Karel L. Detterman, P.G.
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

Subject:
CPT/UVOST Field Investigation Report Addendum
Former BP Station No. 11109
4280 Foothill Boulevard
Oakland, California

Dear Ms. Detterman:

Arcadis U.S., Inc. (Arcadis) has prepared the *CPT/UVOST Field Investigation Report Addendum* on behalf of the Atlantic Richfield Company, a BP affiliated company (ARCO), for the former ARCO service station listed below.

ARCO Facility No.	ACEH Site No.	Location
11109	RO0000426	4280 Foothill Boulevard Oakland, California

I declare, to the best of my knowledge at the present time, that the information and/or recommendations contained in the attached document are true and correct. If you have any questions or comments regarding the contents of this report, please contact Hollis Phillips by telephone at 415.432.6903 or by e-mail at hollis.phillips@arcadis.com.

Sincerely,

Arcadis U.S., Inc.

Prepared by:

Jamey Peterson
Project Geologist

Approved by:

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

REGISTERED GEOLOGIST
HOLLIS E. PHILLIPS
No. 6887
STATE OF CALIFORNIA

Copies:
Geotracker Upload

ENVIRONMENT

Date:
March 14, 2016

Contact:
Hollis E. Phillips
Phone:
415.432.6903

Email:
Hollis.Phillips@arcadis.com

Our ref:
GP09BPNA.C106.C0000

Karel Detterman, PG
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, CA 94502

Arcadis U.S., Inc.
100 Montgomery Street
Suite 300
San Francisco
California 94104
Tel 415 374 2744
Fax 415 374 2745
www.arcadis.com

ENVIRONMENT

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Former BP Station No. 11109
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Dear Ms. Detterman:

This *CPT/UVOST Field Investigation Report Addendum* has been prepared in response to a meeting between Alameda County Environmental Health (ACEH) and Arcadis U.S., Inc. (Arcadis) on December 10, 2015 which discussed the current status of the Former BP Service Station No. 11109 located at 4280 Foothill Boulevard in Oakland, Alameda County, California (the Site; Figure 1). The meeting was precipitated by the sample results and findings presented in the *CPT/UVOST Field Investigation Report* dated September 16, 2015 (Arcadis 2015).

The *CPT/UVOST Field Investigation Report* summarized subsurface investigation activities performed in June 2015 and updated the sensitive receptor survey for the Site. The results of these activities were used to evaluate site conditions relevant to the State Water Resources Control Board (SWRCB) *Low-Threat Underground Storage Tank Case Closure Policy* (LTC Policy; SWRCB 2012). The results of the June 2015 site investigation and the LTC Policy evaluation indicated that the Site is a candidate for closure as a low-risk fuel site as described in the LTC Policy (SWRCB 2012). The evaluation of Site data indicated that both the general and applicable media-specific criteria are satisfied according to the measures within the SWRCB LTC Policy, and therefore, the leaking underground storage tank (UST) case is considered to present a low threat to human health, safety, and the environment (Arcadis 2015).

Upon reviewing the *CPT/UVOST Field Investigation Report,* the ACEH indicated to Arcadis via email on November 12, 2015 that ACEH was in general agreement with the recommendation for no further action (NFA) and that the Site's UST case is conditionally eligible for closure contingent on scheduling a meeting to discuss the Site's status (ACEH 2015). During the December 10, 2015 meeting and in their email dated March 1, 2016 (ACEH 2016), ACEH requested that Arcadis satisfactorily address several comments regarding the Site's eligibility for NFA in order to bring the case to closure.

Below are responses to the ACEH comments from the March 1, 2016 email, ACEH comments are in bold with responses following.

ACEH Comment #1: Table 1, Soil Analytical Results and Table 2, Grab Groundwater Analytical Results: The tables provided in the RFC provided only the detected analytes; please revise Tables 1 and 2 to include all analytes and their detection limits.

Arcadis has compiled the requested data tables and have included them in this report as follows:

- Table 1 – Soil Analytical Results for Volatile Organic Compounds
- Table 2 – Soil Analytical Results for Polycyclic Aromatic Hydrocarbons
- Table 3 – Groundwater Analytical Results for Polycyclic Aromatic Hydrocarbons

Please note, tables were not reproduced for data previously reported in the *CPT/UVOST Field Investigation Report* dated September 16, 2015 (Arcadis 2015). The complete set of results for Gasoline Range Organics (GRO), Total Petroleum Hydrocarbons as motor oil (TPH-mo), Lead, and Wear Metals can obtained from Tables 1 and 2 of the *CPT/UVOST Field Investigation Report* (Arcadis 2015).

ACEH Comment #2 - Soil Boring Logs and CPT/UVOST Logs:

i. **Soil boring logs were provided for B-3, B-4, B-5 and B-8, CPT/UVOST logs were provided for B-1, B-3, B-4, B-5, and B-6, and page one of two was provided for B-7. Please provide soil boring logs for B-1, B-6, and B-7 and the second CPT/UVOST log page for B-7. Also, please provide a legend/key for the CPT/UVOST logs;**

ii. **Please revise the boring logs and CPT/UVOST logs and add the depth of first encountered groundwater and the screen interval for the grab groundwater collection;**

iii. **Please describe why grab groundwater samples were collected at the chosen depths in the borings.**

***Response to i*:** Field soil boring logs were not drafted for B-1, B-6, and B-7. Cone Penetrometer Test/Ultraviolet Optical Screening Tool (CPT/UVOST) soil borings were initially completed at these locations for the purposes of assessing lithologic conditions and evaluating the distribution of light non-aqueous phase liquid (LNAPL). As discussed in the meeting between ACEH and Arcadis on December 10, 2015, although collocated soil borings were completed for subsequent sampling purposes at B-1, B-6, and B-7, field personnel based the performed sampling from interpretations of the CPT/UVOST logs. These collocated soil borings were not field logged according to the unified soil classification system during completions.

The CPT log of B-7 and a key reference for the CPT/UVOST borings logs are included as Attachments 1 and 2, respectively.

Response to ii: The depths to first encountered groundwater were not recorded during advancement of the CPT/UVOST soil borings. Typically this can only be completed with the performance of Pore Pressure Dissipation Tests (PPDTs) which are conducted as a separate field test from the CPT/UVOST at various intervals to measure equilibrium water pressure. PPDTs were not included in the scope of work performed during the June 2015 field investigation. The depth to water (DTW) in borings adjacent to CPTs was estimated based on DTW at nearby monitoring wells.

Soil boring logs were completed for B-3, B-4, B-5, and B-8 and provided in Appendix A of the *CPT/UVOST Field Investigation Report* dated September 16, 2015 (Arcadis 2015). As shown on these logs, groundwater was encountered at soil boring B-3 at a depth of approximately 5 feet below ground surface (bgs). Groundwater was not observed at the other three soil borings with field logs (B-4, B-5, and B-8) and was thus not noted on their respective soil boring logs.

As discussed in Section 3.3.2 of the *CPT/UVOST Field Investigation Report*, upon reaching the desired groundwater sampling depth, based on actual DTW, if encountered or DTW in nearby wells, a 1-inch-diameter polyvinyl chloride (PVC) casing with a 5-foot screened interval of 0.010-inch slotted PVC was placed at the bottom of each boring designated for grab groundwater sampling (B-1, B-6, and B-7). Blank PVC riser pipe was connected to the PVC screen to facilitate sample collection at the surface. As each screened interval was 5 feet in length, the corresponding screened intervals were as followed:

Table 1. Soil Boring Screened Intervals During Grab Groundwater Sampling

Soil Boring Location	Soil Boring Depth (feet)	Screened Interval (feet bgs)
B-1	25	20 – 25
B-6	13	8 – 13
B-7	14	9 – 14

Response to iii:

B-1: During soil and groundwater sampling activities conducted as part of the *CPT /UVOST Field Investigation Work Plan* (Arcadis 2014), soil boring B-1 was initially screened from 15 to 20 feet bgs with a Hydropunch® sampler. This depth was based on DTW measurements at groundwater monitoring wells MW-4 and MW-6 (the closest groundwater monitoring wells to the B-1 location with continuous monitoring records) which historically have ranged from approximately 10 feet to 23 feet below top of casing (btoc). Since 2012 depth to groundwater measurements at MW-4 and MW-6 have predominately been between 15 feet and 18 feet btoc. Although MW-2 is adjacent to B-1, groundwater monitoring ceased at MW-2 following the March 2008 monitoring event when the well apparently was damaged.

Upon advancing B-1 to its total depth, the Hydropunch® sampler was noted to be dry at 20 feet bgs. The Hydropunch® sampler was retracted from the borehole and a 1-inch diameter PVC casing with a 5-foot screened interval of 0.010-inch slotted PVC was temporarily placed at the bottom of the boring to see if groundwater would infiltrate hydrostatically from the formation into the screen. After the boring remained

dry (after approximately 1 hour), the temporary well screen was removed from B-1 and the boring was advanced an additional 5 feet to a total depth of 25 feet bgs where sufficient groundwater was encountered. A temporary well screen was put in B-1 which was screened between 20 to 25 feet bgs where groundwater accumulated in the temporary well.

As noted above, B-1 is located adjacent to groundwater monitoring well MW-2 which was originally advanced to 31.5 feet bgs prior to being damaged or obstructed in March 2005 (B&A 2005). Although the well construction diagram for MW-2 is unavailable, a cross-section included in an Alton Geosciences *Site Investigation Report* dated February 16, 1989, indicates MW-2 was constructed with 10 feet of screen, from 20 to 30 feet bgs (AG 1989). Furthermore, as shown on Table 4, the well screen intervals for the other nearby groundwater monitoring wells MW-4 and MW-6 are respectively, 20 to 27 feet bgs and 20 to 35 feet bgs. Arcadis concluded that collecting the B-1 groundwater sample from 20 to 25 feet bgs would generally be consistent with the screen intervals of onsite monitoring wells and would yield groundwater samples representative of site conditions.

B-6 and B-7: The depth of the grab groundwater samples at B-6 and B-7 were primarily selected based on depth to water in the nearby groundwater monitoring wells and lithology from the CPT readings.

B-6 and B-7 were completed across Foothill Boulevard from the Site with the goal of evaluating the offsite and downgradient extent of dissolved-phase petroleum hydrocarbon plume. As a result of the offsite locations, the nearest groundwater monitoring wells to these soil borings are associated with Chevron Site #9-0076 (“Chevron station”) located at 4265 Foothill Boulevard which is southwest and downgradient of the Site. Chevron station well C-1 is located approximately 50 feet north of B-6 and 50 feet south of B-7. Chevron station well C-10 is located approximately 60 feet south of B-6. Review of the last 10 years of groundwater monitoring records from C-1 and C-10 indicated that depth to water had ranged between approximately 7 to 14 feet btoc at the time of the site investigation (June 2015). Serendipitously, a groundwater monitoring event was being conducted at the Chevron station prior to initiating sampling at B-6 and B-7. The Chevron station field technician indicated that depth to groundwater at C-1 and C-10 were respectively 12.28 and 10.00 feet btoc on June 19, 2015. The selected groundwater sampling depths for B-6 and B-7 appeared appropriate as both the historical range and current DTW measurements at nearby groundwater monitoring wells were consistent and within the screened intervals of B-6 (8 – 13 feet bgs) and B-7 (9 – 14 feet bgs).

Interpretation of the CPT log for B-6 suggested a more permeable unit was present at 12 feet bgs. This more permeable unit, indicated as a sand to silty sand by the CPT, was bounded by less permeable units (clays, sandy silts, clayey silt) and no other permeable units were observed to the maximum advanced depth at B-6 (37.73 feet bgs). Setting the screen for groundwater sampling from 8 – 13 feet bgs appeared to be appropriate at this location.

At B-7, the CPT log did not indicate the presence of any significant permeable zones. As groundwater is typically observed at depths shallower then 15 feet btoc in groundwater monitoring wells located in this offsite area, it appeared warranted to set the screened interval at such a corresponding depth. Furthermore, an approximate 1.5 foot thick unit identified as *very stiff, fine grained over consolidated* was encountered at 14 feet bgs. The presence of this very stiff, fine grained unit suggested that a water

bearing zone was not likely to be encountered at a deeper depth within the boring. As such, setting the screen for groundwater sampling from 9 – 14 feet bgs appeared to be appropriate for B-7.

ACEH Comment #3 - Please provide a copy of the waste manifest to document appropriate removal and disposal of the generated investigation derived waste.

Arcadis has obtained a copy of the waste manifest and has included it to this report as Attachment 3. Please note that investigation derived waste (IDW) was limited to soil. The decontamination water generated during the project was so minimal (<1 gallon), that it was mixed with the soil drum.

ACEH Comment #4 - Soil Sample Collection from B-8: Please provide the rationale behind collection of soil samples in glass jars from B-8.

As stated in the *CPT/UVOST Field Investigation Report* soil samples designated for analytical testing were collected from soil boring B-8 at 5 to 5.5 feet bgs, 8.5 to 9 feet bgs, and 13.5 to 14 feet bgs. B-8 was advanced with a hand auger from the surface to 6.5 feet bgs and with a direct push probing unit from 6.5 to 16 feet bgs. Eight ounce (oz.) jars were supplied by the laboratory, ESC Lab Sciences of Mt. Juliet, Tennessee (ESC), a California state certified analytical laboratory, for soil sample collection. ESC provided the specific sample ware primarily for convenience as all requested analytical tests could be captured with a full volume 8 oz. jar. Using 8 oz. jars eliminated the need for multiple sampling devices, reduced the physical handling of retrieved soil, and allowed for the prompt placement of collected soil into the sample container. All of these factors lessen disruption of the sampled material and minimize exposure to outdoor elements which subsequently lessen the potential volatilization of volatile organic compounds (VOCs) within the soil being sampled. Each sample container was filled quickly and to capacity to eliminate head space. This method is generally consistent with the United States Environmental Protection Agency (U.S. EPA) Method 5035 guidelines for soil sampling (U.S. EPA 2014). According to the guidelines presented in the section *Sampling Methodology - High Concentrations (>200 micrograms per kilogram [µg/kg])*, glass jars may be used for soil sampling when concentrations of VOCs are predicted to be greater than 200 µg/kg (0.2 milligrams per kilogram [mg/kg]). Use of these sampling guidelines were considered appropriate as the expected concentrations of constituents of concern (COC) in soil were anticipated to be >200 µg/kg due to B-8's proximity to the Pacific Gas and Electric Company (PG&E) utility trench which contained noticeable observations of petroleum hydrocarbon-affected soils in 2014.

ACEH Comment #5: **Boring B-1 Polyaromatic Hydrocarbon (PAH) Grab Groundwater results: J-qualified PAHs were detected in a grab groundwater sample from soil boring B-1 located adjacent to the former waste oil UST and equipment blank (EB)-1. Section 3.6, Quality Assurance and Quality Control Procedures in the RFC provides a preliminary explanation for the J-qualified PAH detections. Because SB-1's location is adjacent to the former waste oil UST, a location where PAHs might be present, please provide a thorough explanation for the PAH detections in B-1 and EB-1.**

EB-1 was collected by pouring deionized water through a reusable stainless steel bailer, which was previously decontaminated using a Liquinox-brand liquid detergent solution and rinsed in deionized water following groundwater sampling at soil boring B-1. Although decontamination procedures were followed

between each boring location, trace chemical constituents may adhere to the surface of sampling equipment. Based on the similarity of polycyclic aromatic hydrocarbons (PAHs) constituent concentrations detected in EB-1 and the aqueous sample from B-1, as well as the timing of the equipment blank sampling (B-1 collection time = 17:00; EB-1 collection time = 17:30), it is feasible that the trace PAH constituents detected in EB-1 had remained on the surface of sampling equipment during equipment blank sample collection.

Given the inadvertent detections of PAHs in EB-1, the magnitude of the detections should be assessed to determine field sample data quality. The detections for PAHs benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene and phenanthrene in B-1 and EB-1 did not exceed respective reporting limits (RLs). Furthermore, all PAH RLs are below San Francisco Regional Water Quality Control Board (SF-RWQCB) Tier 1 environmental screening levels (ESLs) for groundwater. The RL is set by the laboratory and is the lowest concentration at which a chemical constituent can be detected in a sample and be reported with a reasonable degree of accuracy. The detected PAHs in the EB-1 sample were reported as 'estimates' by the analytical laboratory and qualified as an *estimated value below the lowest calibration point*. This indicates that the estimated detected PAHs in EB-1 were reported outside the limits of the analytical laboratory's testing equipment and are potentially due to a background source. As such, the results should be considered non-detect at the respective RLs.

Trace PAH constituents likely adhered to the surface of stainless steel bailer prior to equipment blank sampling following decontamination procedures. However, despite the presence of some individual PAHs in the equipment blank sample, there does not appear to be a compromise to the samples collected during the June 2015 site investigation as a result of decontamination procedures considering the following:

- EB-1 did not contain any tested constituents above laboratory RLs, including any of the predominant site COCs such as GRO, benzene, and methyl tertiary butyl ether (MTBE);

- The few detected PAH constituents were reported as estimated concentrations which cannot be reasonably quantified by the laboratory, therefore, the J-qualified PAH detections should be considered non-detect at respective RLs;

- Decontamination procedures appear to be sufficiently performed as they removed all petroleum hydrocarbon and PAH constituents as indicated in the EB-1 sample results, with the exception of the four individual PAH constituents which were detected at trace J-qualified concentrations and still were below RLs; and

- Both the RLs and reported J-qualified PAH concentrations were below SF-RWQCB Tier 1 ESLs for groundwater, therefore there is both no risk of PAH-affected groundwater beneath the Site nor a detrimental quality control/quality assurance compromise to the sample data;

ACEH Comment #6 - Well Construction Summary Table: Please provide a table summarizing the site's groundwater monitoring well construction details.

Arcadis has compiled the requested data table as follows:

- Table 4 – Well Construction Details

Conclusion

This report provides ACEH with the final components of site information that were requested to assess the Site for closure. Available site data suggest that the Site is adequately characterized and no remaining data gaps exist. Additionally, the Site is a candidate for closure as a low-risk fuel site as described in the SWRCB LTC Policy (SWRCB 2012). Site data has fulfilled both the general and applicable media-specific criteria established in the SWRCB LTC Policy, and therefore, the leaking UST case is generally considered to present a low threat to human health, safety, and the environment.

Arcadis recommends that a status of NFA be issued, and the Site be granted regulatory closure. Suspension of groundwater monitoring and reporting is also recommended during the case closure evaluation process. A work plan for monitoring well destruction and decommissioning will be prepared following the case closure evaluation process and upon Site closure approval from ACEH.

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

Sincerely,

Arcadis, U.S. Inc.

Approved by:

Hollis E. Phillips, P.G. (No. 6887)

Principal Geologist/Project Manager

Copies:

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

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

Electronic copy uploaded to GeoTracker

Enclosures:

Tables

1 Soil Analytical Results for Volatile Organic Compounds
2 Soil Analytical Results for Polycyclic Aromatic Hydrocarbons
3 Groundwater Analytical Results for Polycyclic Aromatic Hydrocarbons
4 Well Construction Details

Figures

1 Site Location Map
2 Site Plan

Attachments

1 CPT Log for B-7
2 CPT/UVOST Key References
3 Soil IDW Waste Manifest

References

Alameda County Environmental Health (ACEH). 2015. Email from Ms. Karel Detterman (ACEH) to Ms. Hollis Phillips (Arcadis). Subject: Fuel Leak Case No, RO0000426, Geotracker Global ID T0600100217, BP #11109, RO426 4280 Foothill Blvd, Oakland. November 12.

ACEH. 2016. Email from Ms. Karel Detterman (ACEH) to Ms. Hollis Phillips (Arcadis). Fuel Leak Case No, RO0000426, Geotracker Global ID T0600100217, BP #11109, RO426 4280 Foothill Blvd, Oakland. March 1.

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United States Environmental Protection Agency (U.S. EPA). 2014. Sampling and Analysis for VOCs in Soil and Groundwater, Method 5035A. Made effective August 21. https://www.epa.gov/sites/production/files/2015-06/documents/Soil-Sampling.pdf

TABLES

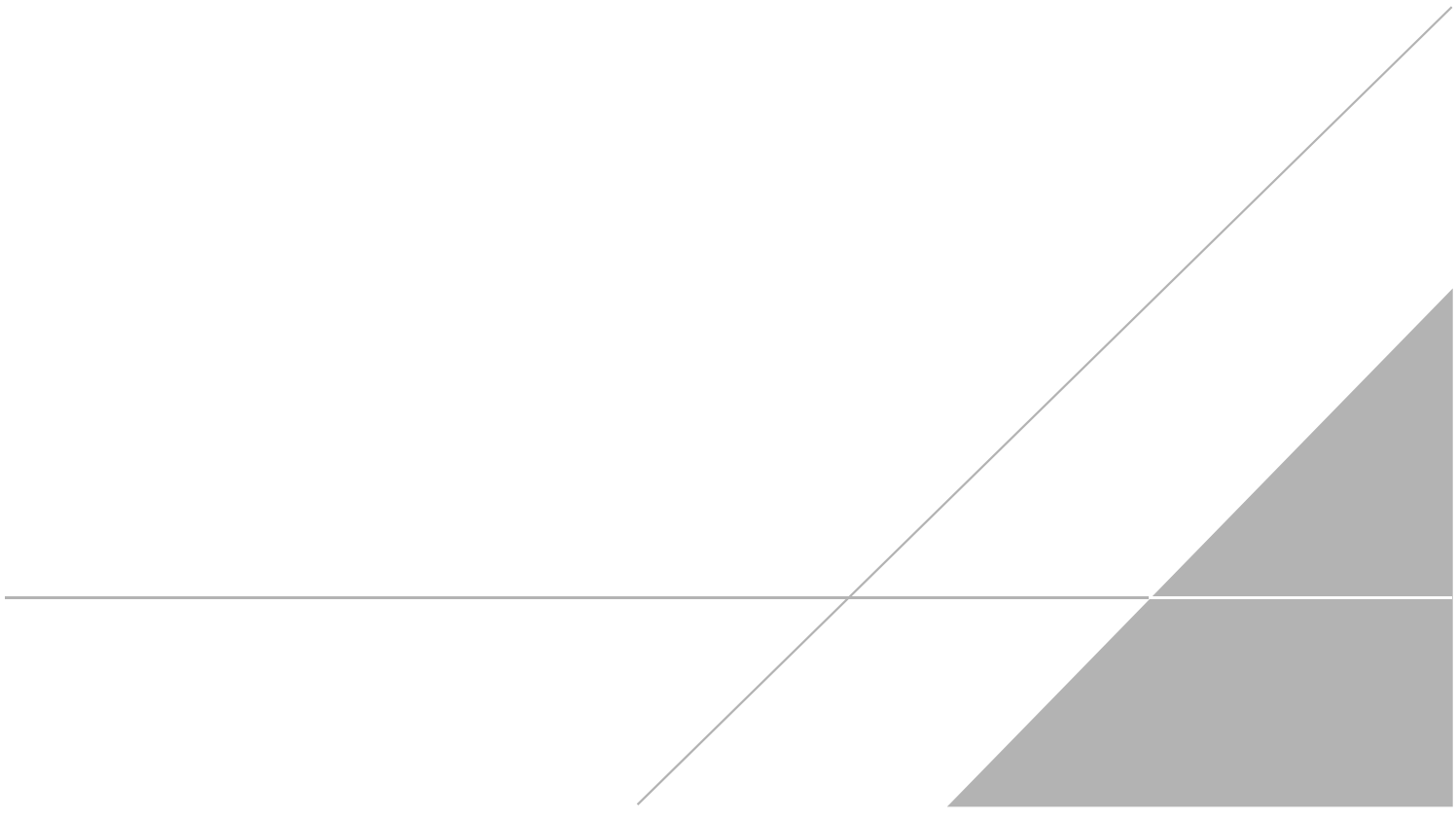

Table 1
Soil Analytical Results for Volatile Organic Compounds
Former BP Station No. 11109
4280 Foothill Boulevard
Oakland, California

ARCADIS Design & Consultancy for natural and built assets

Analyte	*Soil Screening Levels [1] (mg/kg)*			*Soil Sample (results in mg/kg)*	*Soil Sample (results in mg/kg)*	*Soil Sample (results in mg/kg)*
	Residential Direct Exposure Soil Screening Level	Commercial/ Industrial Direct Exposure Soil Screening Level	Construction/ Trench Worker Direct Exposure Soil Screening Level			
			Sample ID	B-1-4-061915	B-1-7.5-061915	B-1-11-061915
			Sample Date	6/19/2015	6/19/2015	6/19/2015
			Depth (feet bgs)	3.5 - 4	6.5 - 7.5	10 - 11
Acetone	60,000	650,000	260,000	0.033 J	0.017 J	<0.010
Acrylonitrile	--	--	--	<0.0018	<0.0018	<0.0018
Benzene	0.25	1.1	26	<0.00027	<0.00027	<0.00027
Bromobenzene	--	--	--	<0.00028	<0.00028	<0.00028
Bromodichloromethane	0.56	2.4	50	<0.00025	<0.00025	<0.00025
Bromoform	63	300	2200	<0.00042	<0.00042	<0.00042
Bromomethane	8.6	38	35	<0.0013	<0.0013	<0.0013
n-Butylbenzene	--	--	--	<0.00026	<0.00026	<0.00026
sec-Butylbenzene	--	--	--	<0.00020	<0.00020	<0.00020
tert-Butylbenzene	--	--	--	<0.00021	<0.00021	<0.00021
Carbon tetrachloride	0.13	0.58	14	<0.00033	<0.00033	<0.00033
Carbon disulfide	--	--	--	<0.00022	<0.00022	<0.00022
Chlorobenzene	270	1300	1100	<0.00021	<0.00021	<0.00021
Chlorodibromomethane	--	--	--	<0.00037	<0.00037	<0.00037
Chloroethane	14000	57,000	55,000	<0.00095	<0.00095	<0.00095
2-Chloroethyl Vinyl Ether	--	--	--	<0.0023	<0.0023	<0.0023
Chloroform	0.32	1.4	34	<0.00023	<0.00023	<0.00023
Chloromethane	110	460	440	<0.00038	<0.00038	<0.00038
2-Chlorotoluene	--	--	--	<0.00030	<0.00030	<0.00030
4-Chlorotoluene	--	--	--	<0.00024	<0.00024	<0.00024
1,2-Dibromo-3-Chloropropane	0.099	0.47	3.4	<0.0010	<0.0010	<0.0010
1,2-Dibromoethane	0.038	0.17	3.4	<0.00034	<0.00034	<0.00034
Dibromomethane	--	--	--	<0.00038	<0.00038	<0.00038
1,2-Dichlorobenzene	2,100	11,000	8,600	<0.00030	<0.00030	<0.00030
1,3-Dichlorobenzene	--	--	--	<0.00024	<0.00024	<0.00024
1,4-Dichlorobenzene	3.2	14	330	<0.00023	<0.00023	<0.00023
Dichlorodifluoromethane	--	--	--	<0.00071	<0.00071	<0.00071
1,1-Dichloroethane	4.1	18	410	<0.00020	<0.00020	<0.00020
1,2-Dichloroethane	0.40	1.7	39	<0.00026	<0.00026	<0.00026
1,1-Dichloroethene	100	430	410	<0.00030	<0.00030	<0.00030
cis-1,2-Dichloroethene	21	96	84	<0.00024	<0.00024	<0.00024
trans-1,2-Dichloroethene	130	590	530	<0.00026	<0.00026	<0.00026
1,2-Dichloropropane	0.95	4.2	59	<0.00036	<0.00036	<0.00036
1,1-Dichloropropene	--	--	--	<0.00032	<0.00032	<0.00032
1,3-Dichloropropane	0.27	--	31	<0.00021	<0.00021	<0.00021
cis-1,3-Dichloropropene	0.31[a]	1.3[a]	31[a]	<0.00026	<0.00026	<0.00026
trans-1,3-Dichloropropene	0.31[a]	1.3[a]	31[a]	<0.00027	<0.00027	<0.00027

Table 1
Soil Analytical Results for Volatile Organic Compounds
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ARCADIS Design & Consultancy for natural and built assets

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			Sample ID	B-1-4-061915	B-1-7.5-061915	B-1-11-061915
			Sample Date	6/19/2015	6/19/2015	6/19/2015
			Depth (feet bgs)	3.5 - 4	6.5 - 7.5	10 - 11
2,2-Dichloropropane	--	--	--	<0.00028	<0.00028	<0.00028
Ethylbenzene	5.50	24	510	<0.00030	<0.00030	<0.00030
Hexachloro-1,3-butadiene	8.9[b]	42[b]	310[b]	<0.00034	<0.00034	<0.00034
Isopropylbenzene	--	--	--	<0.00024	<0.00024	<0.00024
p-Isopropyltoluene	--	--	--	<0.00020	<0.00020	<0.00020
2-Butanone (MEK)	--	--	--	<0.0047	<0.0047	<0.0047
Methylene Chloride	6.0	27	530	<0.0010	<0.0010	<0.0010
4-Methyl-2-pentanone (MIBK)	--	--	--	<0.0019	<0.0019	<0.0019
Naphthalene	1.9	8.2	78	<0.0010	<0.0010	<0.0010
n-Propylbenzene	--	--	--	<0.00021	<0.00021	<0.00021
Styrene	6900	43,000	29,000	<0.00023	<0.00023	<0.00023
1,1,1,2-Tetrachloroethane	4.4	20	360	<0.00026	<0.00026	<0.00026
1,1,2,2-Tetrachloroethane	0.57	2.5	46	<0.0036	<0.00036	<0.00036
1,1,2-Trichlorotrifluoroethane	--	--	--	<0.00036	<0.00036	<0.00036
Tetrachloroethene	0.62	2.8	34	<0.00028	<0.00028	<0.00028
Toluene	1000	4900	4,200	<0.00043	<0.00043	<0.00043
1,2,3-Trichlorobenzene	--	--	--	<0.00031	<0.00031	<0.00031
1,2,4-Trichlorobenzene	24	110	320	<0.00039	<0.00039	<0.00039
1,1,1-Trichloroethane	2,200	9,500	9,100	<0.00029	<0.00029	<0.00029
1,1,2-Trichloroethane	1.0	4.5	5.3	<0.00028	<0.00028	<0.00028
Trichloroethene	1.9	8.5	23	<0.00028	<0.00028	<0.00028
Trichlorofluoromethane	--	--	--	<0.00038	<0.00038	<0.00038
1,2,3-Trichloropropane	--	--	--	<0.00074	<0.00074	<0.00074
1,2,4-Trimethylbenzene	--	--	--	<0.00021	<0.00021	<0.00021
1,2,3-Trimethylbenzene	--	--	--	<0.00029	<0.00029	<0.00029
1,3,5-Trimethylbenzene	--	--	--	<0.00027	<0.00027	<0.00027
Vinyl Chloride	0.036	0.16	3.6	<0.00029	<0.00029	<0.00029
Xylenes, Total	600	2,600	2,400	<0.00070	<0.00070	<0.00070
Di-isopropyl ether	--	--	--	<0.00025	<0.00025	<0.00025
Ethanol	--	--	--	<0.049	<0.049	<0.049
Ethyl tert-butyl ether	--	--	--	<0.00040	<0.00040	<0.00040

Table 1
Soil Analytical Results for Volatile Organic Compounds
Former BP Station No. 11109
4280 Foothill Boulevard
Oakland, California

Analyte	*Soil Screening Levels* [1] *(mg/kg)*			*Soil Sample (results in mg/kg)*	*Soil Sample (results in mg/kg)*	*Soil Sample (results in mg/kg)*
	Residential Direct Exposure Soil Screening Level	Commercial/ Industrial Direct Exposure Soil Screening Level	Construction/ Trench Worker Direct Exposure Soil Screening Level			
Sample ID				**B-1-4-061915**	**B-1-7.5-061915**	**B-1-11-061915**
Sample Date				6/19/2015	6/19/2015	6/19/2015
Depth (feet bgs)				**3.5 - 4**	**6.5 - 7.5**	**10 - 11**
Methyl tert-butyl ether	44	200	3,900	0.00049 J	<0.00021	<0.00021
t-Amyl Alcohol	--	--	--	<0.0042	<0.0042	<0.0042
tert-Butyl alcohol	--	--	--	<0.0020	<0.0020	<0.0020
tert-Amyl Methyl Ether	--	--	--	<0.00027	<0.00028	<0.00029

Notes

1. Soil direct exposure human health risk screening levels Table S-1, SF-RWQCB, 2016.
a. Screening level for 1,3-Dichloropropene applied.
b. Screening level for Hexachlorobutadiene applied.
J = EPA estimated value below the lowest calibration point. Confidence correlates with concentration. Result is less than reporting limit, but greater than MDL.
ft = Feet
ft bgs = Feet below ground surface
SF-RWQCB = San Francisco Bay Regional Water Quality Control Board
mg/kg = milligrams per kilogram
< = Analyte was not detected above the specified Method Detection Limit (MDL)
-- = Not analyzed, not available, no value
Volatile Organic Compounds (VOCs) were analyzed by USEPA Method 8260B.

Table 2
Soil Analytical Results for Polycyclic Aromatic Hydrocarbons
Former BP Station No. 11109
4280 Foothill Blvd, Oakland, California

Analyte	Soil Screening Levels[1] (mg/kg)					
	Residential Direct Exposure Soil Screening Level[1]	Commercial/ Industrial Direct Exposure Soil Screening Level[1]	Construction/ Trench Worker Direct Exposure Soil Screening Level[1]	Soil Sample (results in mg/kg)	Soil Sample (results in mg/kg)	Soil Sample (results in mg/kg)
Sample ID				B-1-4-061915	B-1-7.5-061915	B-1-11-061915
Sample Date				6/19/2015	6/19/2015	6/19/2015
Depth (feet bgs)				3.5 - 4	6.5 - 7.5	10 - 11
Anthracene	18,000	230,000	48,000	<0.00060	<0.00060	<0.00060
Acenaphthene	3,600	45,000	9,600	<0.00060	<0.00060	<0.00060
Acenaphthylene	--	--	--	<0.00060	<0.00060	<0.00060
Benzo (a) anthracene	0.7	2.9	16	<0.00060	<0.00060	<0.00060
Benzo (a) pyrene	0.07	0.29	1.6	<0.00060	<0.00060	<0.00060
Benzo (b) fluoranthene	0.7	2.9	16	<0.00060	<0.00060	<0.00060
Benzo (g,h,i) perylene	--	--	--	<0.00060	<0.00060	<0.00060
Benzo (k) fluoranthene	7	29	150	<0.00060	<0.00060	<0.00060
Chrysene	70	290	1,500	<0.00060	<0.00060	<0.00060
Dibenz (a,h) anthracene	0.07	0.29	1.6	<0.00060	<0.00060	<0.00060
Fluoranthene	2,400	30,000	6,400	<0.00060	<0.00060	<0.00060
Fluorene	2400	30,000	6,400	<0.00060	<0.00060	<0.00060
Indeno (1,2,3-cd) pyrene	0.7	2.9	16.0	<0.00060	<0.00060	<0.00060
Naphthalene	1.9	8.2	78	<0.0020	<0.0020	<0.0020
Phenanthrene	--	--	--	<0.00060	<0.00060	<0.00060
Pyrene	1,800	23,000	4,800	<0.00060	<0.00060	<0.00060
1-Methylnaphthalene	--	--	--	<0.0020	<0.0020	<0.0020
2-Methylnaphthalene	240	3,000	640	<0.0020	<0.0020	<0.0020
2-Chloronaphthalene	--	--	--	<0.0020	<0.0020	<0.0020

Notes

1. Soil direct exposure human health rick screening levels, Table S-1, SF-RWQCB, 2016.
ft = Feet.
ft bgs = Feet below ground surface.
SF-RWQCB = San Francisco Bay Regional Water Quality Control Board.
mg/kg = milligram per kilogram.
< = Analyte was not detected above the specified method detection limit (MDL).
-- = Not analyzed, not available, no value.
Polycyclic Aromatic Hydrocarbons (PAHs) were analyzed by USEPA 8270C/D - SIM.

Table 3
Groundwater Analytical Results for Polycyclic Aromatic Hydrocarbons
Former BP Station No. 11109
4280 Foothill Blvd, Oakland, California

Analyte	Groundwater Screening Level[1] (µg/L)	Aqueous Sample (results in µg/L)	Groundwater Sample (results in µg/L)
Sample ID		EB-1-061915	B-1-25-061915
Sample Date		6/19/2015	6/19/2015
Screen (Top) (feet bgs)		--	20
Screen (Bottom) (feet bgs)		--	25
Screen Length (ft)		--	5
Anthracene	0.73	<0.014	<0.028
Acenaphthene	20	<0.010	<0.020
Acenaphthylene	30	<0.012	<0.024
Benzo (a) anthracene	0.027	0.010 J	0.022 J
Benzo (a) pyrene	0.014	<0.012	<0.023
Benzo (b) fluoranthene	0.035	0.0048 J	0.010 J
Benzo (g,h,i) perylene	0.10	0.0045 J	0.0075 J
Benzo (k) fluoranthene	0.049	<0.014	<0.027
Chrysene	0.049	<0.011	<0.022
Dibenz (a,h) anthracene	0.011	<0.0040	<0.0079
Fluoranthene	8.0	<0.016	<0.031
Fluorene	3.9	<0.0085	<0.017
Indeno (1,2,3-cd) pyrene	0.049	<0.015	<0.030
Naphthalene	0.12	<0.020	<0.040
Phenanthrene	4.6	0.011 J	0.031 J
Pyrene	2.0	<0.012	<0.023
1-Methylnaphthalene	--	<0.0082	<0.016
2-Methylnaphthalene	2.1	<0.0090	0.022 J
2-Chloronaphthalene	--	<0.0065	<0.013

Notes

1. Groundwater screening levels (Tier 1 ESLs, SF-RWQCB [February 2016]).

ft = Feet
ft bgs = Feet below ground surface
J = EPA estimated value below the lowest calibration point. Confidence correlates with concentration. Result is less than reporting limit, but greater than MDL.
SF-RWQCB = San Francisco Bay Regional Water Quality Control Board.
µg/L = micrograms per liter
< = Analyte was not detected above the specified method detection limit (MDL)
-- = Not analyzed, not available, no value
Polycyclic Aromatic Hydrocarbons (PAHs) were analyzed by USEPA 8270C/D - SIM

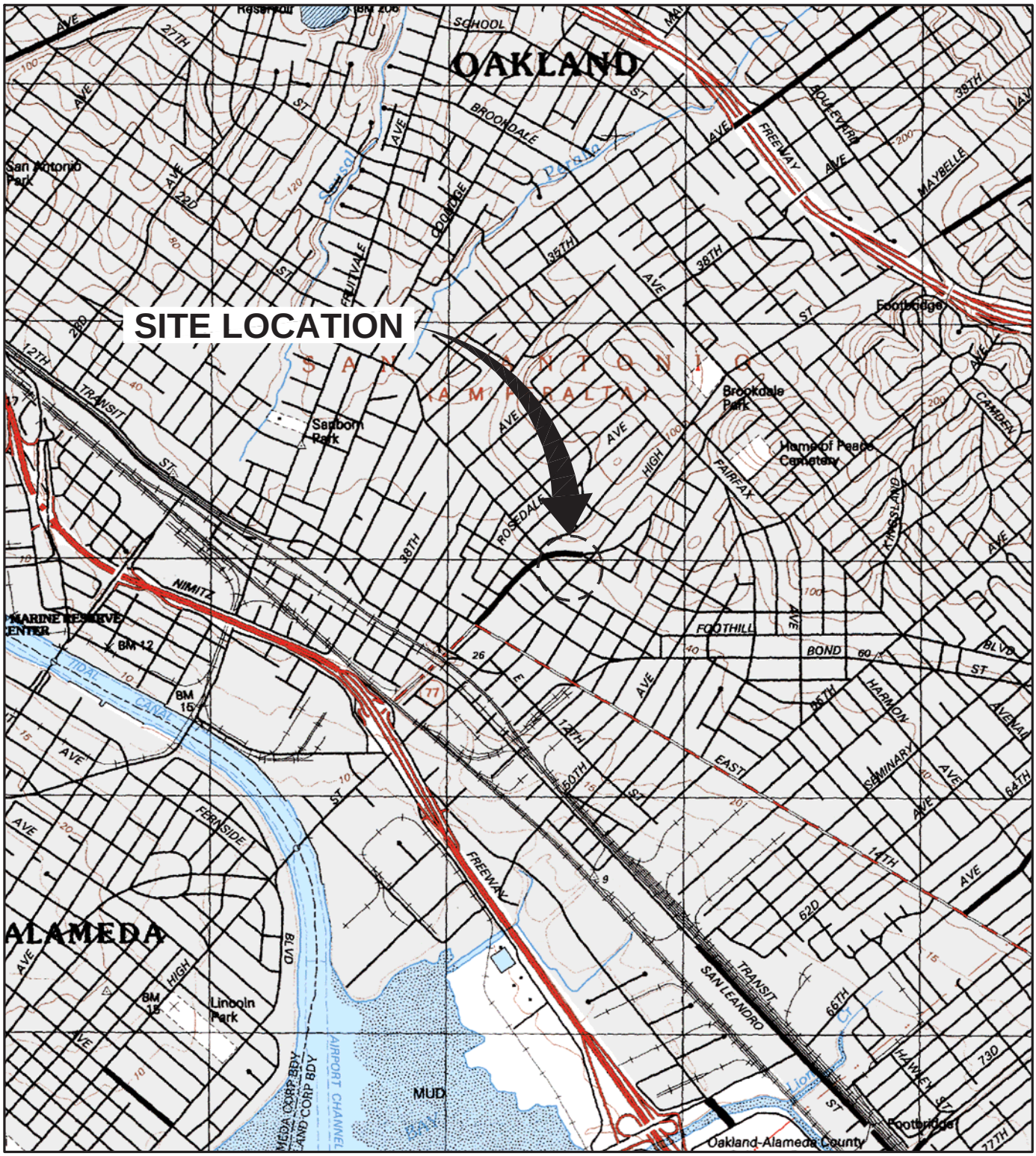
Table 4
Well Construction Details
Former BP Station No. 11109
4280 Foothill Blvd, Oakland, California

Well I.D.	Drill Date	Depth (feet bgs)	Borehole Diameter (inches)	Casing		Screen			Sand		Destruction Date
				Material	Diameter (inches)	Top (feet bgs)	Bottom (feet bgs)	Length (feet)	Top (feet bgs)	Bottom (feet bgs)	
Groundwater Monitoring Wells											
MW-2	4/19/1989	31.5	NA	NA	NA	20	30	10	20	30	NA
MW-3	1/29/1990	33.5	10	PVC	4	20	32	12	18	32	NA
MW-4	1/30/1990	29.5	10	PVC	4	20	27	7	18.5	28	NA
MW-5	9/09/1991	34.5	10	PVC	4	18	33	15	17	33	NA
MW-6	9/09/1991	36.5	10	PVC	4	20	35	15	18	35	NA
MW-7	9/09/1991	34.5	12	PVC	6	19.5	34.5	15	17.5	34.5	NA
MW-8	9/11/1992	31.5	8	PVC	2	17	30	13	14.5	30	NA
MW-9	9/11/1992	31.5	8	PVC	2	20	30	10	18	30	NA
MW-10	3/23/2009	30	10	PVC	4	7	30	23	6	30	NA
MW-11	3/23/2009	30	10	PVC	4	7	30	23	6	30	NA
MW-12	3/24/2009	30	10	PVC	4	7	30	23	6	30	NA
Destroyed Groundwater Monitoring Wells											
MW-1	4/19/1989	31.5	NA	NA	NA	20	30	10	20	30	Sept. 1990

Notes:

NA = Not Available; Not Applicable
PVC = poly-vinyl-chloride
bgs = Below ground surface

FIGURES



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

0 2000' 4000'

Approximate Scale: 1 in. = 2000 ft.

FORMER BP STATION #11109
4280 FOOTHILL BOULEVARD
OAKLAND, CALIFORNIA

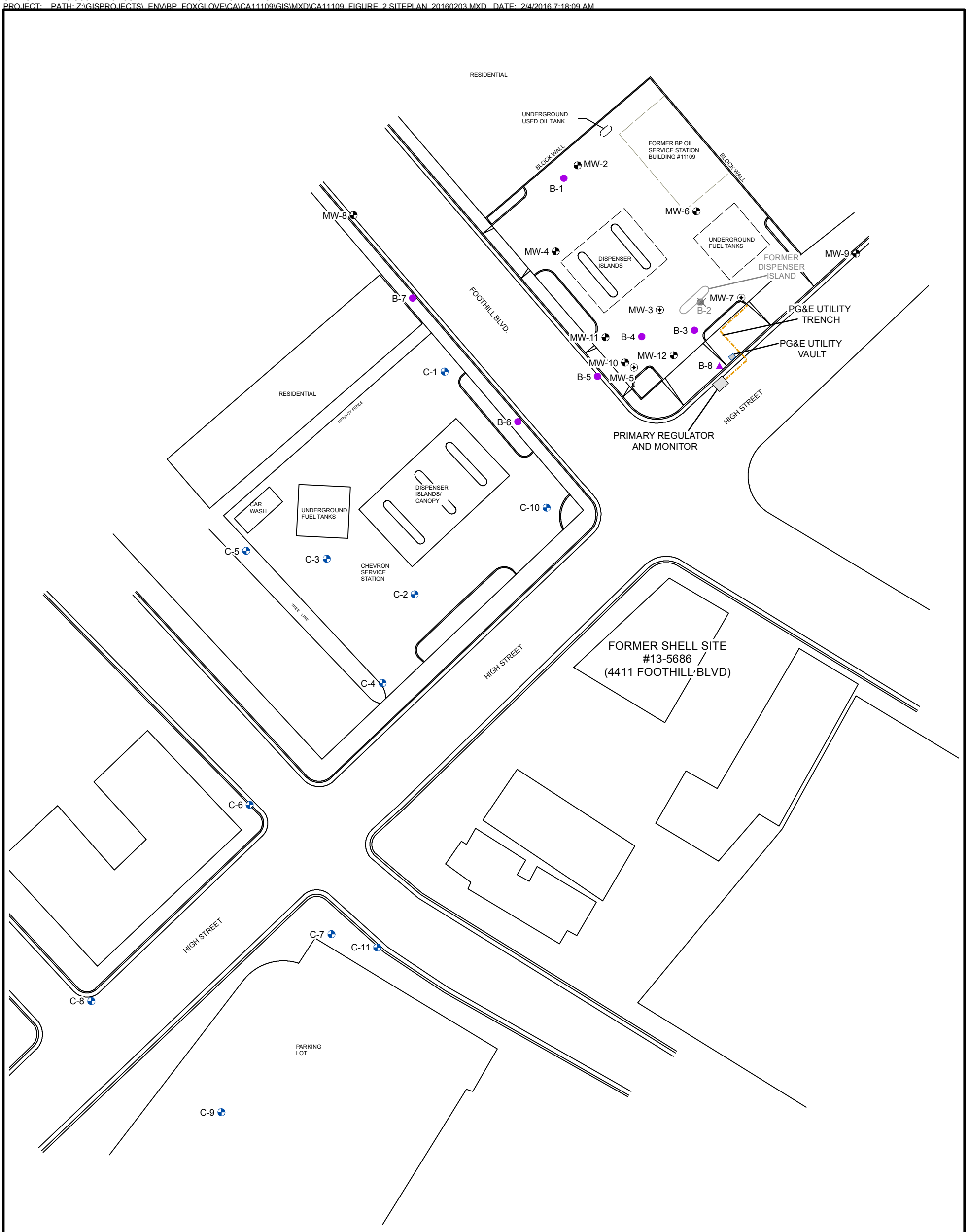
SITE LOCATION MAP

ARCADIS

FIGURE 1

CITY: PETALUMA, CA DIV/GROUP: ENV DB: J. HARRIS LD:--- PIC:--- PM: H. PHILLIPS TM: B. McKENNA LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\Petaluma\ACTIVE\09BPNAC106\E0000\GP09BPNAC106-1.dwg LAYOUT: 1SAVED: 11/20/2009 8:30 AM ACADVER: 17.1S (LMS TECH) PAGESETUP: SETUP:1PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 11/20/2009 8:40 AM BY: HARRIS, JESSICA
XREFS: IMAGES: PROJECTNAME: ---
GP09BX01.tif
GP09BX03.tiff

CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: KGPETERS LD: PIC: PM: TM:
PROJECT: PATH: Z:\GISPROJECTS_ENV\BP_FOXGLOVE\CA\CA11109\GIS\MXD\CA11109_FIGURE_2 SITEPLAN_20160203.MXD DATE: 2/4/2016 7:18:09 AM



LEGEND:

- GROUNDWATER MONITORING WELL
- GROUNDWATER MONITORING WELL-CHEVRON
- RECOVERY POINT
- APPROXIMATE CPT/UVOST BORING LOCATION
- APPROXIMATE SOIL BORING LOCATION
- ABANDONED SOIL BORING LOCATION

NOTES:

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

0 50 100
SCALE IN FEET

FORMER BP STATION #11109
4280 FOOTHILL BOULEVARD
OAKLAND, CALIFORNIA

SITE PLAN

ARCADIS

FIGURE
2

ATTACHMENT 1

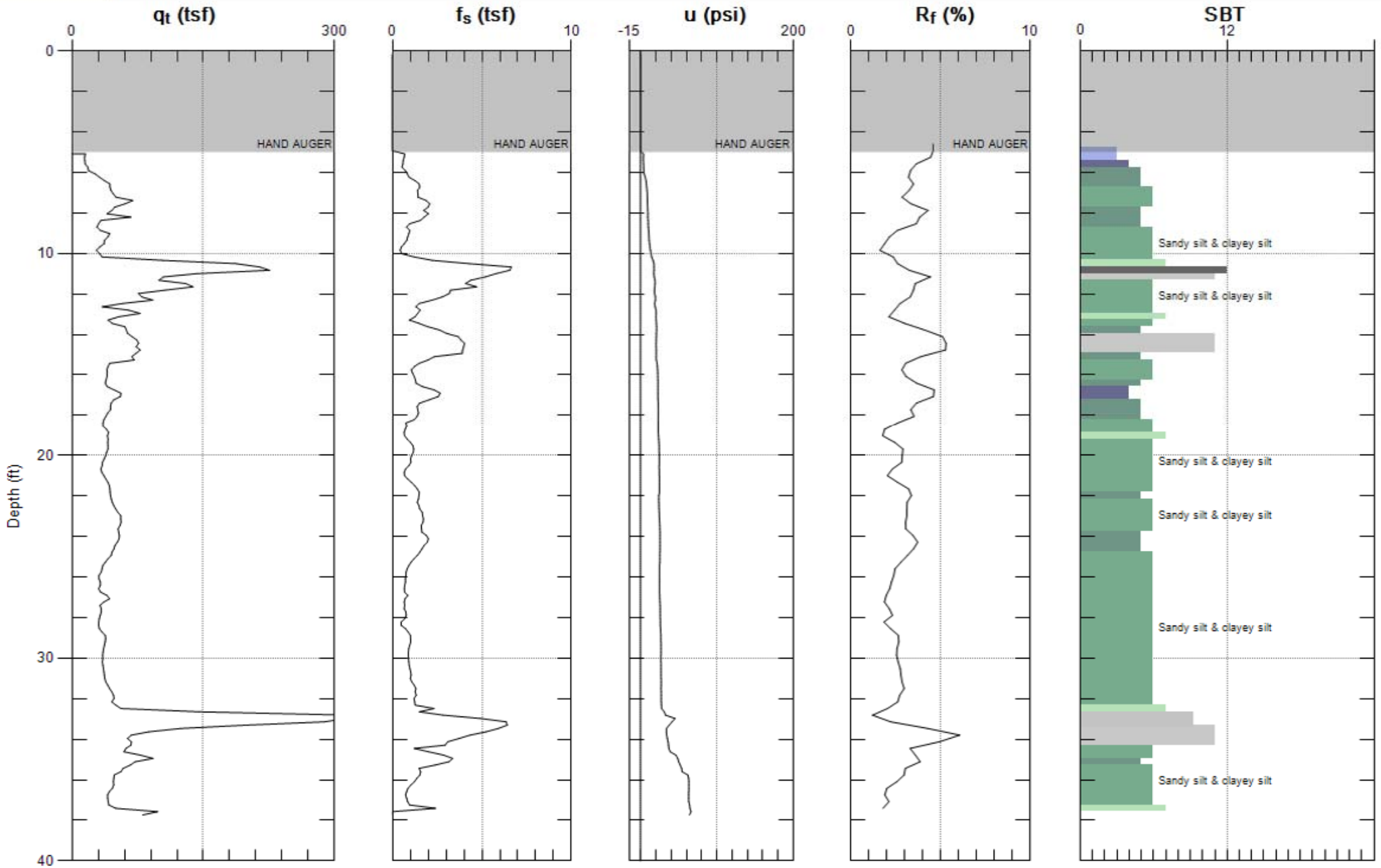
CPT Log for B-7

GREGG

ARCADIS

Site: BP-11109
Sounding: B-7

Engineer: B.JESSUP
Date: 6/18/2015 12:46



Max. Depth: 37.730 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

ATTACHMENT 2

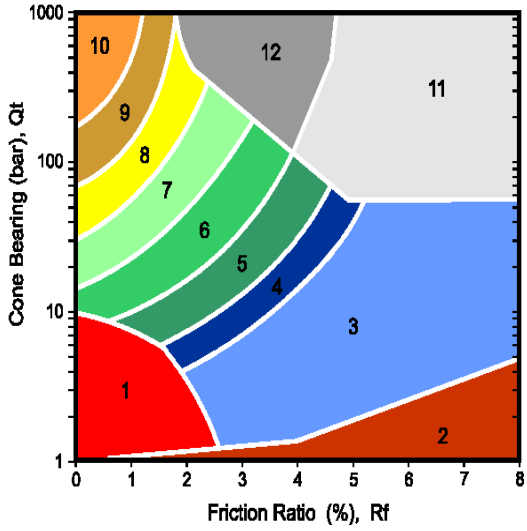
CPT/UVOST Key References

Cone Penetration Test Data & Interpretation

The Cone Penetration Test (CPT) data collected are presented in graphical and electronic form in the report. The plots include interpreted Soil Behavior Type (SBT) based on the charts described by Robertson (1990). Typical plots display SBT based on the non-normalized charts of Robertson et al (1986). For CPT soundings deeper than 30m, we recommend the use of the normalized charts of Robertson (1990) which can be displayed as SBTn, upon request. The report also includes spreadsheet output of computer calculations of basic interpretation in terms of SBT and SBTn and various geotechnical parameters using current published correlations based on the comprehensive review by Lunne, Robertson and Powell (1997), as well as recent updates by Professor Robertson (Guide to Cone Penetration Testing, 2015). The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg Drilling & Testing Inc. does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software. Some interpretation methods require input of the groundwater level to calculate vertical effective stress. An estimate of the in-situ groundwater level has been made based on field observations and/or CPT results, but should be verified by the user.

A summary of locations and depths is available in Table 1. Note that all penetration depths referenced in the data are with respect to the existing ground surface.

Note that it is not always possible to clearly identify a soil type based solely on q_t, f_s, and u_2. In these situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the correct soil behavior type.



ZONE		SBT
1		Sensitive, fine grained
2		Organic materials
3		Clay
4		Silty clay to clay
5		Clayey silt to silty clay
6		Sandy silt to clayey silt
7		Silty sand to sandy silt
8		Sand to silty sand
9		Sand
10		Gravely sand to sand
11		Very stiff fine grained*
12		Sand to clayey sand*

*over consolidated or cemented

Figure SBT (After Robertson et al., 1986) – Note: Colors may vary slightly compared to plots

Dakota Technologies
UVOST Log Reference

2008-12-12

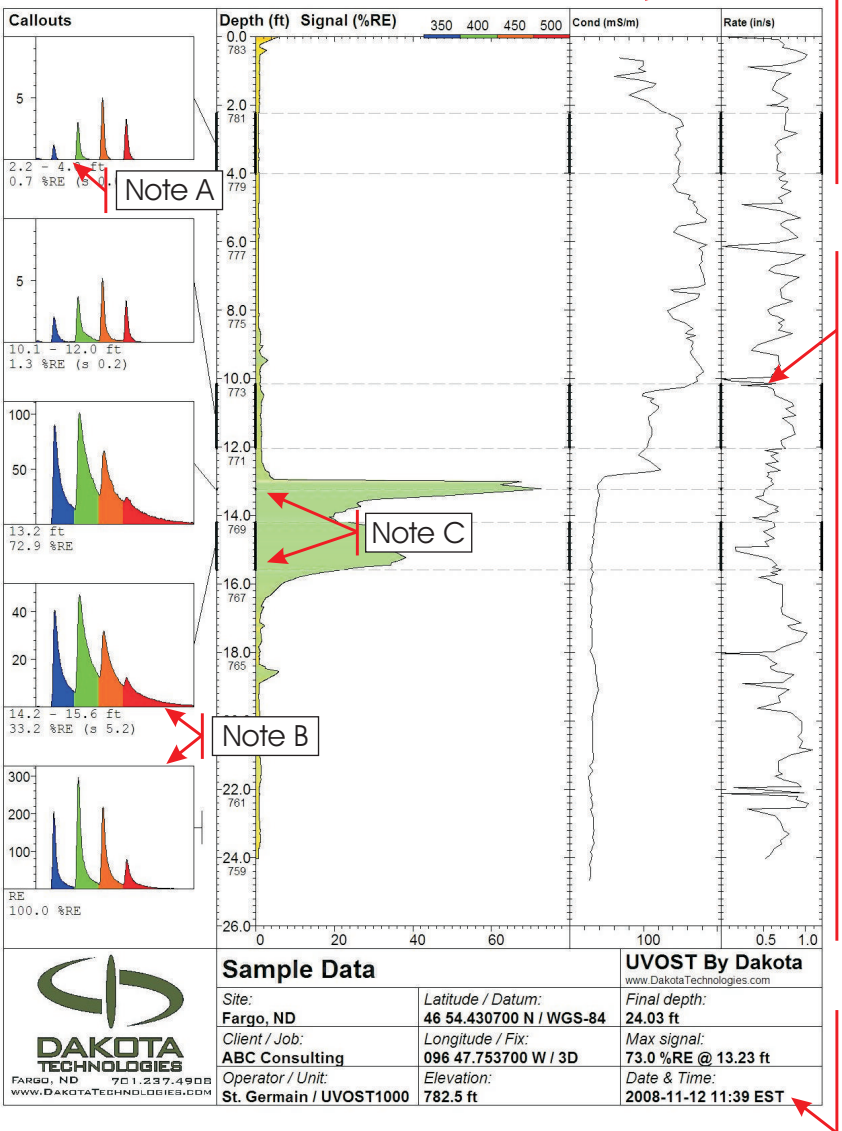
Main Plot :
Signal (total fluorescence) versus depth where signal is relative to the Reference Emitter (RE). The total area of the waveform is divided by the total area of the Reference Emitter yielding the %RE. This %RE scales with the NAPL fluorescence. The fill color is based on relative contribution of each channel's area to the total waveform area (see callout waveform). The channel-to-color relationship and corresponding wavelengths are given in the upper right corner of the main plot.

Callouts :
Waveforms from selected depths or depth ranges showing the multi-wavelength waveform for that depth.

The four peaks are due to fluorescence at four wavelengths and referred to as “channels”. Each channel is assigned a color.

Various NAPLs will have a unique waveform "fingerprint" due to the relative amplitude of the four channels and/or broadening of one or more channels.

Basic waveform statistics and any operator notes are given below the callout.



Conductivity Plot :
The Electrical Conductivity (EC) of the soil can be logged simultaneously with the UVOST data. EC often provides insight into the stratigraphy.
Note the drop in EC from 10 - 13 ft, indicating a shift from consolidated to unconsolidated stratigraphy. This correlates with the observed NAPL distribution.

Rate Plot :
The rate of probe advancement. ~ 0.8in (2cm) per second is preferred.

A noticeable decrease in the rate of advancement may be indicative of difficult probing conditions (gravel, angular sands, etc.) such as that seen here at ~5 ft.

Notice that this log was terminated arbitrarily, not due to "refusal", which would have been indicated by a sudden rate drop at final depth.

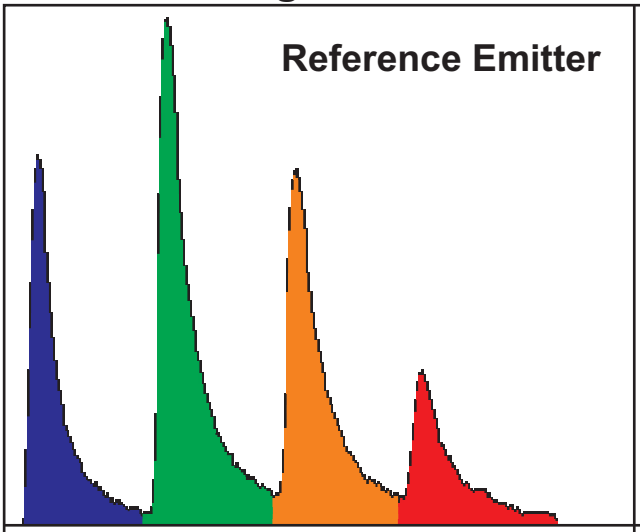
Info Box :
Contains pertinent log info including name and location.

Note A :
Time is along the x axis. No scale is given, but it is a consistent 320ns wide.
The y axis is in mV and directly corresponds to the amount of light striking the photodetector.

Note B :
These two waveforms are clearly different. The first is weathered diesel from the log itself while the second is the Reference Emitter (a blend of NAPLs) always taken before each log for calibration.

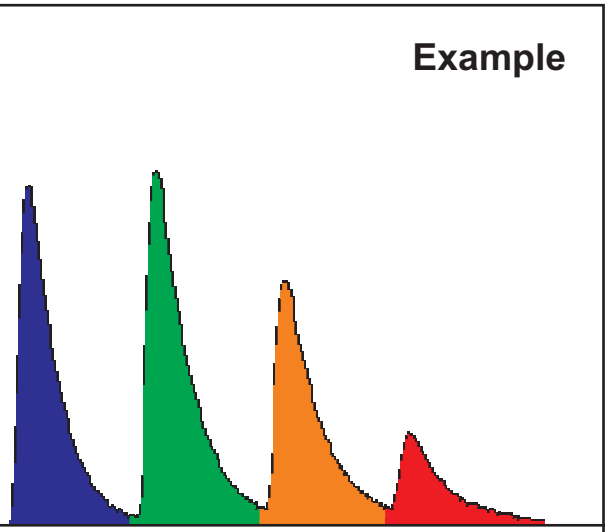
Note C :
Callouts can be a single depth (see 3rd callout) or a range (see 4th callout). The range is noted on the depth axis by a bold line. When the callout is a range, the average and standard deviation in %RE is given below the callout.

Waveform Signal Calculation



CH1		CH2		CH3		CH4		Total
4820	+	8108	+	6249	+	2984	=	**22161**
21.7		36.6		28.2		13.5		**100%**

Channel Area (pVs) Percent RE

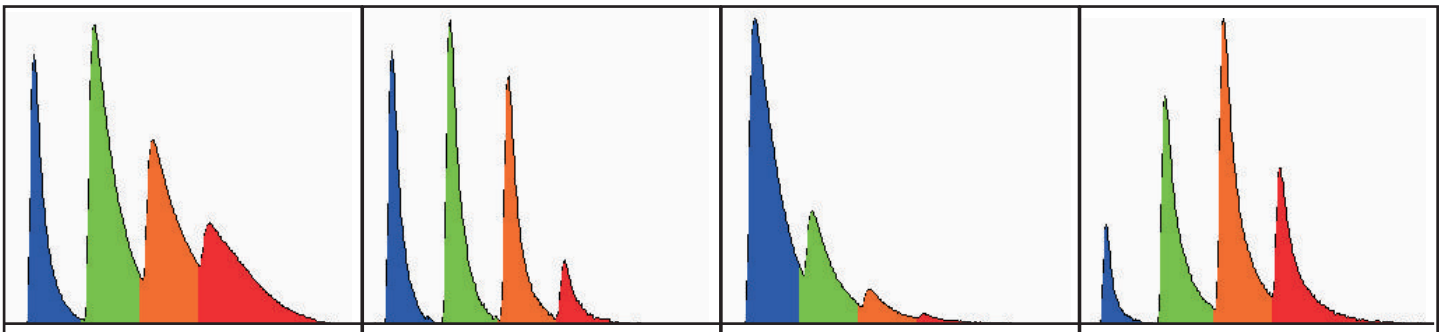


CH1		CH2		CH3		CH4		Total
4923	+	5743	+	4166	+	1735	=	**16587**
22.3		25.9		18.8		7.8		**75%**

Data Files

***.lif.raw.bin**	Raw data file. Header is ASCII format and contains information stored when the file was initially written (e.g. date, total depth, max signal, gps, etc., and any information entered by the operator). All raw waveforms are appended to the bottom of the file in a binary format.
***.lif.plt**	Stores the plot scheme history (e.g. callout depths) for associated Raw file. Transfer along with the Raw file in order to recall previous plots.
***.lif.jpg**	A jpg image of the OST log including the main signal vs. depth plot, callouts, information, etc.
***.lif.dat.txt**	Data export of a single Raw file. ASCII tab delimited format. No string header is provided for the columns (to make importing into other programs easier). Each row is a unique depth reading. The columns are: Depth, Total Signal (%RE), Ch1%, Ch2%, Ch3%, Ch4%, Rate, Conductivity Depth, Conductivity Signal, Hammer Rate. Summing channels 1 to 4 yields the Total Signal.
***.lif.sum.txt**	A summary file for a number of Raw files. ASCII tab delimited format. The file contains a string header. The summary includes one row for each Raw file and contains information for each file including: the file name, gps coordinates, max depth, max signal, and depth at which the max signal occured.
***.lif.log.txt**	An activity log generated automatically located in the OST application directory in the 'log' subfolder. Each OST unit the computer operates will generate a separate log file per month. A log file contains much of the header information contained within each separate Raw file, including: date, total depth, max signal, etc.

Common Waveforms (highly dependent on soil, weathering, etc.)



Diesel	Gas	Kerosene	Motor Oil

ATTACHMENT 3

Soil IDW Waste Manifest

Manifest

SOIL SAFE OF CA – TPST
Non-Hazardous Soils

↓ Manifest # ↓

Date of Shipment:	Responsible for Payment:	Transport Truck #:	Facility #:	Approval Number:	Load #
9/18/15		875/733	A07	44877	001

Generator and/or Consultant

Generator's Name and Billing Address: BP WEST COAST PRODUCTS, LLC P.O. BOX 80249 RANCHO SANTA MARGARITA, CA 92688	Generator's Phone #: 949-460-5200	
	Person to Contact:	
	FAX#:	Customer Account Number
Consultant's Name and Billing Address:	Consultant's Phone #:	
	Person to Contact:	
	FAX#:	Customer Account Number
Generation Site (Transport from): *(name & address)* FORMER ARCO 11109 4280 FOOTHILL BLVD OAKLAND, CA 94601	Site Phone #:	
	Person to Contact:	
	FAX#:	
Designated Facility (Transport to): *(name & address)* SOIL SAFE 12328 HIBISCUS AVENUE ADELANTO, CA 92301	Facility Phone #: (800) 862-8001	
	Person to Contact: JOE PROVANSAL	
	FAX#: (760) 246-8004	
Transporter Name and Mailing Address: BELSHIRE 25971 TOWNE CENTRE DRIVE FOOTHILL RANCH, CA 92610 BESI: 258303	Transporter's Phone #: 949-460-5200	CAR000183913
	Person to Contact: LARRY MOOTHART	450847
	FAX#: 949-460-5210	Customer Account Number

Description of Soil	Moisture Content	Contaminated by:	Approx. Qty:	Description of Delivery	Gross Weight	Tare Weight	Net Weight
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐	1 DM		37580	37330	580
Sand ☐ Organic ☐ Clay ☐ Other ☐	0 - 10% ☐ 10 - 20% ☐ 20% - over ☐	Gas ☐ Diesel ☐ Other ☐					.09

List any exception to items listed above: Scale Ticket # 122114

Generator's and/or consultant's certification: I/We certify that the soil referenced herein is taken entirely from those soils descried in the Soil Data Sheet completed and certified by me/us for the Generation Site shown above and nothing has been added or done to such soil that would alter it in any way.

Print or Type Name: Generator ☐ Consultant ☐
EMILY WAHLSTRAND
On behalf of BP West Coast Products, LLC

Signature and date: Month 9 Day 3 Year 15

Transporter

Transporter's certification: I/We acknowledge receipt of the soil referenced above and certify that such soil is being delivered in exactly the same condition as when received. I/We further certify that the soil is being directly transported from the Generation Site to the Designated Facility without off-loading, adding to, subtracting from or in any way delaying delivery to such site.

Print or Type Name: Eric Decious

Signature and date: Month 9 Day 3 Year 15

Recycling Facility

Discrepancies:

Recycling Facility certifies the receipt of the soil covered by this manifest except as noted above:

Print or Type Name: J. PROVANSAL

Signature and date: 9-18-15

Please print or type.

TRANSPORTER COPY

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STATE WATER RESOURCES CONTROL BOARD

GEOTRACKER ESI

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Report Type:	**Other Report / Document**
Report Date:	**3/14/2016**
Facility Global ID:	**T0600100217**
Facility Name:	**BP #11109**
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