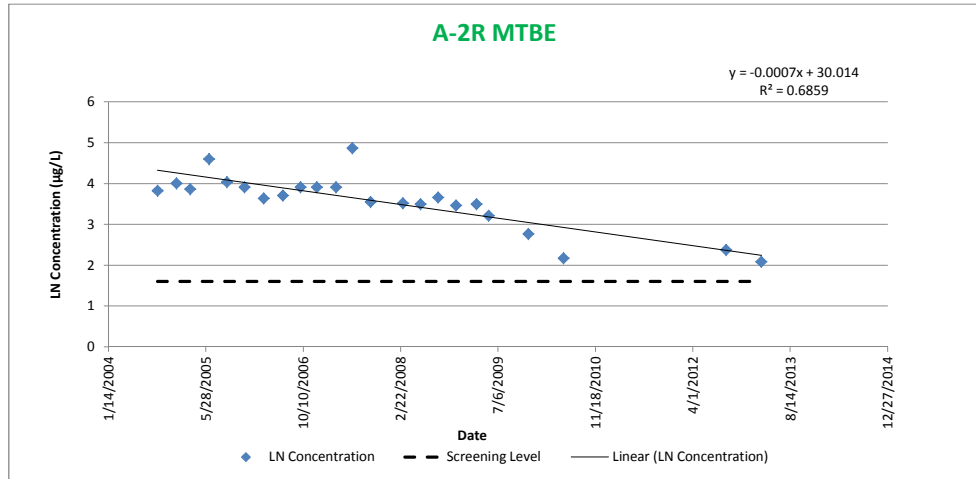
Abbreviations and Notes

ug/l = micrograms per liter
 LN = Natural Logarithm

MTBE = Methyl tert-butyl ether

Sample Information
 Sample Location A-2R
 Constituent MTBE

Sample Date	Concentration (ug/L)	LN Concentration
9/21/2004	46	3.83
12/28/2004	55	4.01
3/8/2005	48	3.87
6/14/2005	100	4.61
9/13/2005	57	4.04
12/13/2005	50	3.91
3/21/2006	38	3.64
6/27/2006	41	3.71
9/26/2006	50	3.91
12/19/2006	50	3.91
3/27/2007	50	3.91
6/19/2007	130	4.87
9/20/2007	35	3.56
3/4/2008	34	3.53
6/3/2008	33	3.50
9/2/2008	39	3.66
12/2/2008	32	3.47
3/17/2009	33	3.50
5/19/2009	25	3.22
12/8/2009	16	2.77
6/8/2010	8.8	2.17
9/18/2012	10.8	2.38
3/19/2013	8.06	2.09



Notes:
 ND taken at reporting limit/reported value

Data quality	
Total # of data points used in regression	23
# of nondetects	4
% of data as detects	83

Results		
Coefficient of Determination (R^2) =	0.6859	
p-Value =	1.07E-06	
Attenuation Rate in Groundwater (K) =	0.0007	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0005	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	1.03E+03	days

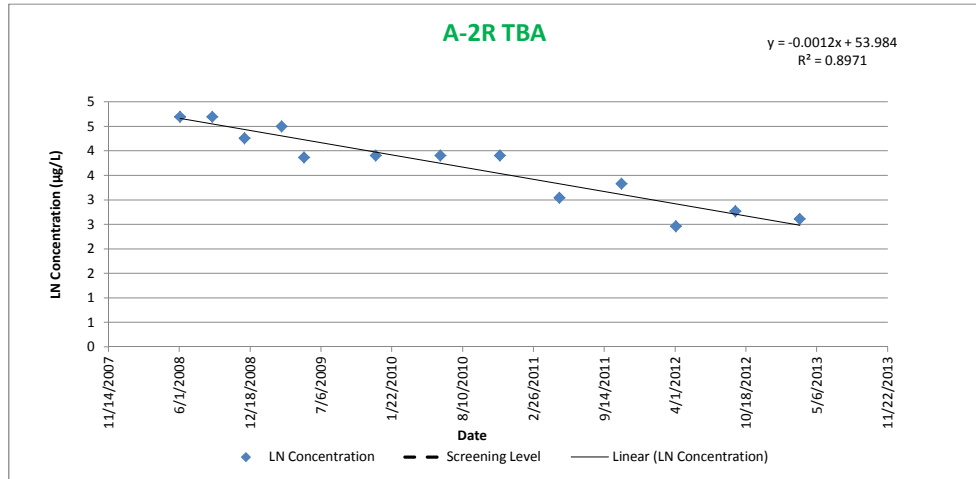
Date Screening Level Reached	
Screening Level	5
LN Screening Level	1.6
Intercept	30.014
Slope	-0.0007
Date to Screening Level	10/21/2015

Abbreviations and Notes
 ug/l = micrograms per liter
 LN = Natural Logarithm
 MTBE = Methyl tert-butyl ether

Sample Information
 Sample Location
 Constituent

A-2R
 TBA

Sample Date	Concentration (ug/L)	LN Concentration
6/3/2008	110	4.70
9/2/2008	110	4.70
12/2/2008	71	4.26
3/17/2009	90	4.50
5/19/2009	48	3.87
12/8/2009	50	3.91
6/8/2010	50	3.91
11/23/2010	50	3.91
5/10/2011	21	3.04
11/1/2011	28	3.33
4/3/2012	11.8	2.47
9/18/2012	16	2.77
3/19/2013	13.7	2.62



Notes:

ND taken at reporting limit/reported value
 Qualified data converted to reported value

Analytical data collected during or immediately after active remediation.
 Low analytical results which may bias regression result. Low data could be due to previous air sparge installation activities.

Data quality	
Total # of data points used in regression	13
# of nondetects	3
% of data as detects	77

Results		
Coefficient of Determination (R^2) =	0.8971	
p-Value =	9.11E-07	
Attenuation Rate in Groundwater (K) =	0.0012	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0011	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	5.56E+02	days

Date Screening Level Reached	
Screening Level	12
LN Screening Level	2.5
Intercept	53.984
Slope	-0.0012
Date to Screening Level	3/18/2013

Abbreviations and Notes

ug/l = micrograms per liter
 LN = Natural Logarithm
 TBA = tert-butyl alcohol

Sample Information

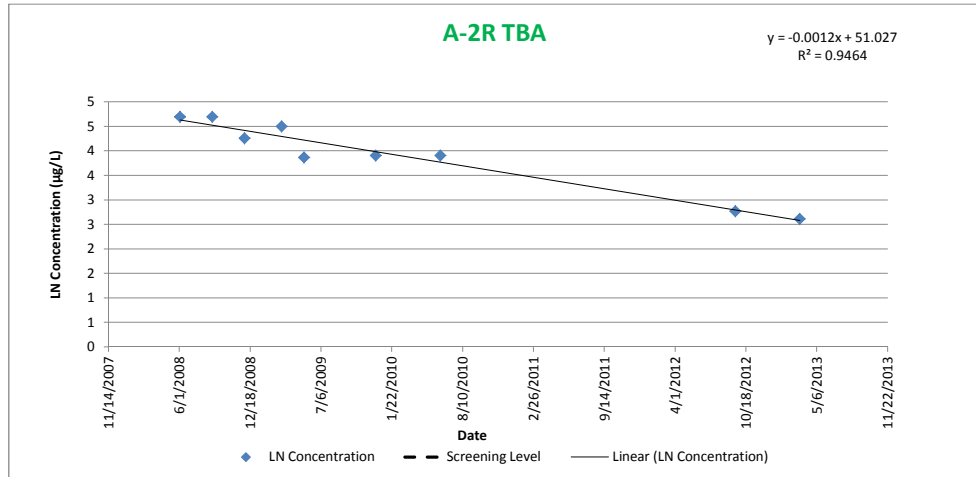
Sample Location

Constituent

A-2R

TBA

Data		
Sample Date	Concentration (ug/L)	LN Concentration
6/3/2008	110	4.70
9/2/2008	110	4.70
12/2/2008	71	4.26
3/17/2009	90	4.50
5/19/2009	48	3.87
12/8/2009	50	3.91
6/8/2010	50	3.91
9/18/2012	16	2.77
3/19/2013	13.7	2.62



Notes:

ND taken at reporting limit/reported value

Data quality	
Total # of data points used in regression	9
# of nondetects	2
% of data as detects	78

Results		
Coefficient of Determination (R^2) =	0.9464	
p-Value =	1.06E-05	
Attenuation Rate in Groundwater (K) =	0.0012	days ⁻¹
Attenuation Rate in Groundwater at 90% confidence (K) =	0.0010	days ⁻¹
Chemical Half Life in Groundwater ($t_{1/2}$) =	5.92E+02	days

Date Screening Level Reached	
Screening Level	12
LN Screening Level	2.5
Intercept	51.027
Slope	-0.0012
Date to Screening Level	6/11/2013

Abbreviations and Notes

ug/l = micrograms per liter
LN = Natural Logarithm

TBA = tert-butyl alcohol



Attachment 3

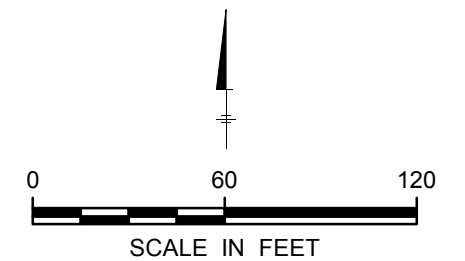
Figures: Groundwater Elevation Contour and Flow Direction for the Perched/Shallow and Deep/Regional groundwater bearing units (Figures 7A and 7B) and GRO and Benzene Iso-concentration maps (Figure 9 and 10)

CITY: CLEVELAND DIV/GROUP: ENV/IM DB: kgpeters LD: PIC: PM: TM: PROJECT: H:\GIS\PROJECTS\ENR\BP_FOXGLOVE\CA06185\GIS\MXD\CA06185_FIG7A_GW_CONTOUR.mxd DATE: 8/5/2013 3:42:07 PM



LEGEND:

- GROUNDWATER MONITORING WELL
- GROUNDWATER MONITORING WELL (FORMER SHELL)
- PERCHED WATER ZONE WELL (FORMER SHELL)
- TEMPORARY MONITORING WELL
- HYDROPUNCH WELL
- VAPOR EXTRACTION WELL
- AIR SPARGE WELL
- CPT BORING LOCATION
- DESTROYED GROUNDWATER MONITORING WELL
- DESTROYED GROUNDWATER WELL (FORMER SHELL)
- DESTROYED PERCHED WATER ZONE WELL (FORMER SHELL)
- (276.39) GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
- 276 GROUNDWATER ELEVATION CONTOUR LINE (DASHED WHERE INFERRED)
- 0.07 FT/FT GROUNDWATER FLOW DIRECTION (FOOT PER FOOT)
- (NS) NOT SURVEYED



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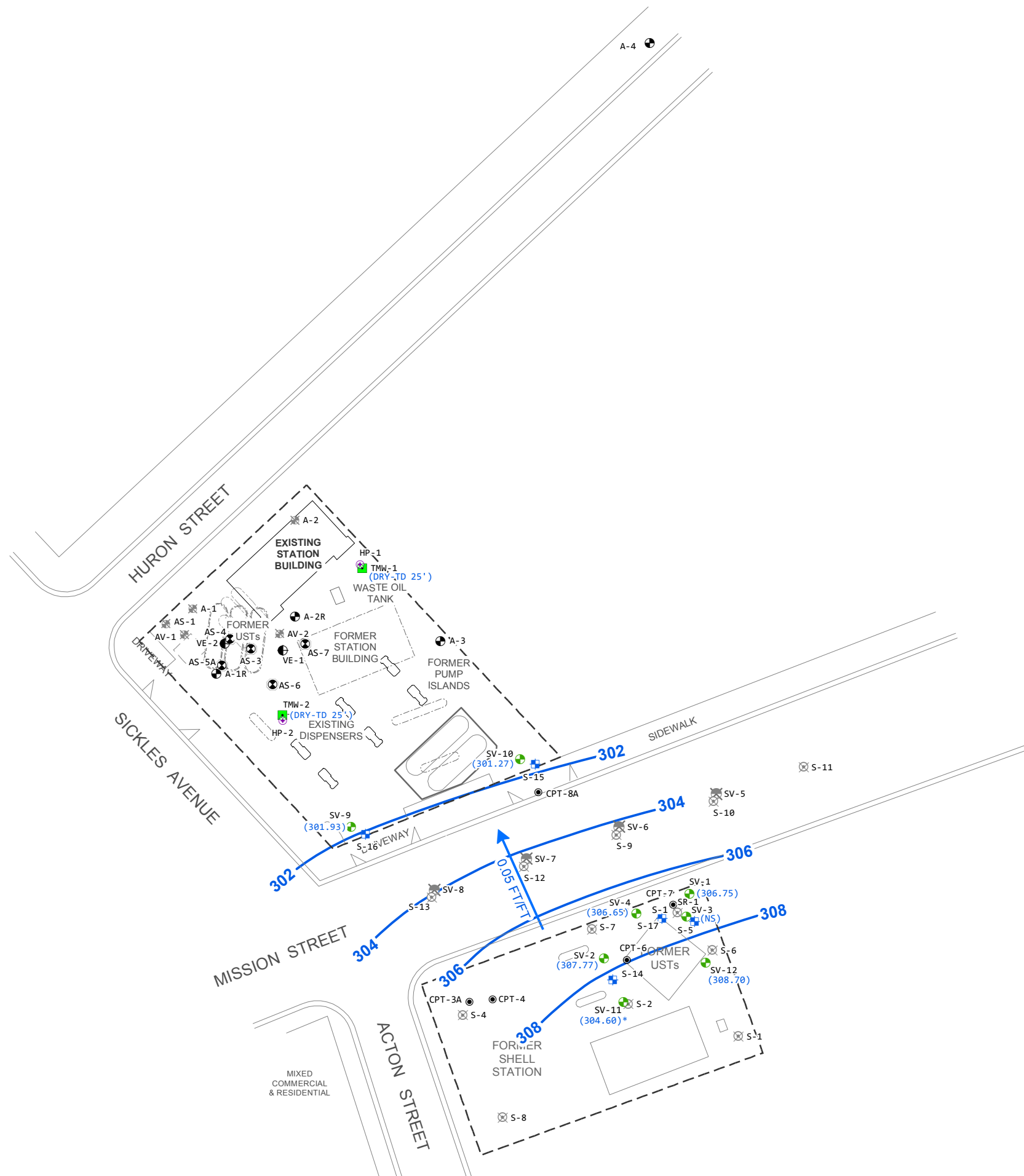
**GROUNDWATER ELEVATION
CONTOUR MAP DEEP WATER ZONE
MARCH 19, 2013**



FIGURE

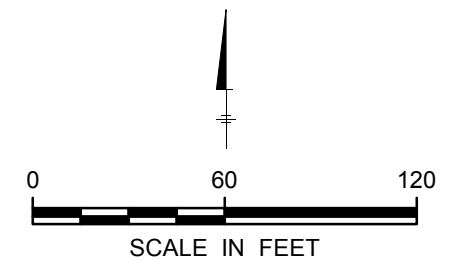
7A

CITY: CLEVELAND DIV/GROUP: ENV/IM DB: kspeters LD: PIC: PM: TM: PROJECT: H:\GIS\PROJECTS\ENV\BP_FOXGLOVE\CA06185\GIS\MXD\CA06185_FIG7B_GW_CONTOUR_PERCHED.mxd DATE: 8/5/2013 3:46:59 PM



LEGEND:

- GROUNDWATER MONITORING WELL
- GROUNDWATER MONITORING WELL (FORMER SHELL)
- PERCHED WATER ZONE WELL (FORMER SHELL)
- TEMPORARY MONITORING WELL
- HYDROPUNCH WELL
- VAPOR EXTRACTION WELL
- AIR SPARGE WELL
- CPT BORING LOCATION
- DESTROYED GROUNDWATER MONITORING WELL
- DESTROYED GROUNDWATER WELL (FORMER SHELL)
- DESTROYED PERCHED WATER ZONE WELL (FORMER SHELL)
- (308.70) GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
- 308 GROUNDWATER ELEVATION CONTOUR LINE (DASHED WHERE INFERRED)
- 0.05 FT/FT GROUNDWATER FLOW DIRECTION (FOOT PER FOOT)
- (NS) NOT SURVEYED
- * NOT USED FOR GENERATION OF CONTOUR SET

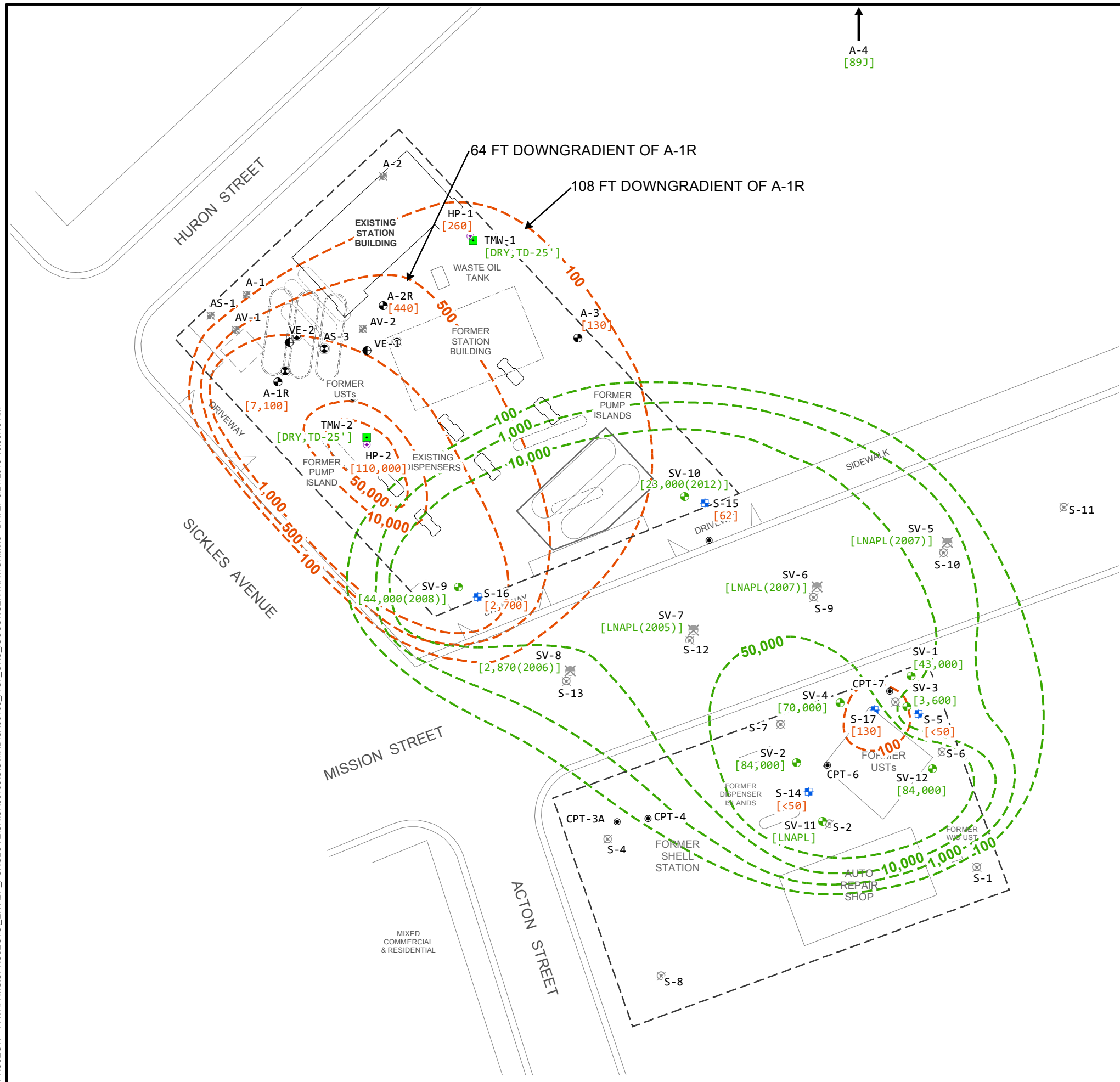


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**GROUNDWATER ELEVATION
CONTOUR MAP PERCHED WATER ZONE
MARCH 19, 2013**

FIGURE
7B

CITY: CLEVELAND DIV/GROUP: ENV/IM DB: kspeters LD: PIC: PM: TM: PROJECT: H:\GIS\PROJECTS\ENWBP_FOXGLOVE\CACA06185\GIS\MXD\CA06185_FIG7_GRO_ISOCONCENTRATION.mxd DATE: 8/21/2013 10:56:48 AM



LEGEND:

- GROUNDWATER MONITORING WELL
- GROUNDWATER MONITORING WELL (FORMER SHELL)
- PERCHED WATER ZONE WELL (FORMER SHELL)
- TEMPORARY MONITORING WELL
- HYDROPUNCH WELL
- VAPOR EXTRACTION WELL
- AIR SPARGE WELL
- CPT BORING LOCATION
- ⊗ DESTROYED GROUNDWATER MONITORING WELL
- ⊗ DESTROYED GROUNDWATER WELL (FORMER SHELL)
- ⊗ DESTROYED PERCHED WATER ZONE WELL (FORMER SHELL)
- [440] GASOLINE RANGE ORGANICS (GRO) CONCENTRATION IN MICROGRAMS PER LITER (µg/L) DEEP WATER ZONE WELL
- [70,000] GASOLINE RANGE ORGANICS (GRO) CONCENTRATION IN MICROGRAMS PER LITER (µg/L) PERCHED WATER ZONE WELL
- 100 - - - GRO CONCENTRATION CONTOUR LINE (µg/L) DEEP WATER ZONE WELL, DASHED WHERE INFERRED
- 100 - - - GRO CONCENTRATION CONTOUR LINE (µg/L) PERCHED WATER ZONE WELL, DASHED WHERE INFERRED
- µg/L MICROGRAMS PER LITER
- < NOT DETECTED AT OR ABOVE STATED LABORATORY REPORTING LIMIT
- LNAPL LIGHT NON-AQUEOUS PHASE LIQUID

0 40 80
SCALE IN FEET

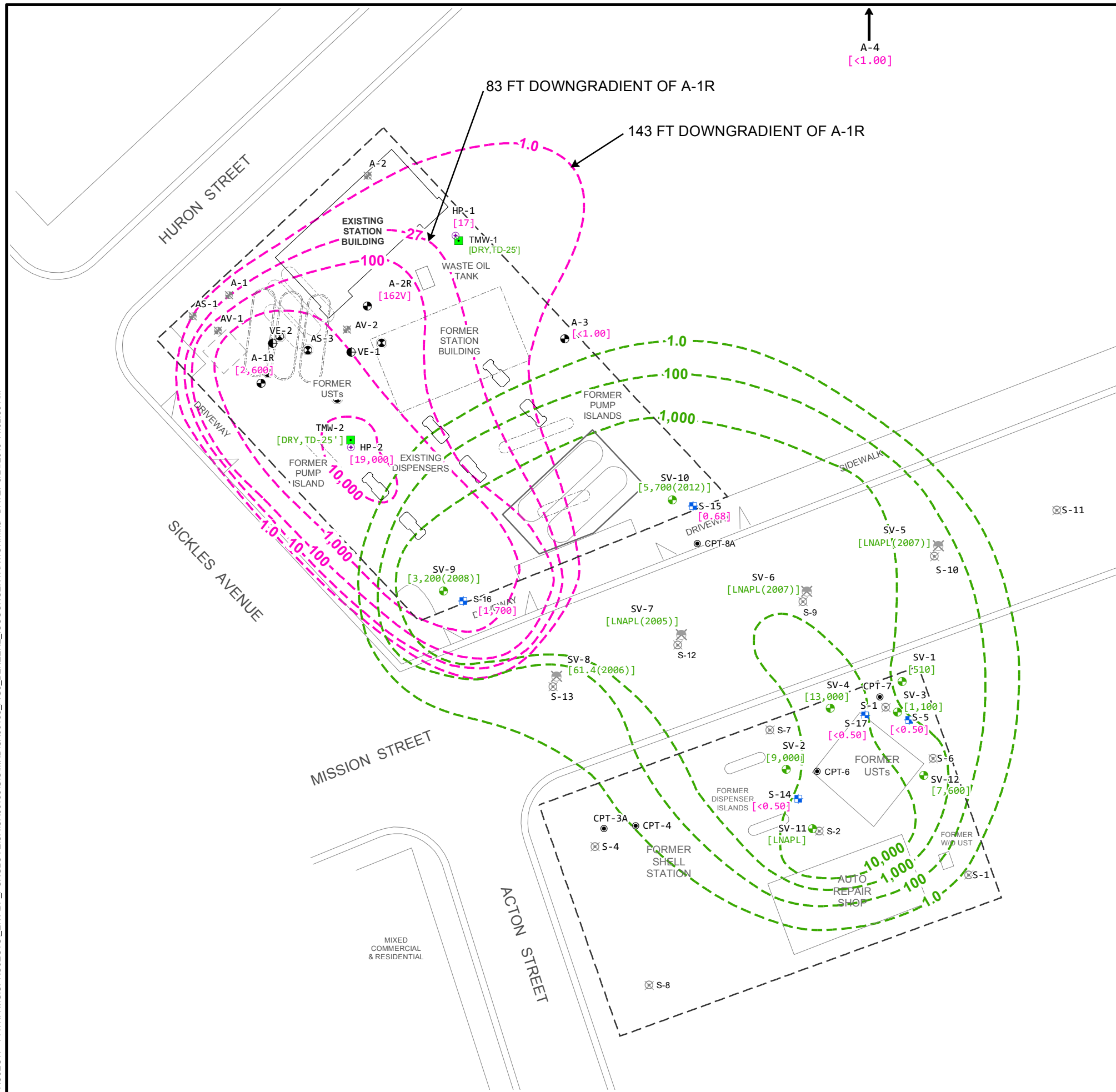
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5898 MISSION STREET, SAN FRANCISCO, CALIFORNIA

**GROUNDWATER GRO
CONCENTRATION MAP
MARCH 19, 2013**

ARCADIS

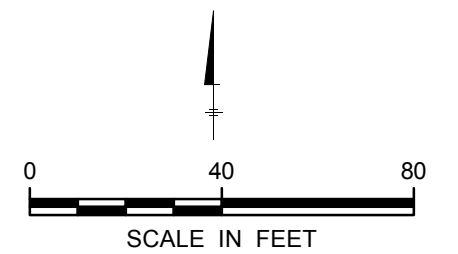
FIGURE
9

CITY: CLEVELAND DIV/GROUP: ENV/IM DB: kspeters LD: PIC: PM: TM: PROJECT: H:\GIS\PROJECTS\ENWBP_FOXGLOVE\CA06185\GIS\MXD\CA06185_FIG8_BENZENE_ISOCENTRATION.mxd DATE: 8/21/2013 11:02:35 AM



LEGEND:

- GROUNDWATER MONITORING WELL
- ⊕ GROUNDWATER MONITORING WELL (FORMER SHELL)
- ⊕ PERCHED WATER ZONE WELL (FORMER SHELL)
- TEMPORARY MONITORING WELL
- ⊕ HYDROPUNCH WELL
- ⊕ VAPOR EXTRACTION WELL
- ⊕ AIR SPARGE WELL
- CPT BORING LOCATION
- ⊕ DESTROYED GROUNDWATER MONITORING WELL
- ⊕ DESTROYED GROUNDWATER WELL (FORMER SHELL)
- ⊕ DESTROYED PERCHED WATER ZONE WELL (FORMER SHELL)
- [2,600] BENZENE CONCENTRATION IN MICROGRAMS PER LITER (µg/L) DEEP WATER ZONE WELL
- [13,000] BENZENE CONCENTRATION IN MICROGRAMS PER LITER (µg/L) PERCHED WATER ZONE WELL
- 100 --- BENZENE CONCENTRATION CONTOUR LINE (µg/L) DEEP WATER ZONE WELL, DASHED WHERE INFERRED
- 100 --- BENZENE CONCENTRATION CONTOUR LINE (µg/L) PERCHED WATER ZONE WELL, DASHED WHERE INFERRED
- µg/L MICROGRAMS PER LITER
- < NOT DETECTED AT OR ABOVE STATED LABORATORY REPORTING LIMIT
- > THE SAMPLE CONCENTRATION WAS TOO HIGH TO EVALUATE ACCURATE SPIKE RECOVERIES
- LNAPL LIGHT NON-AQUEOUS PHASE LIQUID



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**GROUNDWATER BENZENE
CONCENTRATION MAP
MARCH 19, 2013**

FIGURE
10