ARCADIS
Infrastructure · Water · Environment · Buildings

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Soil Vapor Probe Installation and Sampling Summary
Former Atlantic Richfield Company Station No. 4931
731 West MacArthur Boulevard
Oakland, California 94609
ACEH Case # RO0000076

ENVIRONMENT

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

Date:
July 15, 2011

Submitted by:

ARCADIS U.S., Inc

Hollis E. Phillips, P.G.
Project Manager

Contact:
Hollis E. Phillips

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415.374.2744 ext 13

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Our ref:
GP09BPNA.C110

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ENVIRONMENT

Mr. Paresh Khatri
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Subject:
Soil Vapor Probe Installation and Sampling Summary
Former Atlantic Richfield Company Station No. 4931
731 West MacArthur Boulevard
Oakland, California 94609
ACEH Case # RO0000076

Date:
July 15, 2011

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GP09BPNA.C110

Dear Mr. Khatri:

ARCADIS U.S. (ARCADIS) has prepared this *Soil Vapor Probe Installation and Sampling Summary* for the Former ARCO Service Station No. 4931 (Site) located at 731 West MacArthur Blvd in Oakland California (**Figure 1**). This Summary has been prepared to document site assessment activities conducted as proposed in ARCADIS' *Work Plan for Soil Vapor Characterization* dated March 7, 2011. This work was conducted as requested in the Alameda County Environmental Health (ACEH) letters dated January 6, 2011 and May 12, 2011.

The May 12, 2011 directive requested soil vapor monitoring points be installed and sampled twice, once in the dry season and once in the wet season. This summary describes the results of the dry season monitoring.

Site Background

The Site is located at 731 West MacArthur Boulevard in Oakland, California. It is an active Beacon-branded gasoline station. Improvements to the Site include four 10,000 gallon double-wall fiberglass gasoline underground storage tanks (USTs) installed on April 8, 1992. Product lines were excavated, removed, inspected, and replaced October 2, 2002. The majority of the Site surface is paved with concrete and asphalt. A Site Location Map is provided as **Figure 1**. A Site Map showing historical sampling locations is provided as **Figure 2**.

The Site is bound by West MacArthur Boulevard to the north-northeast, West Street to the west-northwest and single-family residential dwellings to the south-southwest

and east-southeast. Interstate 580 is located approximately 620 feet south-southwest of the Site. *Previous site investigations are summarized in ARCADIS' Site* Investigation Report dated November 11, 2010.

Recent Site Activities

On May 31 and June 1, 2011 ARCADIS supervised Gregg Drilling and Testing (Gregg) in the installation of six permanent soil vapor probes (SV-1 through SV-6) at the locations show in **Figure 3.** The soil vapor probes were sampled by ARCADIS on June 9 and 10, 2011. The vapor probe locations were selected based on the elevated soil and groundwater concentration results from the October 2010 investigation (ARCADIS 2010). .

Scope of Work

ARCADIS prepared a site specific Health and Safety Plan (HASP) which was reviewed by the field staff and contractors prior to beginning field operations at the site. Boring Permits were obtained from Alameda County Public Works Department and are included in **Appendix A**.

Underground Service Alert (USA) was notified at least 48 hours before proposed drilling activities to identify public utilities in the vicinity of the proposed borings. In conjunction with USA, a private utility locating company was utilized to further evaluate the potential presence of underground utilities in the vicinity of the proposed boring locations. In conjuncture with installation, the boring locations were hand augered to 5 feet bgs to identify potential underground utility conflicts. Several of the soil boring locations required field modifications due to the presence of concrete slabs underneath the asphalt and the presence of water in the bottom of the borehole.

Soil Vapor Probe Installation

The boring locations were hand augered to the final approximate depth of 5 feet bgs. When each boring reached its final depth, a 6-inch-long, 0.375-inch-OD stainless steel soil vapor screen was set in a 1-foot interval of standard sand pack, allowing approximately 3 inches of sand above and below the screen. Teflon®-lined polyethylene tubing was connected to the vapor screen and capped with a vapor-tight valve at the surface to eliminate the potential for barometric pressure fluctuations to induce vapor transport between the subsurface and the atmosphere.

The valve was installed in the closed position to allow equilibration of soil vapor concentrations to commence immediately upon installation. A schematic drawing of the soil vapor construction is shown in **Figure 4**.

A 1-foot interval of dry, granular bentonite was placed above the sand pack followed by hydrated granular bentonite to the surface. Sand pack was used around the screened interval of each sample probe to allow soil vapor from the adjacent soil to reach the probes. Dry granular bentonite was used to ensure that the hydrated bentonite did not seal the soil vapor probe screen. At the surface, the probe cluster location was fitted with a concrete cap and a flush-mounted, traffic-rated well box with sufficient room to store the tubing lines. Boring logs of soil vapor probes SV-1 through SV-6 are included in **Appendix B**.

Specific soil samples were collected for geotechnical analysis for potential use in vapor transport modeling. ARCADIS collected soil samples from SV-1 through SV-6, at depths of 5 feet bgs, using a hand-operated slide hammer and undisturbed core sampler. The soil samples were submitted to Test America Laboratories (and subsequently subcontracted to Cooper Testing Laboratories in Palo Alto, California) for the following analyses:

- moisture content, density and porosity by ASTM International (ASTM) D 2937
- specific gravity by ASTM D 854M

A copy of the laboratory report and chain-of-custody documentation is included in **Appendix C**.

Soil samples were examined for odors, visible signs of petroleum hydrocarbons, and screened for organic vapors using a photo-ionization detector (PID). Field documentation is included in **Appendix D**.

Investigation-derived waste was containerized in 55-gallon Department of Transportation (DOT)-approved drums and temporarily stored on the subject property pending transport by Belshire Environmental Services Inc. (BESI) disposal contractor to an appropriate disposal or treatment facility.

Soil Vapor Sampling

Soil vapor sampling for the warm season was conducted on June 9 and 10, 2011. Sampling consisted of collecting two sets of samples, one in the morning hours and one in the afternoon hours as requested in the ACEH letter dated May 12, 2011 and in the email correspondence dated May 17, 2011. Samples collected in the evening are depicted with a "B" after the soil vapor probe number (i.e., SV-1B-6911).

Sampling Equipment

Samples were collected using dedicated 0.25-inch-OD Teflon-lined polyethylene tubing. Flow controllers, duplicate sampling equipment and 1-liter SUMMA® canisters were individually certified by the laboratory. Flow controllers used in conjunction with 1-liter SUMMA canisters for collecting soil gas samples from the soil vapor probes were calibrated to 200 milliliters per minute (mL/min). When duplicate samples were collected, the canisters were coupled together and one calibrated flow controller was used. This method provided that duplicate samples were collected at the appropriate flow rate for the sampling location.

Sampling Train Assembly

Each sampling train assembly (STA) consisted of a laboratory-provided soil gas sampling manifold (SGSM) with a two-way valve, vacuum gauge for reading the vacuum within the sample or purge canisters flow controller, and vacuum gauge for reading the vacuum within the sampling point and particulate filter. The components of the SGSM were assembled using ¼-inch-OD stainless steel tubing. One 1-liter SUMMA sample canister and one 1-liter SUMMA purge canister were connected to the SGSM. Soil vapor probes SV-1 through SV-6 were purged using vacuum pumps that were calibrated to 200 mL/min. Purge volumes and methods are discussed below. When duplicate samples were collected, two laboratory-certified SUMMA canisters of the appropriate size were coupled using dedicated laboratory-provided duplicate sample t-fittings and connected to the SGSM.

Vacuum Leak Testing

Prior to sampling, each STA was checked for leaks. The leak check was performed by assembling the STA and applying a vacuum to the STA using the purge SUMMA canister. At the soil vapor probes, this vacuum was applied with the two-way valve in the closed position. In the absence of a cap at the sub-slab probe, a laboratory-

provided cap was affixed to the sample end of the SGSM and the vacuum was applied. The vacuum inside the STA was monitored with the vacuum gauges. This vacuum was monitored for 30 minutes for a decrease greater than or equal to 0.5 inch mercury (inHg). If the vacuum reading did not decrease by 0.5 inHg or more during the 30-minute period, the STA could be used for sampling. If the vacuum readings decreased by 0.5 inHg or more during this monitoring period, the fittings and connection on the STA were checked and tightened, and the vacuum leak check was performed again until the STA maintained a vacuum throughout the monitoring period. After the STA was cleared for sampling, the fittings were left in place as tested. The STA was not disassembled and fittings were not removed until purging and sampling with the STA was complete. The vacuum test readings for each sample are included on the soil gas sample collection sheets included in **Appendix D**.

Purging

Following the vacuum leak check, each sample point was purged immediately prior to sampling using vacuum pumps that were calibrated to 200 mL/min. Purging or sampling was not conducted at multiple locations simultaneously. The soil vapor probes were purged of three volumes of soil gas prior to sampling. Purge volume calculations were based on the dimensions of the aboveground gauges, tubing, sampling equipment, below-ground tubing and subsurface soil vapor screen. The total purge volumes for each soil vapor probe are notated on the soil gas sampling sheets included in **Appendix D**.

Tracer Gas Application

To assess the potential for leakage at the two-way valve attached to the tubing in the soil vapor probe and the potential for ambient air intrusion, the two-way valve at the end of each soil vapor well and the well head were placed under a shroud during purging and sampling. Ultra-high-purity helium was used as a tracer gas. The flow of helium to the shroud was controlled by a single-stage regulator. Helium was supplied to the shroud through a length of Teflon-lined polyethylene tubing. The helium concentrations within the shroud were monitored continuously using a portable helium detector and maintained between 10 and 20 percent. Helium shroud concentrations were recorded on the soil gas sampling sheets included in **Appendix D**.

Sample Collection

Warm season soil vapor samples were collected from soil vapor probes SV-1 through SV-6 on June 9 and 10, 2011. The afternoon sample could not be collected from soil vapor probe SV-5 due to the presence of water in the sample tubing. Soil vapor samples were submitted to AirToxics in Folsom, California following applicable chain-of-custody procedures.

Quality Assurance/Quality Control Samples

One blind duplicate sample (DUP-01-6911) was collected during the sampling event. The blind duplicate sample was collected from soil vapor probe SV-6 during the warm season sampling event. One equipment blank sample was collected by transferring the contents of a laboratory-provided pressurized SUMMA canister to an evacuated SUMMA canister using a section of Teflon-lined polyethylene tubing from the batch of tubing and a laboratory-provided SGSM.

Laboratory Analyses

Soil vapor samples were analyzed for the following parameters:

- Total petroleum hydrocarbons as gasoline (TPH-g), benzene, toluene, ethylbenzene, and xylenes (BTEX), methyk-tert-butyl-ether (MTBE) and Naphthalene by USEPA Method TO-15

- Carbon Dioxide, Nitrogen, Helium and Methane by ASTM Method ASTM D-1946 modified

Site Investigation Results

Subsurface Conditions:

Sub surface soils that were encountered consisted of alternating layers of clay, clayey silts, and sandy silts extending from the surface to the maximum depth of 5 feet bgs. Boring Logs from the well installations are included as **Appendix B**.

Geotechnical analysis of soil samples reported specific gravity ranging from 2.69 (SV-1) to 2.76 (SV-4) at 20 degrees Celsius. Total porosity results ranged from 35.2% (SV-3) to 46.0% (SV-5). Moisture content ranged from 5.1% (SV-4) to 21.6%

(SV-2). Dry bulk density results ranged from 1.49 grams per cubic centimeter (g/cc) in SV-5 to 1.75 g/cc in SV-3 and SV-4, respectively. Geotechnical results are presented in **Appendix C**.

Soil Vapor Analytical Data

Warm season soil vapor analytical results are presented in **Table 1** and summarized below:

- Concentrations of TPH-G in soil vapor were detected in five of the six soil vapor sampling locations, with concentrations ranging from non-detect to 44,000,000 micrograms per cubic meter (µg/m^3) in SV-2B.

- Benzene was detected in five of the six soil vapor sampling locations, with concentrations ranging from non-detect to 130,000 µg/m^3 in SV-2.

- Toluene was detected in one of the six soil vapor sampling locations, with concentrations ranging from non-detect to 19 µg/m^3 in SV-1.

- Ethylbenzene was detected in one of the six soil vapor sampling locations, with concentrations ranging from non-detect to 6,000 µg/m^3 in SV-2.

- Total xylenes were detected in one of the six soil vapor sampling locations, with concentrations ranging from non-detect to 3,500 µg/m^3 in SV-2.

- Naphthalene was not detected above the laboratory reporting limits in any of the soil vapor sampling locations.

- MTBE was detected in three of the six soil vapor sampling locations, with concentrations ranging from non-detect to 3,500 µg/m^3 in SV-3B.

A copy of the laboratory analytical report and chain-of-custody documentation is included in **Appendix D.**

Soil vapor analytical data collected at the Site were compared with human health risk-based screening criteria. Environmental Screening Levels (ESLs) developed in 2008 by the San Francisco Bay RWQCB for residential and commercial land uses were used to evaluate potential exposures to residual constituents at the Site. The

ESLs were developed using USEPA and California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC) human health risk assessment methodologies.

The commercial ESLs were exceeded in seven of the 11 samples collected for TPH-g; five out of 11 samples collected for benzene; and two out of 11 samples for ethylbenzene. All other results were below the commercial ESLs. Refer to Table 1 and Figure 3 for soil vapor results and locations.

The sample collected from SV-1-6911 contained 4.4% helium. Based on the DTSC's *DRAFT Advisory – Active Soil Gas Investigation* (DTSC, 2010) the concentration of helium (4.4%) in the sample divided by the concentration of helium in the shroud (20%) provides a measure of the proportion of the sample attributable to leakage (22%). The guidance indicates that a leak that comprises less than 5% of the sample is relatively insignificant. Therefore this sample result is greater than the DTSC's guidance of 5%. During the cold season sampling event the data will be verified.

Cold Season Vapor Sampling

ARCADIS will conduct the cold season vapor sampling in the fourth quarter 2011 and submit a report of the analytical results comparing the warm and cold season results. Additionally an evaluation of the potential contaminant volatilization to indoor air exposure pathway will be conducted.

During the cold season sampling scheduled for the fourth quarter 2011, ARCADIS will install one sub-slab vapor sampling point inside the kiosk building onsite. The sub-slab vapor probe will be sampled along with the other vapor sampling points to evaluate the soil vapor conditions and any potential indoor air migration.

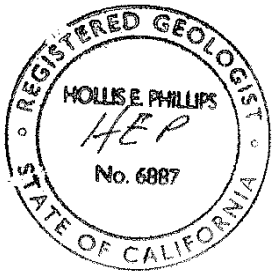
If you have any questions or comments, please contact Ben McKenna by telephone at 925.296.7857 or by e-mail at Benino.McKenna@arcadis-us.com or Hollis Phillips by telephone at 415.374.2744 ext. 13 or by e-mail at Hollis.Phillips@arcadis-us.com.

Sincerely,

ARCADIS

Ben McKenna
Project Geologist

Hollis E. Phillips, P.G.
Project Manager



Enclosures:

Table 1	Soil Vapor Analytical Data
Figure 1	Site Location Map
Figure 2	Site Map with Historical Sampling Locations
Figure 3	Site Plan with Vapor Sampling Locations
Figure 4	Soil Vapor Probe Detail
Appendix A	Alameda County Soil Boring Permit
Appendix B	Soil Boring Logs
Appendix C	Laboratory Analytical Report and Chain-of-Custody Documentation
Appendix D	Field Documentation

References

ACEH, 12 May 2011. *Fuel Leak Case No. RO0000076 and GeoTracker Global ID T0600100110, ARCO No.4931, 731W. MacArthur Boulevard, Oakland, CA 94610*. Submitted to Mr. Paul Supple for Atlantic Richfield Company, by Mr. Paresh Khatri.

ACEH, 1 January 2011. *Fuel Leak Case No. RO0000076 and GeoTracker Global ID T0600100110, ARCO No.4931, 731W. MacArthur Boulevard, Oakland, CA 94610*. Submitted to Mr. Paul Supple for Atlantic Richfield Company, by Mr. Paresh Khatri.

ARCADIS-U.S. 2010. *Site Investigation Report, Former BP Service Station #4931, 731 West MacArthur Boulevard, Oakland, California, ACEH Case # RO000076.* 11 November.

Department of Toxic Substances Control (DTSC), 2010. *DRAFT Advisory – Active Soil Gas Investigation.* March.

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Tables

Table 1
Soil Vapor Analytical Data
Soil Vapor Probe Installation and Sampling Report
Former BP Service Station 4931
731 West MacArthur Blvd
Oakland, California

Location ID	Date Collected	TO-15								ASTM D-1946			
		TPH-g	Benzene	Toluene	Ethyl benzene	m,p-Xylene	o-Xylene	MTBE	Naphthalene	Nitrogen	Carbon Dioxide	Methane	Helium
	Commercial/Industrial ESLs	29,000	280	180,000	3,300	58,000	58,000	31,000	240	NA	NA	NA	NA
	Units	(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)	%	%	%	%
SV-1-6911	6/9/2011	**4,100**	**8.7**	**19**	<5	<5	<5	**26**	<24	**83.00**	**2.50**	**0.01**	**4.40**
SV-1B-6911	6/9/2011	**16,000**	**16**	**9.4**	<5.6	<5.6	<5.6	**52**	<27	**94.00**	**4.80**	**0.02**	<0.13
SV-2-6911	6/9/2011	**42,000,000**	**130,000**	<2200	**6,000**	**3,500**	<2500	<2100	<12000	**54.00**	**12.00**	**31.00**	<0.2
SV-2B-6911	6/9/2011	**44,000,000**	**120,000**	<2300	**5,500**	**3,000**	<2700	<2200	<13000	**55.00**	**12.00**	**30.00**	<0.12
SV-3-6911	6/9/2011	**15,000,000**	**2,700**	<1200	<1300	<1300	<1300	**3,200**	<6500	**74.00**	**23.00**	**0.88**	<0.12
SV-3B-6911	6/9/2011	**14,000,000**	**2,500**	<2400	<2700	<2700	<2700	**3,500**	<13000	**75.00**	**22.00**	**0.82**	<0.13
SV-4-6911	6/9/2011	<260	<4	<4.7	<5.5	<5.5	<5.5	<4.5	<26	**80.00**	**1.70**	<.00025	**0.13**
SV-4B-6911	6/9/2011	<260	<4.1	<4.9	<5.6	<5.6	<5.6	<4.6	<27	**80.00**	**1.70**	<0.00026	<0.13
SV-5-6911	6/9/2011	**400,000**	**56**	<38	<44	<44	<44	**2,900**	<210	**89.00**	**1.00**	**1.50**	<1
SV-5B-6911	**Not Collected**												
SV-6-6911	6/9/2011	**36,000,000**	**4,800**	<2200	<2600	<2600	<2600	<2100	<12000	**83.00**	**7.20**	**6.10**	<0.12
SV-6B-6911	6/9/2011	**25,000,000**	<3800	<4500	<5200	<5200	<5200	<4300	<25000	**81.00**	**6.20**	**4.90**	**0.45**
Dup-01-6911	6/9/2011	**23,000,000**	<3700	<4400	<5000	<5000	<5000	<4200	<24000	**81.00**	**5.90**	**4.70**	**0.51**
Equip Blank-01	6/9/2011	<100	<1.6	<1.9	<2.2	<2.2	<2.2	<1.8	<10	**100.00**	<0.01	<0.0001	<0.05
Lab Blank	6/9/2011	<100	<1.6	<1.9	<2.2	<2.2	<2.2	<1.8	<10	<0.1	<0.01	<0.0001	<0.05

Notes:
Detected concentrations are in bold.
Concentrations exceeding residential ESLs are highlighted.
µg/m^3 = micrograms per cubic meter
< = The analyte was not detected above the reporting limit.
% = percent
-- = Not analyzed / not applicable
DUP-01-6911= duplicate sample of SV-6B collected on 6/9/11
MTBE = Methyl tert-butyl ether
NA = Not available
TPH-g = TPH ref. to Gasoline (MW=100)
UB= Compound considered non-detect at the listed value due to associated blank contamination.

Reference:
RWQCB (2008). San Francisco Bay Regional Water Quality Control Board. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater. Table E-2. May.
Warm Data entered by RK on 7/5/11
Data QC by RK on 7/6/11

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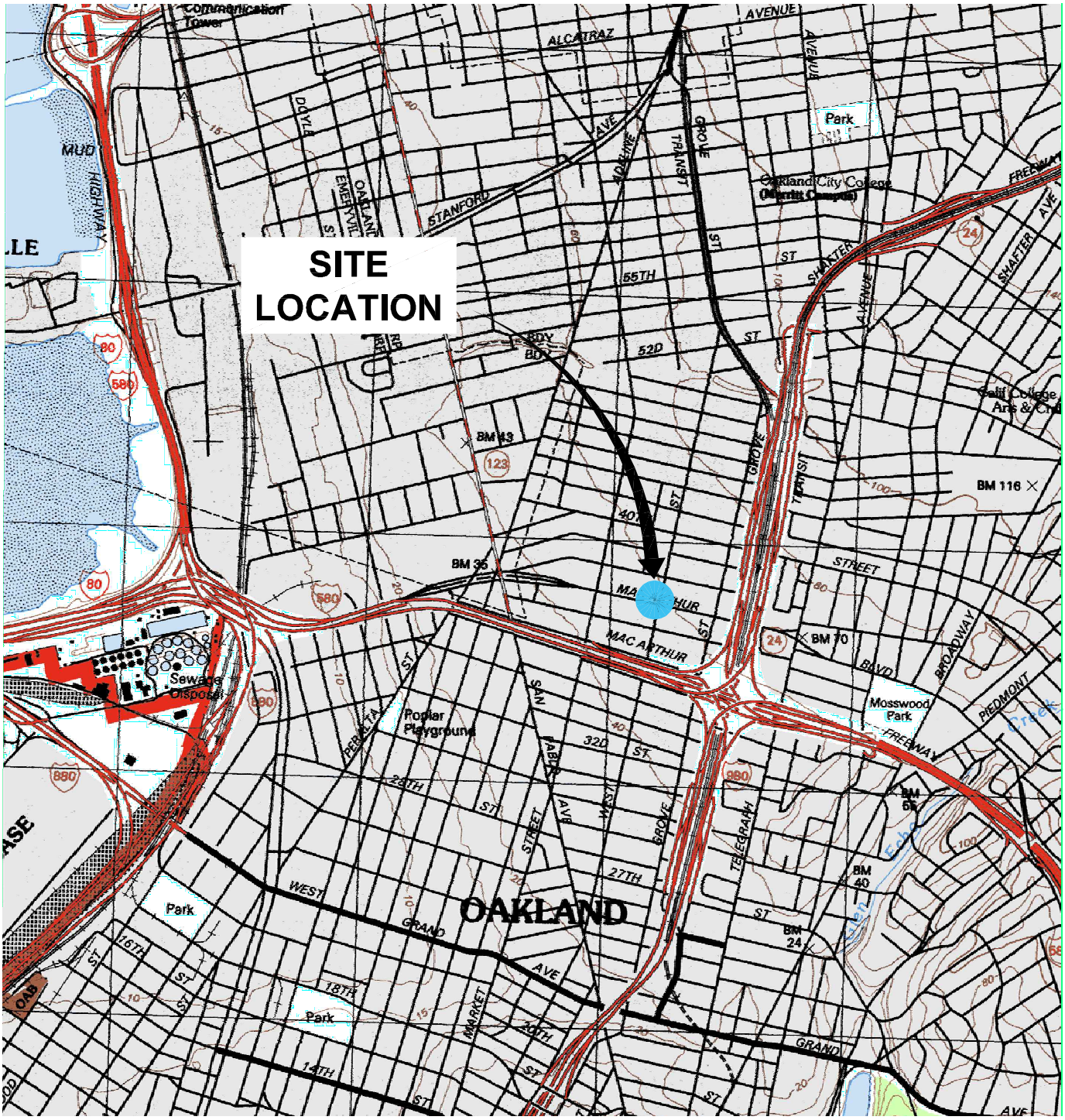
Figures



NOTE:
1. BASE MAP USGS 7.5 MIN. TOPO. QUAD, OAKLAND WEST CALIFORNIA 1997.

0 2000' 4000'

Approximate Scale: 1 in. = 2000 ft.

FORMER ARCO SERVICE STATION No. 4391
731 WEST MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
SOIL VAPOR PROBE INSTALLATION AND SAMPLING REPORT

SITE LOCATION MAP

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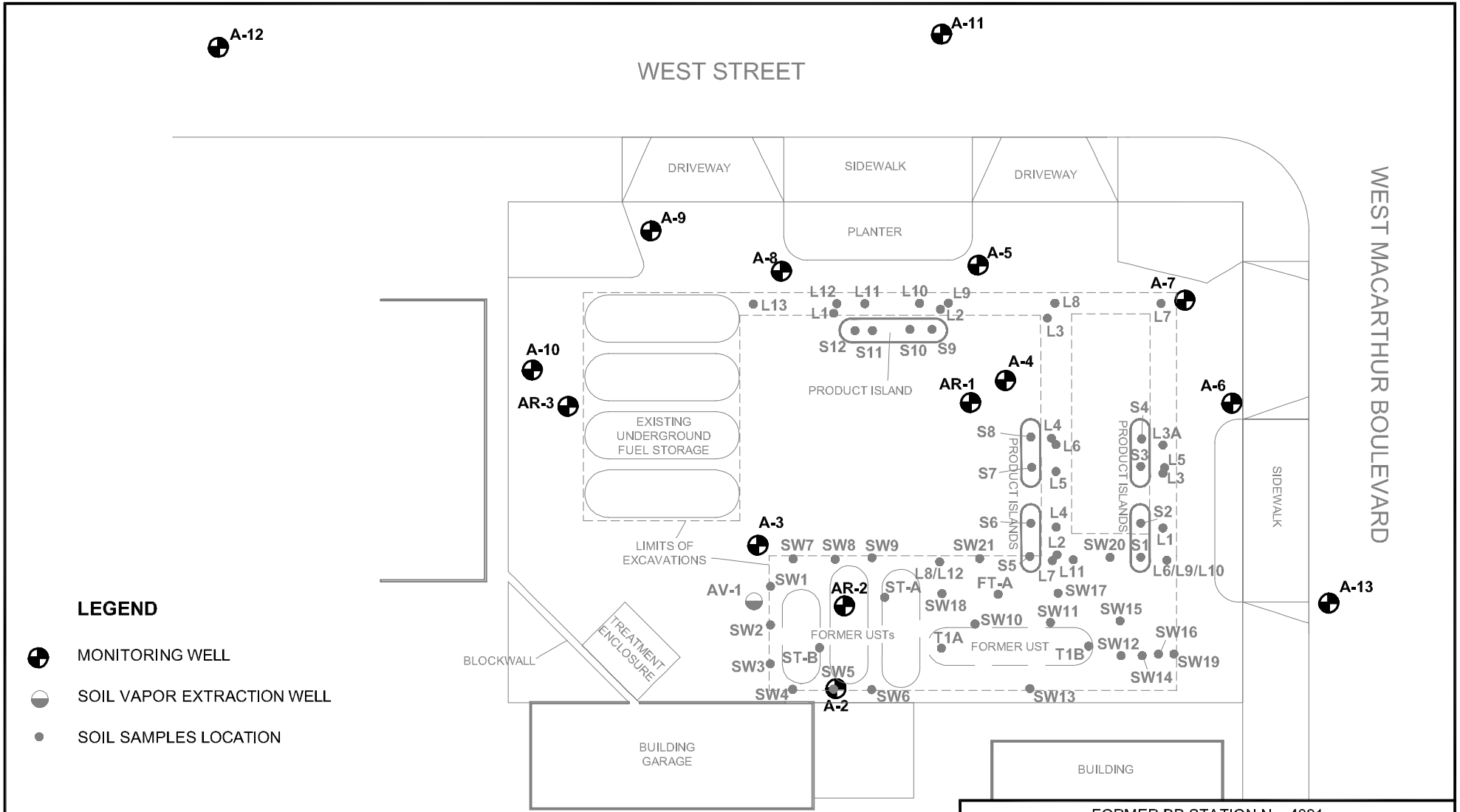
FIGURE
1

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*:OFF=*REF*
G:\ENVCAD\Emeryville\ACT\GP09BPNA\C110\C0000\DWG\04391 Site Plan 1.dwg LAYOUT: 2 SAVED: 7/5/2011 2:10 PM ACADVER: 18.0S (LMS TECH) PAGESETUP: -- PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 7/5/2011 2:16 PM BY: BEARDSLEY, DANIEL



LEGEND

- MONITORING WELL
- SOIL VAPOR EXTRACTION WELL
- SOIL SAMPLES LOCATION

0 30' 60'

Approximate Scale: 1 in. =60 ft.

NOTE:
SITE MAP ADAPTED FROM FIGURES BY OTHERS.
SITE DIMENSIONS AND FACILITY LOCATIONS NOT VERIFIED.

FORMER BP STATION No. 4391
731 WEST MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
SOIL VAPOR PROBE INSTALLATION AND SAMPLING REPORT

SITE MAP WITH HISTORICAL SAMPLING LOCATIONS

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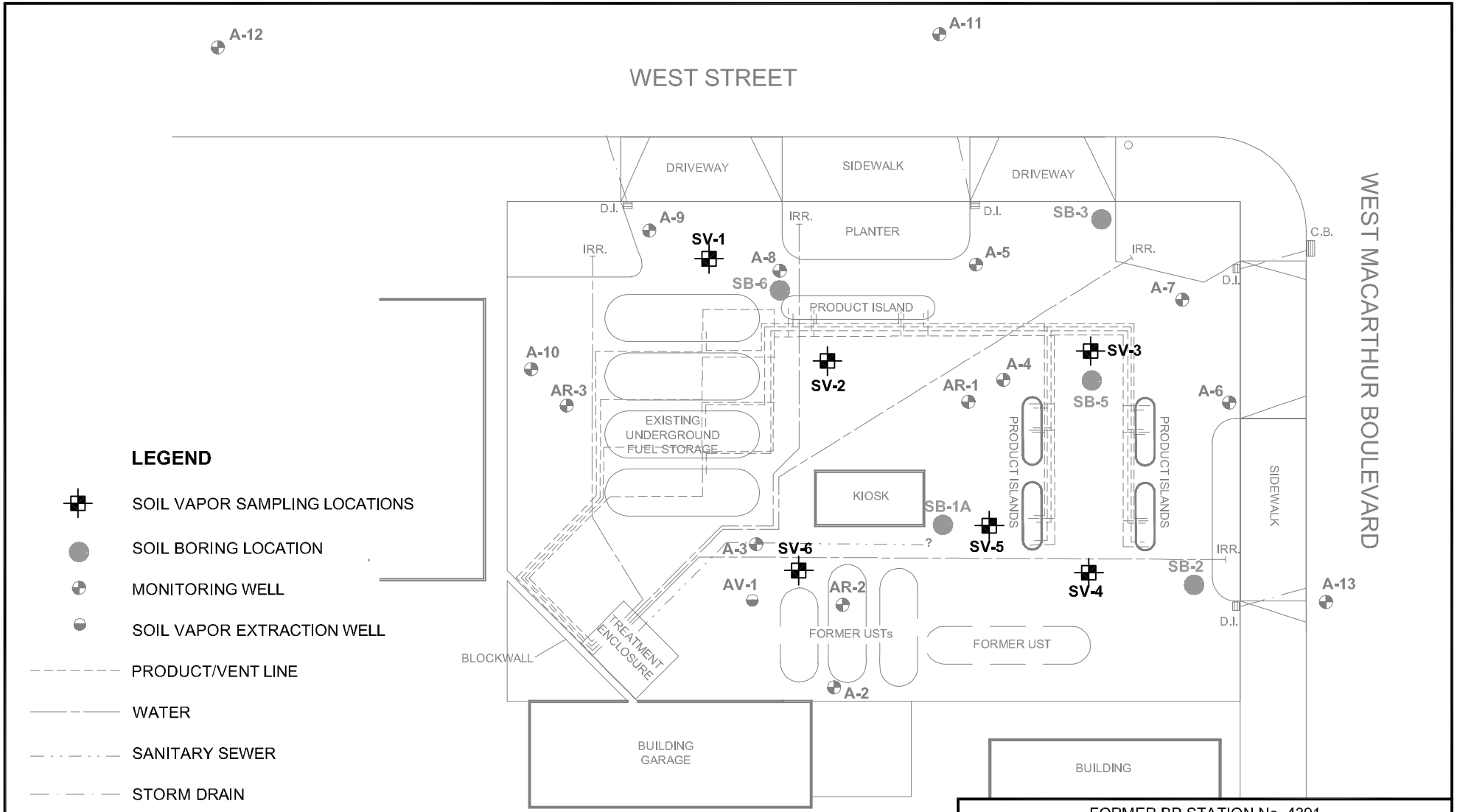
FIGURE
2

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*:OFF=*REF*
G:\ENVCAD\Emeryville\ACT\GP09BPNA\C110\C0000\DWG\GP09BPNAC110-B03.dwg LAYOUT: 3 SAVED: 7/6/2011 8:37 AM ACADVER: 18.0S (LMS TECH) PAGESETUP: -- PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 7/6/2011 8:43 AM BY: BEARDSLEY, DANIEL



NOTE:
SITE MAP ADAPTED FROM FIGURES BY OTHERS.
SITE DIMENSIONS AND FACILITY LOCATIONS NOT VERIFIED.

FORMER BP STATION No. 4391
731 WEST MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
SOIL VAPOR PROBE INSTALLATION AND SAMPLING REPORT

SITE PLAN WITH VAPOR SAMPLING LOCATIONS

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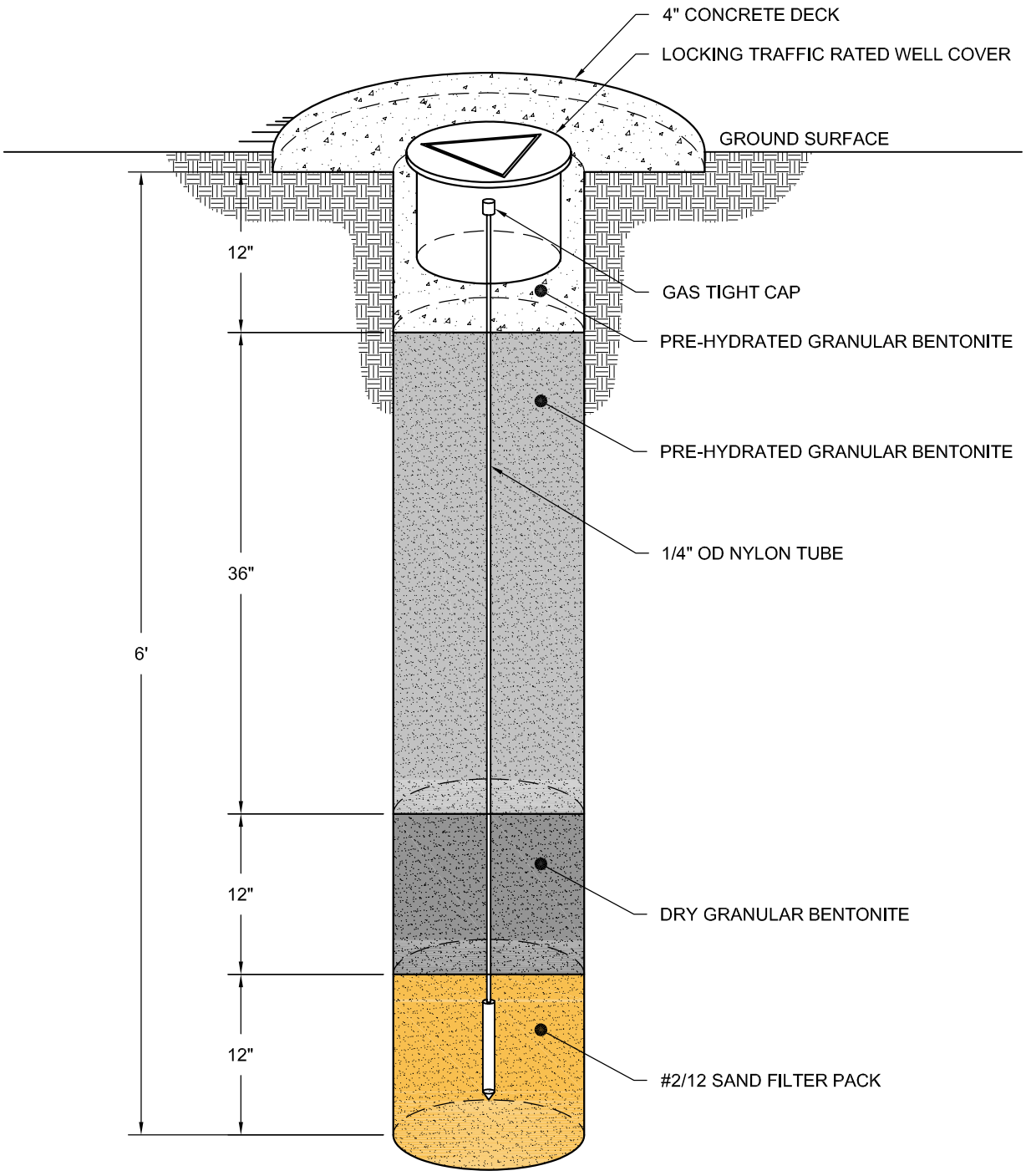
FIGURE
3



FORMER ARCO SERVICE STATION No. 4391
731 WEST MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
SOIL VAPOR PROBE INSTALLATION AND SAMPLING REPORT

TYPICAL SOIL VAPOR PROBE DETAIL

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FIGURE
4

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Appendix A

Alameda County Soil Boring Permits

Alameda County Public Works Agency - Water Resources Well Permit

399 Elmhurst Street
Hayward, CA 94544-1395
Telephone: (510)670-6633 Fax:(510)782-1939

Application Approved on: 05/20/2011 By jamesy

Permit Numbers: W2011-0338
Permits Valid from 05/31/2011 to 06/30/2011

Application Id:	1305571876502	**City of Project Site:**Oakland
Site Location:	731 West MacArthur Blvd., Oakland, CA	
Project Start Date:	05/31/2011	**Completion Date:**06/30/2011
Assigned Inspector:	Contact Steve Miller at (510) 670-5517 or stevem@acpwa.org	
Applicant:	ARCADIS U.S. - Ben McKenna 2033 North Main Street, Suite 340, Walnut Creek, CA 94596	**Phone:** 925-296-7857
Property Owner:	Nick Goyal 28456 Century Street, Hayward, CA 94545	**Phone:** --
Client:	Ben McKenna 2033 North Main Street, Suite 340, Walnut Creek, CA 94596	**Phone:** 925-296-7857
Contact:	Ben McKenna	**Phone:** 925-296-7857 **Cell:** 916-508-5536

	Total Due:	$265.00
Receipt Number: WR2011-0146	**Total Amount Paid:**	$265.00
Payer Name : Benino P. McKenna	Paid By: VISA	**PAID IN FULL**

Works Requesting Permits:

Borehole(s) for Investigation-Contamination Study - 6 Boreholes
Driller: Gregg Drilling & Testing - Lic #: 485165 - Method: hstem

Work Total: $265.00

Specifications

Permit Number	Issued Dt	Expire Dt	# Boreholes	Hole Diam	Max Depth
W2011-0338	05/20/2011	08/29/2011	6	4.00 in.	5.50 ft

Specific Work Permit Conditions

1. Backfill bore hole by tremie with cement grout or cement grout/sand mixture. Upper two-three feet replaced in kind or with compacted cuttings. All cuttings remaining or unused shall be containerized and hauled off site. The containers shall be clearly labeled to the ownership of the container and labeled hazardous or non-hazardous.

2. Boreholes shall not be left open for a period of more than 24 hours. All boreholes left open more than 24 hours will need approval from Alameda County Public Works Agency, Water Resources Section. All boreholes shall be backfilled according to permit destruction requirements and all concrete material and asphalt material shall be to Caltrans Spec or County/City Codes. No borehole(s) shall be left in a manner to act as a conduit at any time.

3. Permittee shall assume entire responsibility for all activities and uses under this permit and shall indemnify, defend and save the Alameda County Public Works Agency, its officers, agents, and employees free and harmless from any and all expense, cost, liability in connection with or resulting from the exercise of this Permit including, but not limited to, properly damage, personal injury and wrongful death.

4. Prior to any drilling activities, it shall be the applicant's responsibility to contact and coordinate an Underground Service Alert (USA), obtain encroachment permit(s), excavation permit(s) or any other permits or agreements required for that Federal, State, County or City, and follow all City or County Ordinances. No work shall begin until all the permits and requirements have been approved or obtained. It shall also be the applicants responsibilities to provide to the Cities or to Alameda County an Traffic Safety Plan for any lane closures or detours planned. No work shall begin until all the permits and requirements have been approved or obtained.

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Appendix B

Soil Boring Logs

Date Start/Finish: 5/31/11-5/31/11
Drilling Company: Gregg Drilling
Driller's Name: N/A
Drilling Method: Hand Auger
Sampling Method: Hand Auger
Rig Type: N/A

Northing: N/A
Easting: N/A
Casing Elevation: N/A

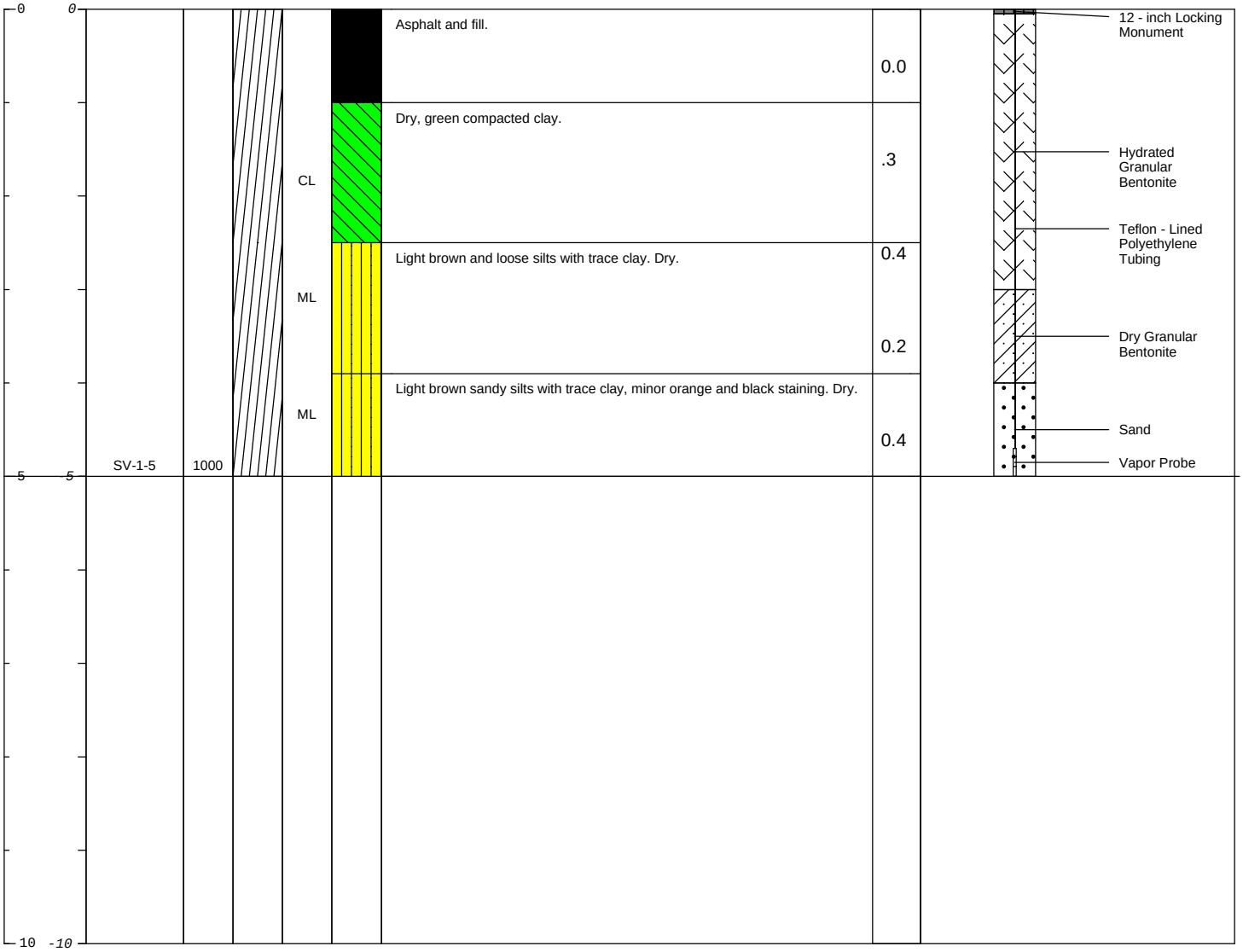
Borehole Depth: 5'
Surface Elevation: N/A

Descriptions By: Miljan Draganic

Well/Boring ID: **SV-1**

Client: British Petroleum/ ARCO

Location: 731 W McArthur Blvd.
Oakland, CA



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Remarks: bgs = below ground surface
N/A = Not Applicable/Available
MSL = Above Mean Sea Level.

Date Start/Finish: 5/31/11
Drilling Company: Gregg Drilling
Driller's Name: N/A
Drilling Method: Hand Auger
Sampling Method: Hand Auger
Rig Type: None

Northing: N/A
Easting: N/A
Casing Elevation: N/A

Borehole Depth: 5'
Surface Elevation: N/A

Descriptions By: Miljan Draganic

Well/Boring ID: **SV-2**

Client: British Petroleum/ ARCO

Location: 731 W McArthur Blvd.
Oakland, CA

DEPTH (BGS) / ELEVATION (AMSL)	Sample Type Number	Time	Recovery (feet)	USCS Code	Geologic Column	Stratigraphic Description	PID (ppm)	Well/Boring Construction
0 / 0						Asphalt with silty gravely fill	13.9	12 - inch Locking Monument
				CL		Bluish green clay with strong odor and some black staining. Dry.	84.7	Hydrated Granular Bentonite
							57.4	Teflon - Lined Polyethylene Tubing
				ML		Clayey silts with strong odor. Dark bluish color. Dry.	160	Dry Granular Bentonite
							223	
				ML		Green sandy silts with strong odor. Dry	212	Sand
5 / -5	SV-2-5	1055					172	Vapor Probe
10 / -10								

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Remarks: ags = above ground surface; below ground surface; Not Applicable/ Available; AMSL = Above Mean Sea Level

Date Start/Finish: 5/31/11
Drilling Company: Gregg Drilling
Driller's Name: N/A
Drilling Method: Hand Auger
Sampling Method: Hand Auger
Rig Type: None

Northing: N/A
Easting: N/A
Casing Elevation: N/A

Borehole Depth: 5'
Surface Elevation: N/A

Descriptions By: Miljan Draganic

Well/Boring ID: **SV-3**

Client: British Petroleum/ ARCO

Location: 731 W McArthur Blvd.
Oakland, CA

DEPTH (BGS) / ELEVATION (AMSL)	Sample Type Number	Time	Recovery (feet)	USCS Code	Geologic Column	Stratigraphic Description	PID (ppm)	Well/Boring Construction
0 / 0						Concrete with gravely fill	0.2	12 - inch Locking Monument
						Thick green clays with some black staining and dry.	7.8	Hydrated Granular Bentonite
				CL			1.1	Teflon - Lined Polyethylene Tubing
						Sandy silts with clay	0.4	Dry Granular Bentonite
				ML		Fine sandy silts with trace clay orange/light borwn in color with some black staining with some greenish shading	0.7	Sand
5 / -5	SV-3-5	1235						Vapor Probe
10 / -10								

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Remarks: ags = above ground surface; below ground surface; Not Applicable/ Available; AMSL = Above Mean Sea Level

Date Start/Finish: 5/31/11
Drilling Company: Gregg Drilling
Driller's Name: N/A
Drilling Method: Hand Auger
Sampling Method: Hand Auger
Rig Type: None

Northing: N/A
Easting: N/A
Casing Elevation: N/A

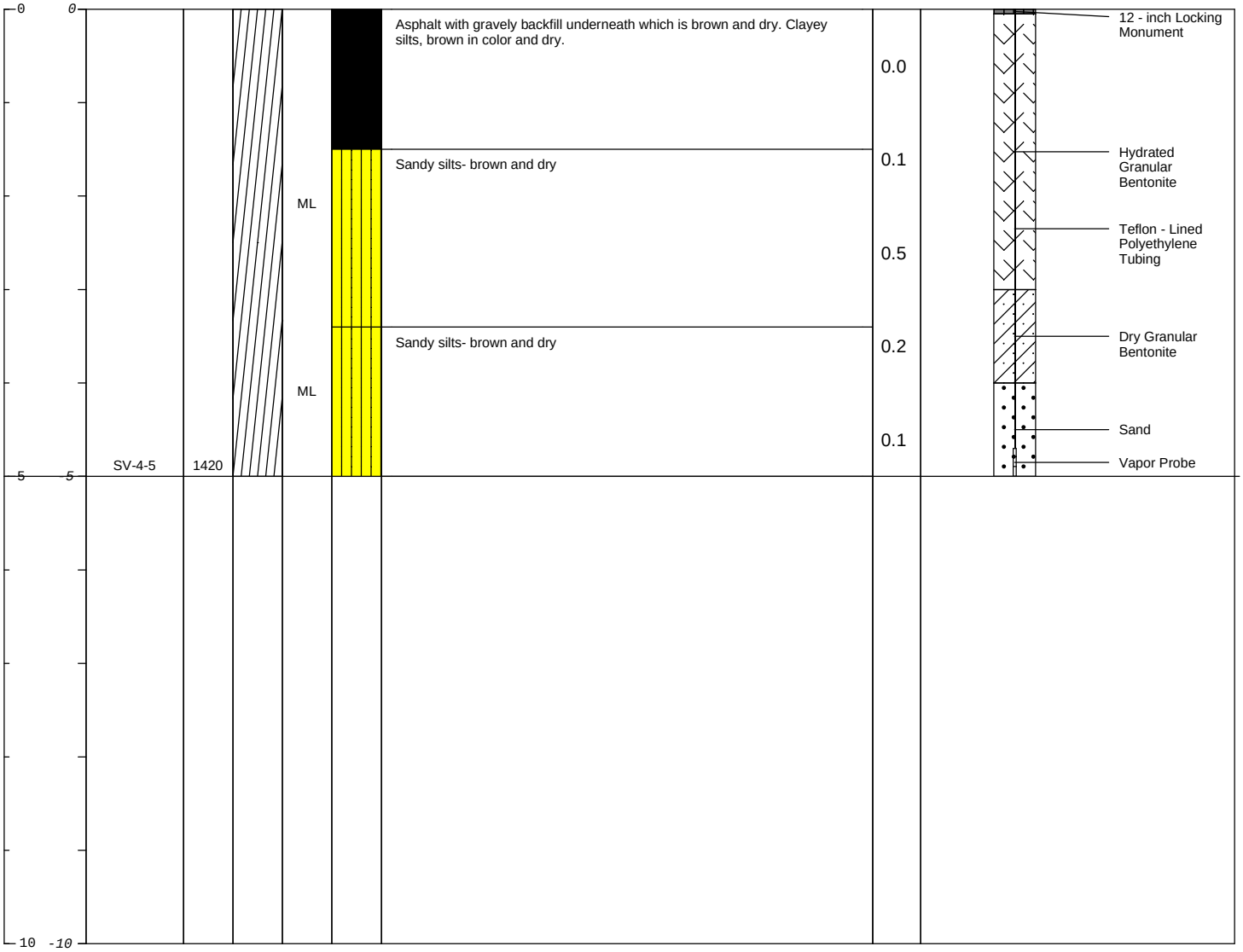
Borehole Depth: 5'
Surface Elevation: N/A

Descriptions By: Miljan Draganic

Well/Boring ID: **SV-4**

Client: British Petroleum/ ARCO

Location: 731 W McArthur Blvd.
Oakland, CA



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Remarks: ags = above ground surface; below ground surface; Not Applicable/ Available; AMSL = Above Mean Sea Level

Date Start/Finish: 6/1/11
Drilling Company: Gregg Drilling
Driller's Name: N/A
Drilling Method: Hand Auger
Sampling Method: Hand Auger
Rig Type: None

Northing: N/A
Easting: N/A
Casing Elevation: N/A

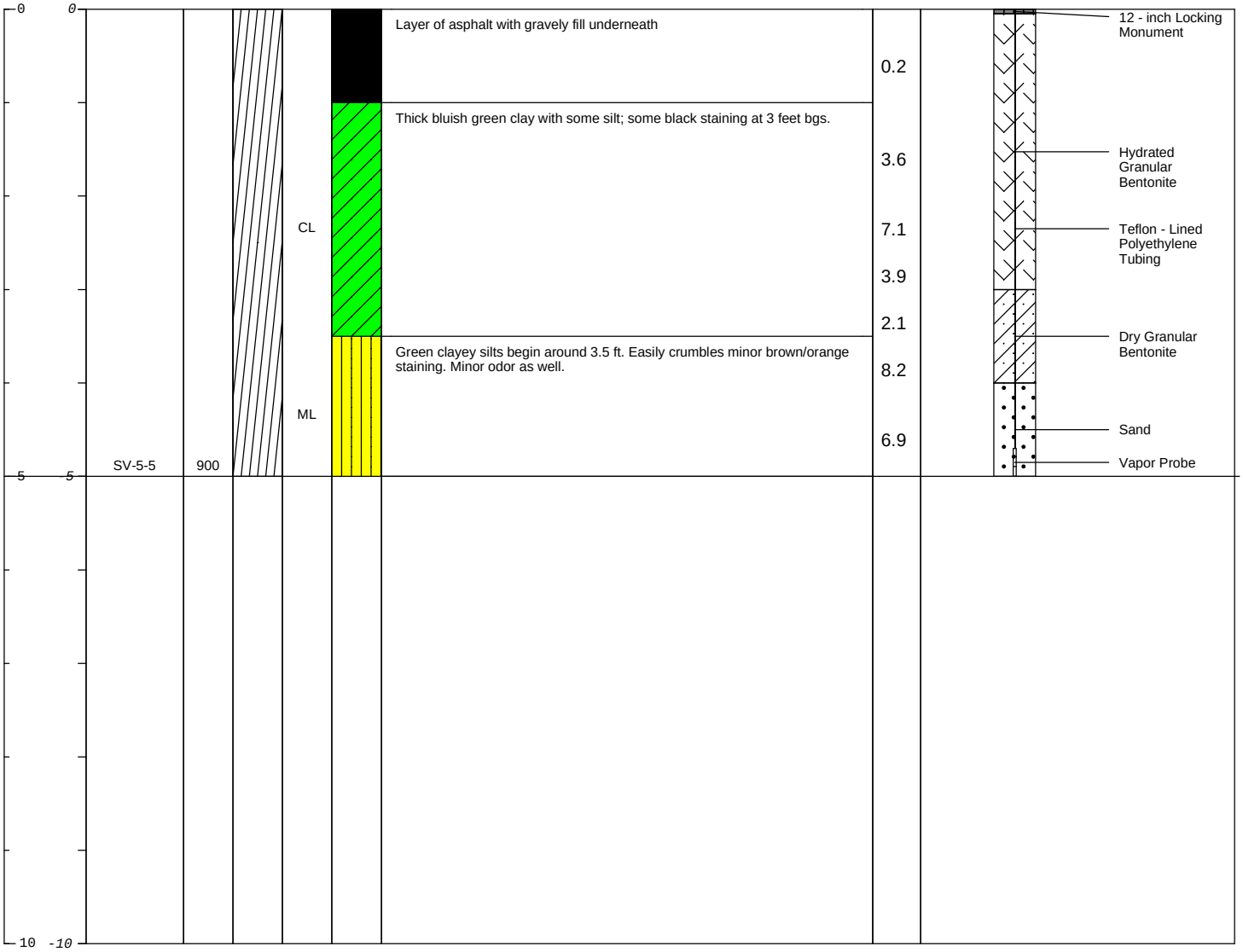
Borehole Depth: 5
Surface Elevation: N/A

Descriptions By: Miljan Draganic

Well/Boring ID: **SV-5**

Client: British Petroleum/ ARCO

Location: 731 W McArthur Blvd.
Oakland, CA



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Remarks: ags = above ground surface; below ground surface; Not Applicable/ Available; AMSL = Above Mean Sea Level

Date Start/Finish: 6/1/11
Drilling Company: Gregg Drilling
Driller's Name: N/A
Drilling Method: Hand Auger
Sampling Method: Hand Auger
Rig Type: None

Northing: N/A
Easting: N/A
Casing Elevation: N/A

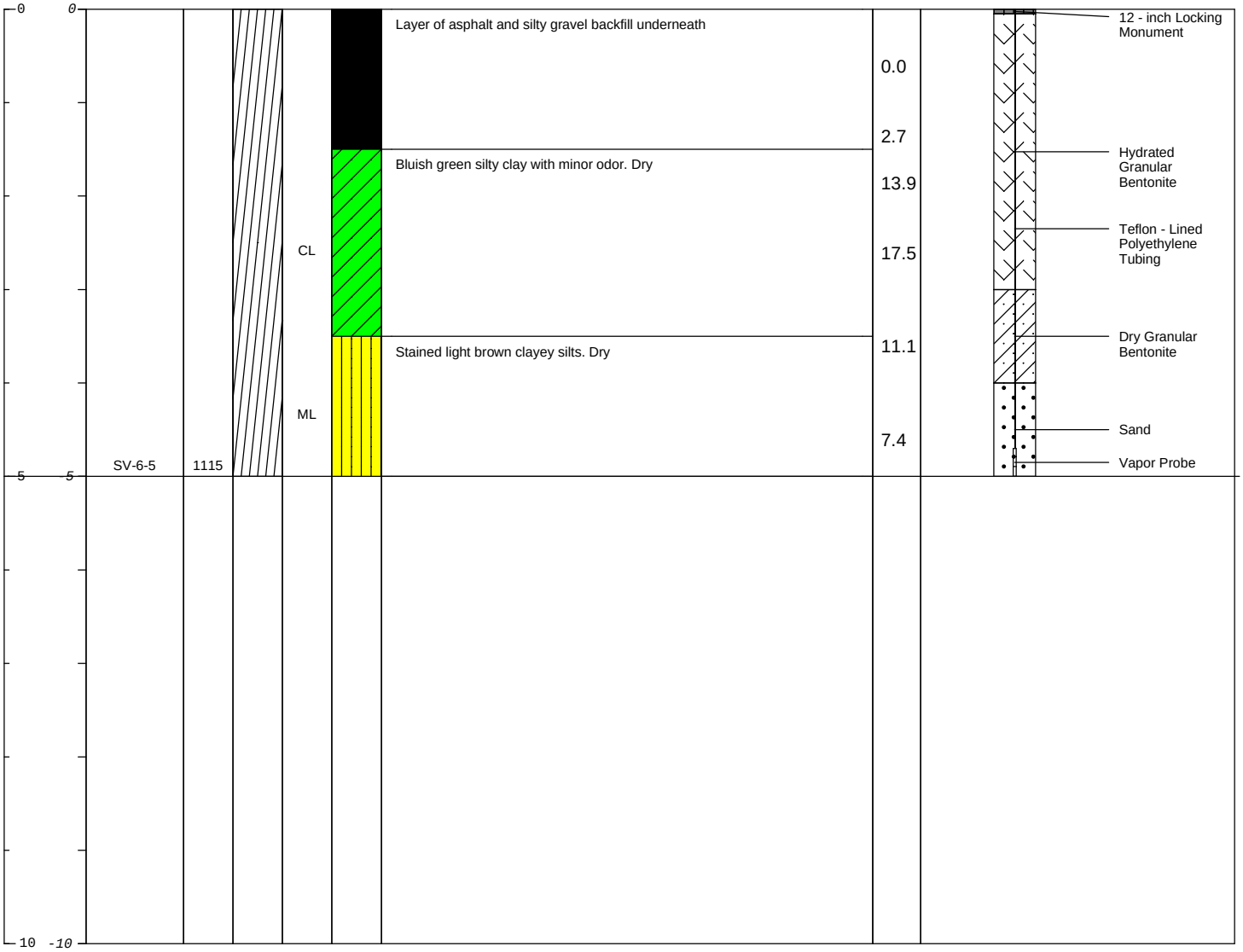
Borehole Depth: 5
Surface Elevation: N/A

Descriptions By: Miljan Draganic

Well/Boring ID: **SV-6**

Client: British Petroleum/ ARCO

Location: 731 W McArthur Blvd.
Oakland, CA



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Remarks: ags = above ground surface; below ground surface; Not Applicable/ Available; AMSL = Above Mean Sea Level

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Appendix C

Laboratory Analytical Report and
Chain-of-Custody Documentation

Air Toxics LTD.
Laboratory Services Since 1989

6/27/2011
Mr. Michael Strickler
ARCADIS, Inc.
2300 Eastlake Avenue East
Suite 200
Seattle WA 98102

Project Name: Former BP #4931
Project #: GP09BPNA.C110.C0000
Workorder #: 1106259A

Dear Mr. Michael Strickler

The following report includes the data for the above referenced project for sample(s) received on 6/11/2011 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

WORK ORDER #: 1106259A

Work Order Summary

CLIENT:	Mr. Michael Strickler ARCADIS, Inc. 2300 Eastlake Avenue East Suite 200 Seattle, WA 98102	**BILL TO:**	Accounts Payable ARCADIS, Inc. 630 Plaza Drive Suite 130 Highlands Ranch, CO 80129
PHONE:	206.726.4732	**P.O. #**	AUS-MSA-Nat-Air2007-06032
FAX:	206-325-8218	**PROJECT #**	GP09BPNA.C110.C0000 Former BP #4931
DATE RECEIVED:	06/11/2011	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	06/27/2011		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SV-1-6911	Modified TO-15	4.0 "Hg	15 psi
02A	SV-2-6911	Modified TO-15	4.0 "Hg	15 psi
03A	SV-3-6911	Modified TO-15	5.5 "Hg	15 psi
04A	SV-4-6911	Modified TO-15	6.0 "Hg	15 psi
05A	SV-5-6911	Modified TO-15	27.0 "Hg	15 psi
06A	SV-6-6911	Modified TO-15	4.5 "Hg	15 psi
07A	SV-1B-6911	Modified TO-15	6.5 "Hg	15 psi
08A	SV-2B-6911	Modified TO-15	5.5 "Hg	15 psi
09A	SV-3B-6911	Modified TO-15	6.0 "Hg	15 psi
10A	SV-6B-6911	Modified TO-15	4.5 "Hg	15 psi
11A	Dup-01-6911	Modified TO-15	4.0 "Hg	15 psi
12A	Equip-Blank-01	Modified TO-15	11 psi	11 psi
13A	SV-4B-6911	Modified TO-15	6.5 "Hg	15 psi
14A	Lab Blank	Modified TO-15	NA	NA
14B	Lab Blank	Modified TO-15	NA	NA
15A	CCV	Modified TO-15	NA	NA
15B	CCV	Modified TO-15	NA	NA

Continued on next page

Air Toxics LTD.
Laboratory Services Since 1989

WORK ORDER #: 1106259A

Work Order Summary

CLIENT:	Mr. Michael Strickler ARCADIS, Inc. 2300 Eastlake Avenue East Suite 200 Seattle, WA 98102	**BILL TO:**	Accounts Payable ARCADIS, Inc. 630 Plaza Drive Suite 130 Highlands Ranch, CO 80129
PHONE:	206.726.4732	**P.O. #**	AUS-MSA-Nat-Air2007-06032
FAX:	206-325-8218	**PROJECT #**	GP09BPNA.C110.C0000 Former BP #4931
DATE RECEIVED:	06/11/2011	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	06/27/2011		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
16A	LCS	Modified TO-15	NA	NA
16AA	LCSD	Modified TO-15	NA	NA
16B	LCS	Modified TO-15	NA	NA
16BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Linda D. Frumarn DATE: 06/27/11

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763,
NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/11
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15
ARCADIS, Inc.
Workorder# 1106259A

Thirteen 1 Liter Summa Canister (100% Certified) samples were received on June 11, 2011. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

The number of samples received did not match the information on the Chain of Custody (COC). Sample SV-4B-6911 was added to the analytical request.

Analytical Notes

Dilution was performed on samples SV-2-6911, SV-3-6911, SV-6-6911, SV-2B-6911, SV-3B-6911, SV-6B-6911, and Dup-01-6911 due to the presence of high level non-target species.

The recovery of surrogate 1,2-Dichloroethane-d4 in samples SV-3-6911, SV-5-6911, SV-6-6911, and SV-3B-6911 was outside control limits due to high level hydrocarbon matrix interference. Data is reported as qualified.

A single point calibration for TPH referenced to Gasoline was performed for each daily analytical batch. Recovery is reported as 100% in the associated results for each CCV.

The results for TPH gasoline were reported as not-detected in samples SV-4-6911, Equip-Blank-01, and SV-4B-6911 since the chromatographic profiles were not consistent with a gasoline pattern.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV and/or LCS.

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

Air Toxics LTD.
Laboratory Services Since 1989

Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SV-1-6911

Lab ID#: 1106259A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.2	2.7	3.7	8.7
Toluene	1.2	5.0	4.4	19
Methyl tert-butyl ether	1.2	7.2	4.2	26
TPH ref. to Gasoline (MW=100)	58	1000	240	4100

Client Sample ID: SV-2-6911

Lab ID#: 1106259A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	580	40000	1800	130000
Ethyl Benzene	580	1400	2500	6000
m,p-Xylene	580	800	2500	3500
TPH ref. to Gasoline (MW=100)	12000	10000000	47000	42000000

Client Sample ID: SV-3-6911

Lab ID#: 1106259A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	310	880	1100	3200
Benzene	310	840	990	2700
TPH ref. to Gasoline (MW=100)	6200	3600000	25000	15000000

Client Sample ID: SV-4-6911

Lab ID#: 1106259A-04A

No Detections Were Found.

Client Sample ID: SV-5-6911

Lab ID#: 1106259A-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	10	17	32	56

Air Toxics LTD.
Laboratory Services Since 1989

Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SV-5-6911

Lab ID#: 1106259A-05A

Methyl tert-butyl ether	10	800	36	2900
TPH ref. to Gasoline (MW=100)	500	98000	2100	400000

Client Sample ID: SV-6-6911

Lab ID#: 1106259A-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	600	1500	1900	4800
TPH ref. to Gasoline (MW=100)	12000	8800000	49000	36000000

Client Sample ID: SV-1B-6911

Lab ID#: 1106259A-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.3	5.0	4.1	16
Toluene	1.3	2.5	4.9	9.4
Methyl tert-butyl ether	1.3	14	4.6	52
TPH ref. to Gasoline (MW=100)	64	4000	260	16000

Client Sample ID: SV-2B-6911

Lab ID#: 1106259A-08A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	620	39000	2000	120000
Ethyl Benzene	620	1300	2700	5500
m,p-Xylene	620	680	2700	3000
TPH ref. to Gasoline (MW=100)	12000	11000000	51000	44000000

Client Sample ID: SV-3B-6911

Lab ID#: 1106259A-09A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	630	960	2300	3500

Air Toxics LTD.
Laboratory Services Since 1989

Summary of Detected Compounds
EPA METHOD TO-15 GC/MS

Client Sample ID: SV-3B-6911

Lab ID#: 1106259A-09A

Benzene	630	770	2000	2500
TPH ref. to Gasoline (MW=100)	13000	3400000	52000	14000000

Client Sample ID: SV-6B-6911

Lab ID#: 1106259A-10A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH ref. to Gasoline (MW=100)	24000	6200000	97000	25000000

Client Sample ID: Dup-01-6911

Lab ID#: 1106259A-11A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH ref. to Gasoline (MW=100)	23000	5700000	95000	23000000

Client Sample ID: Equip-Blank-01

Lab ID#: 1106259A-12A

No Detections Were Found.

Client Sample ID: SV-4B-6911

Lab ID#: 1106259A-13A

No Detections Were Found.

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-1-6911

Lab ID#: 1106259A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3062123**	**Date of Collection:**	**6/9/11 9:31:00 AM**
Dil. Factor:	**2.33**	**Date of Analysis:**	**6/21/11 09:30 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.2	2.7	3.7	8.7
Ethyl Benzene	1.2	Not Detected	5.0	Not Detected
Toluene	1.2	5.0	4.4	19
m,p-Xylene	1.2	Not Detected	5.0	Not Detected
o-Xylene	1.2	Not Detected	5.0	Not Detected
Methyl tert-butyl ether	1.2	7.2	4.2	26
Naphthalene	4.7	Not Detected	24	Not Detected
TPH ref. to Gasoline (MW=100)	58	1000	240	4100

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	116	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	100	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-2-6911

Lab ID#: 1106259A-02A

EPA METHOD TO-15 GC/MS

File Name:	**14062214**	**Date of Collection: 6/9/11 10:27:00 AM**	
Dil. Factor:	**116**	**Date of Analysis: 6/22/11 08:45 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	580	Not Detected	2100	Not Detected
Benzene	580	40000	1800	130000
Toluene	580	Not Detected	2200	Not Detected
Ethyl Benzene	580	1400	2500	6000
m,p-Xylene	580	800	2500	3500
o-Xylene	580	Not Detected	2500	Not Detected
TPH ref. to Gasoline (MW=100)	12000	10000000	47000	42000000
Naphthalene	2300	Not Detected	12000	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	118	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	96	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-3-6911

Lab ID#: 1106259A-03A

EPA METHOD TO-15 GC/MS

File Name:	**14062215**	**Date of Collection: 6/9/11 10:58:00 AM**	
Dil. Factor:	**61.8**	**Date of Analysis: 6/22/11 09:12 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	310	880	1100	3200
Benzene	310	840	990	2700
Toluene	310	Not Detected	1200	Not Detected
Ethyl Benzene	310	Not Detected	1300	Not Detected
m,p-Xylene	310	Not Detected	1300	Not Detected
o-Xylene	310	Not Detected	1300	Not Detected
TPH ref. to Gasoline (MW=100)	6200	3600000	25000	15000000
Naphthalene	1200	Not Detected	6500	Not Detected

Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	154 Q	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	97	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-4-6911

Lab ID#: 1106259A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3062126**	**Date of Collection:**	**6/9/11 11:31:00 AM**
Dil. Factor:	**2.52**	**Date of Analysis:**	**6/21/11 10:38 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.3	Not Detected	4.0	Not Detected
Ethyl Benzene	1.3	Not Detected	5.5	Not Detected
Toluene	1.3	Not Detected	4.7	Not Detected
m,p-Xylene	1.3	Not Detected	5.5	Not Detected
o-Xylene	1.3	Not Detected	5.5	Not Detected
Methyl tert-butyl ether	1.3	Not Detected	4.5	Not Detected
Naphthalene	5.0	Not Detected	26	Not Detected
TPH ref. to Gasoline (MW=100)	63	Not Detected	260	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	119	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	98	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-5-6911

Lab ID#: 1106259A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3062127**	**Date of Collection: 6/9/11 12:16:00 PM**	
Dil. Factor:	**20.2**	**Date of Analysis: 6/21/11 11:32 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	10	17	32	56
Ethyl Benzene	10	Not Detected	44	Not Detected
Toluene	10	Not Detected	38	Not Detected
m,p-Xylene	10	Not Detected	44	Not Detected
o-Xylene	10	Not Detected	44	Not Detected
Methyl tert-butyl ether	10	800	36	2900
Naphthalene	40	Not Detected	210	Not Detected
TPH ref. to Gasoline (MW=100)	500	98000	2100	400000

Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	157 Q	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	99	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-6-6911

Lab ID#: 1106259A-06A

EPA METHOD TO-15 GC/MS

File Name:	**14062216**	**Date of Collection: 6/9/11 12:57:00 PM**	
Dil. Factor:	**119**	**Date of Analysis: 6/22/11 10:03 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	600	Not Detected	2100	Not Detected
Benzene	600	1500	1900	4800
Toluene	600	Not Detected	2200	Not Detected
Ethyl Benzene	600	Not Detected	2600	Not Detected
m,p-Xylene	600	Not Detected	2600	Not Detected
o-Xylene	600	Not Detected	2600	Not Detected
TPH ref. to Gasoline (MW=100)	12000	8800000	49000	36000000
Naphthalene	2400	Not Detected	12000	Not Detected

Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	191 Q	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	96	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-1B-6911

Lab ID#: 1106259A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3062122**	**Date of Collection:**	**6/9/11 2:02:00 PM**
Dil. Factor:	**2.58**	**Date of Analysis:**	**6/21/11 08:57 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.3	5.0	4.1	16
Ethyl Benzene	1.3	Not Detected	5.6	Not Detected
Toluene	1.3	2.5	4.9	9.4
m,p-Xylene	1.3	Not Detected	5.6	Not Detected
o-Xylene	1.3	Not Detected	5.6	Not Detected
Methyl tert-butyl ether	1.3	14	4.6	52
Naphthalene	5.2	Not Detected	27	Not Detected
TPH ref. to Gasoline (MW=100)	64	4000	260	16000

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	123	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	100	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-2B-6911

Lab ID#: 1106259A-08A

EPA METHOD TO-15 GC/MS

File Name:	**14062217**	**Date of Collection: 6/9/11 2:27:00 PM**	
Dil. Factor:	**124**	**Date of Analysis: 6/22/11 10:26 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	620	Not Detected	2200	Not Detected
Benzene	620	39000	2000	120000
Toluene	620	Not Detected	2300	Not Detected
Ethyl Benzene	620	1300	2700	5500
m,p-Xylene	620	680	2700	3000
o-Xylene	620	Not Detected	2700	Not Detected
TPH ref. to Gasoline (MW=100)	12000	11000000	51000	44000000
Naphthalene	2500	Not Detected	13000	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	118	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	95	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-3B-6911

Lab ID#: 1106259A-09A

EPA METHOD TO-15 GC/MS

File Name:	**14062218**	**Date of Collection: 6/9/11 2:52:00 PM**	
Dil. Factor:	**126**	**Date of Analysis: 6/22/11 10:51 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	630	960	2300	3500
Benzene	630	770	2000	2500
Toluene	630	Not Detected	2400	Not Detected
Ethyl Benzene	630	Not Detected	2700	Not Detected
m,p-Xylene	630	Not Detected	2700	Not Detected
o-Xylene	630	Not Detected	2700	Not Detected
TPH ref. to Gasoline (MW=100)	13000	3400000	52000	14000000
Naphthalene	2500	Not Detected	13000	Not Detected

Q = Exceeds Quality Control limits of 70% to 130%, due to matrix effects.

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	132 Q	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	97	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-6B-6911

Lab ID#: 1106259A-10A

EPA METHOD TO-15 GC/MS

File Name:	**14062219**	**Date of Collection: 6/9/11 4:11:00 PM**	
Dil. Factor:	**238**	**Date of Analysis: 6/22/11 11:10 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	1200	Not Detected	4300	Not Detected
Benzene	1200	Not Detected	3800	Not Detected
Toluene	1200	Not Detected	4500	Not Detected
Ethyl Benzene	1200	Not Detected	5200	Not Detected
m,p-Xylene	1200	Not Detected	5200	Not Detected
o-Xylene	1200	Not Detected	5200	Not Detected
TPH ref. to Gasoline (MW=100)	24000	6200000	97000	25000000
Naphthalene	4800	Not Detected	25000	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	124	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	96	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Dup-01-6911

Lab ID#: 1106259A-11A

EPA METHOD TO-15 GC/MS

File Name:	**14062220**	**Date of Collection: 6/9/11 3:45:00 PM**	
Dil. Factor:	**233**	**Date of Analysis: 6/22/11 11:32 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	1200	Not Detected	4200	Not Detected
Benzene	1200	Not Detected	3700	Not Detected
Toluene	1200	Not Detected	4400	Not Detected
Ethyl Benzene	1200	Not Detected	5000	Not Detected
m,p-Xylene	1200	Not Detected	5000	Not Detected
o-Xylene	1200	Not Detected	5000	Not Detected
TPH ref. to Gasoline (MW=100)	23000	5700000	95000	23000000
Naphthalene	4700	Not Detected	24000	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	122	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	95	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Equip-Blank-01

Lab ID#: 1106259A-12A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3062120**	**Date of Collection: 6/10/11 3:40:00 PM**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/21/11 07:56 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.50	Not Detected	1.6	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
Naphthalene	2.0	Not Detected	10	Not Detected
TPH ref. to Gasoline (MW=100)	25	Not Detected	100	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	116	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	99	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-4B-6911

Lab ID#: 1106259A-13A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3062121**	**Date of Collection:**	**6/9/11**
Dil. Factor:	**2.58**	**Date of Analysis:**	**6/21/11 08:26 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.3	Not Detected	4.1	Not Detected
Ethyl Benzene	1.3	Not Detected	5.6	Not Detected
Toluene	1.3	Not Detected	4.9	Not Detected
m,p-Xylene	1.3	Not Detected	5.6	Not Detected
o-Xylene	1.3	Not Detected	5.6	Not Detected
Methyl tert-butyl ether	1.3	Not Detected	4.6	Not Detected
Naphthalene	5.2	Not Detected	27	Not Detected
TPH ref. to Gasoline (MW=100)	64	Not Detected	260	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	116	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	100	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1106259A-14A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3062109**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/21/11 02:24 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.50	Not Detected	1.6	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
Naphthalene	2.0	Not Detected	10	Not Detected
TPH ref. to Gasoline (MW=100)	25	Not Detected	100	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	99	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1106259A-14B

EPA METHOD TO-15 GC/MS

File Name:	**14062207**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/21/11 09:34 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
TPH ref. to Gasoline (MW=100)	100	Not Detected	410	Not Detected
Naphthalene	20	Not Detected	100	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	96	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: CCV

Lab ID#: 1106259A-15A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3062102**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/21/11 09:53 AM**	

Compound	%Recovery
Benzene	104
Ethyl Benzene	103
Toluene	103
m,p-Xylene	102
o-Xylene	102
Methyl tert-butyl ether	88
Naphthalene	88
TPH ref. to Gasoline (MW=100)	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	115	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	98	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: CCV

Lab ID#: 1106259A-15B

EPA METHOD TO-15 GC/MS

File Name:	**14062202**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/21/11 07:26 PM**	

Compound	%Recovery
Methyl tert-butyl ether	103
Benzene	111
Toluene	105
Ethyl Benzene	102
m,p-Xylene	101
o-Xylene	101
TPH ref. to Gasoline (MW=100)	100
Naphthalene	67

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	97	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCS

Lab ID#: 1106259A-16A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3062103**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/21/11 10:41 AM**	

Compound	%Recovery
Benzene	104
Ethyl Benzene	102
Toluene	102
m,p-Xylene	102
o-Xylene	103
Methyl tert-butyl ether	89
Naphthalene	98
TPH ref. to Gasoline (MW=100)	Not Spiked

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	114	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	96	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCSD

Lab ID#: 1106259A-16AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3062105**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/21/11 11:38 AM**	

Compound	%Recovery
Benzene	104
Ethyl Benzene	103
Toluene	102
m,p-Xylene	103
o-Xylene	105
Methyl tert-butyl ether	88
Naphthalene	103
TPH ref. to Gasoline (MW=100)	Not Spiked

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	112	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	97	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCS

Lab ID#: 1106259A-16B

EPA METHOD TO-15 GC/MS

File Name:	**14062204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/21/11 08:21 PM**	

Compound	**%Recovery**
Methyl tert-butyl ether	95
Benzene	104
Toluene	97
Ethyl Benzene	95
m,p-Xylene	95
o-Xylene	94
TPH ref. to Gasoline (MW=100)	Not Spiked
Naphthalene	87

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	97	70-130

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCSD

Lab ID#: 1106259A-16BB

EPA METHOD TO-15 GC/MS

File Name:	**14062205**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/21/11 08:40 PM**	

Compound	**%Recovery**
Methyl tert-butyl ether	96
Benzene	105
Toluene	98
Ethyl Benzene	95
m,p-Xylene	97
o-Xylene	95
TPH ref. to Gasoline (MW=100)	Not Spiked
Naphthalene	101

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	98	70-130

1106259

JPM June 10, 2011

1 OF 2

ARCADIS
Infrastructure · Water · Environment · Buildings

2033 N. Main Street, Suite 340
Walnut Creek, CA 94596
T. 925.296.7857 | F. 925.274.1103

LABORATORY CLIENT: ARCADIS U.S., Inc.	CLIENT PROJECT NAME / NUMBER: Former BP #4931 / GP09BPNA.C110.C0000
ADDRESS: 2033 N. Main Street, Suite 340	P.O. NO.:
CITY: Walnut Creek STATE: CA ZIP: 94596	PROJECT CONTACT: Ben McKenna
TEL: 925.296.7857 FAX: 925.274.1103 E-MAIL: Benino.McKenna@arcadis-us.com	LAB CONTACT OR QUOTE NO.:
	SAMPLER(S): (SIGNATURE) Jamey Peterson
	LAB USE ONLY

TURNAROUND TIME:
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS:
1) Please send Log-ins and Results to email listed above
2) PID recordings collected during sampling (ppm); Posted to assist analyst in order minimize elevating the reporting limits
3) Please make effort to keep Reporting Limits as low as possible

LAB USE ONLY	SAMPLE ID	SUMMA CANISTER ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Please list tests required	BTEX, MTBE by USEPA TO-15	TPH-G by USEPA TO-15	Helium, Carbon Dioxide, Methane by ASTM D-1946	Nitrogen, Methane by ASTM D-1946	Naphthalene by USEPA TO-15	PID (ppm)	Canister Pressure/Vacuum Initial	Final	Receipt	Final
01A	SV-1-6911	14527	6/9/11	9:31	SOIL GAS	1		X	X	X	X	X	12	25	5		
02A	SV-2-6911	36399		10:27	SOIL GAS	1		X	X	X	X	X	17.8	28	5		
03A	SV-3-6911	35675		10:58	SOIL GAS	1		X	X	X	X	X	539	29	5		
04A	SV-4-6911	36524		11:31	SOIL GAS	1		X	X	X	X	X	0.7	29	5		
05A	SV-5-6911	33407		12:16		1		X	X	X	X	X	11.9	29	27		
06A	SV-6-6911	36561		12:57		1		X	X	X	X	X	370	29	5		
07A	SV-1B-6911	31786		14:02		1		X	X	X	X	X	10.1	28	5		
08A	SV-2B-6911	13390		14:27		1		X	X	X	X	X	90	30	4		
09A	SV-3B-6911	3020		14:52		1		X	X	X	X	X	523	29	6		
10A	SV-6B-6911	34110		16:11	Soil gas	1		X	X	X	X	X	—	26	5		

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
ARCADIS 6/10/11 @ 16:20		6/11/11	0920
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

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1106259

June 10, 2011

2 OF 2

ARCADIS
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2033 N. Main Street, Suite 340
Walnut Creek, CA 94596
T. 925.296.7857 | F. 925.274.1103

LABORATORY CLIENT: ARCADIS U.S., Inc.

ADDRESS: 2033 N. Main Street, Suite 340

CITY: Walnut Creek STATE: CA ZIP: 94596

TEL: 925.296.7857 FAX: 925.274.1103 E-MAIL: Benino.McKenna@arcadis-us.com

CLIENT PROJECT NAME / NUMBER: Former BP #4931 / GP09BPNA.C110.C0000

P.O. NO.:

PROJECT CONTACT: Ben McKenna

LAB CONTACT OR QUOTE NO.:

SAMPLER(S): (SIGNATURE)

LAB USE ONLY

TURNAROUND TIME:
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS:
1) Please send Log-ins and Results to email listed above
2) PID recordings collected during sampling (ppm); Posted to assist analyst in order minimize elevating the reporting limits
3) Please make effort to keep Reporting Limits as low as possible

LAB USE ONLY	SAMPLE ID	SUMMA CANISTER ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Please list tests required: BTEX, MTBE by USEPA TO-15	TPH-G by USEPA TO-15	Helium, Carbon Dioxide, Methane by ASTM D-1946	Nitrogen, Methane by ASTM D-1946	Naphthalene by USEPA TO-15	PID	Canister Pressure/Vacuum: Initial	Final	Receipt	Final
11A	Dup-01-6911	2079	6.9.11	15:45	SOIL GAS	1	X	X	X	X	X	-	26	5		
12A	Equip-Blank-01	37423	6.10.11	15:40	SOIL GAS	1						-	see tag			
					SOIL GAS											
					SOIL GAS											

Relinquished by: (Signature) - ARCADIS 6/10/11 @ 16:20
Received by: (Signature)
Date: 6/11/11 Time: 0920

Relinquished by: (Signature)
Received by: (Signature)
Date: Time:

Relinquished by: (Signature)
Received by: (Signature)
Date: Time:

02/24/10 Revision

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Air Toxics LTD.
Laboratory Services Since 1989

6/21/2011
Mr. Michael Strickler
ARCADIS, Inc.
2300 Eastlake Avenue East
Suite 200
Seattle WA 98102

Project Name: Former BP #4931
Project #: GP09BPNA.C110.C0000
Workorder #: 1106259B

Dear Mr. Michael Strickler

The following report includes the data for the above referenced project for sample(s) received on 6/11/2011 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

Air Toxics LTD.
Laboratory Services Since 1989

WORK ORDER #: 1106259B

Work Order Summary

CLIENT:	Mr. Michael Strickler ARCADIS, Inc. 2300 Eastlake Avenue East Suite 200 Seattle, WA 98102	**BILL TO:**	Accounts Payable ARCADIS, Inc. 630 Plaza Drive Suite 130 Highlands Ranch, CO 80129
PHONE:	206.726.4732	**P.O. #**	AUS-MSA-Nat-Air2007-06032
FAX:	206-325-8218	**PROJECT #**	GP09BPNA.C110.C0000 Former BP #4931
DATE RECEIVED:	06/11/2011	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	06/21/2011		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SV-1-6911	Modified ASTM D-1946	4.0 "Hg	15 psi
02A	SV-2-6911	Modified ASTM D-1946	4.0 "Hg	15 psi
03A	SV-3-6911	Modified ASTM D-1946	5.5 "Hg	15 psi
04A	SV-4-6911	Modified ASTM D-1946	6.0 "Hg	15 psi
05A	SV-5-6911	Modified ASTM D-1946	27.0 "Hg	15 psi
06A	SV-6-6911	Modified ASTM D-1946	4.5 "Hg	15 psi
07A	SV-1B-6911	Modified ASTM D-1946	6.5 "Hg	15 psi
08A	SV-2B-6911	Modified ASTM D-1946	5.5 "Hg	15 psi
09A	SV-3B-6911	Modified ASTM D-1946	6.0 "Hg	15 psi
10A	SV-6B-6911	Modified ASTM D-1946	4.5 "Hg	15 psi
11A	Dup-01-6911	Modified ASTM D-1946	4.0 "Hg	15 psi
12A	Equip-Blank-01	Modified ASTM D-1946	29.0 "Hg	15 psi
13A	SV-4B-6911	Modified ASTM D-1946	6.5 "Hg	15 psi
14A	Lab Blank	Modified ASTM D-1946	NA	NA
14B	Lab Blank	Modified ASTM D-1946	NA	NA
15A	LCS	Modified ASTM D-1946	NA	NA
15AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: Linda D. Fruman DATE: 06/21/11

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763,
NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/09, Expiration date: 06/30/11
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified ASTM D-1946
ARCADIS, Inc.
Workorder# 1106259B

Thirteen 1 Liter Summa Canister (100% Certified) samples were received on June 11, 2011. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane and fixed gases in air using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Since Nitrogen is used to pressurize samples, the reported Nitrogen values are calculated by adding all the sample components and subtracting from 100%.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***ASTM D-1946***	***ATL Modifications***
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A 3-point calibration curve is performed. Quantitation is based on a daily calibration standard which may or may not resemble the composition of the associated samples.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.

Receiving Notes

The number of samples received did not match the information on the Chain of Custody (COC). Sample SV-4B-6911 was added to the analytical request.

Sample SV-5-6911 was received with significant vacuum remaining in the canister. The residual canister vacuum resulted in elevated reporting limits.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

Air Toxics LTD.
Laboratory Services Since 1989

Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: SV-1-6911

Lab ID#: 1106259B-01A

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.23	83
Methane	0.00023	0.011
Helium	0.12	4.4
Carbon Dioxide	0.023	2.5

Client Sample ID: SV-2-6911

Lab ID#: 1106259B-02A

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.23	54
Methane	0.00023	31
Carbon Dioxide	0.023	12

Client Sample ID: SV-3-6911

Lab ID#: 1106259B-03A

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.25	74
Methane	0.00025	0.88
Carbon Dioxide	0.025	23

Client Sample ID: SV-4-6911

Lab ID#: 1106259B-04A

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.25	80
Carbon Dioxide	0.025	1.7

Client Sample ID: SV-5-6911

Lab ID#: 1106259B-05A

Air Toxics LTD.
Laboratory Services Since 1989

Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: SV-5-6911

Lab ID#: 1106259B-05A

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	2.0	89
Methane	0.0020	1.5
Carbon Dioxide	0.20	1.0

Client Sample ID: SV-6-6911

Lab ID#: 1106259B-06A

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.24	83
Methane	0.00024	6.1
Carbon Dioxide	0.024	7.2

Client Sample ID: SV-1B-6911

Lab ID#: 1106259B-07A

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.26	94
Methane	0.00026	0.024
Carbon Dioxide	0.026	4.8

Client Sample ID: SV-2B-6911

Lab ID#: 1106259B-08A

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.25	55
Methane	0.00025	30
Carbon Dioxide	0.025	12

Client Sample ID: SV-3B-6911

Lab ID#: 1106259B-09A

Air Toxics LTD.
Laboratory Services Since 1989

Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: SV-3B-6911

Lab ID#: 1106259B-09A

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.25	75
Methane	0.00025	0.82
Carbon Dioxide	0.025	22

Client Sample ID: SV-6B-6911

Lab ID#: 1106259B-10A

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.24	81
Methane	0.00024	4.9
Helium	0.12	0.45
Carbon Dioxide	0.024	6.2

Client Sample ID: Dup-01-6911

Lab ID#: 1106259B-11A

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.23	81
Methane	0.00023	4.7
Helium	0.12	0.51
Carbon Dioxide	0.023	5.9

Client Sample ID: Equip-Blank-01

Lab ID#: 1106259B-12A

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.10	100

Client Sample ID: SV-4B-6911

Lab ID#: 1106259B-13A

Air Toxics LTD.
Laboratory Services Since 1989

Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: SV-4B-6911

Lab ID#: 1106259B-13A

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.26	80
Carbon Dioxide	0.026	1.7

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-1-6911

Lab ID#: 1106259B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9061906**	**Date of Collection: 6/9/11 9:31:00 AM**	
Dil. Factor:	**2.33**	**Date of Analysis: 6/19/11 09:21 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.23	83
Methane	0.00023	0.011
Helium	0.12	4.4
Carbon Dioxide	0.023	2.5

Container Type: 1 Liter Summa Canister (100% Certified)

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-2-6911

Lab ID#: 1106259B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9061907**	**Date of Collection: 6/9/11 10:27:00 AM**	
Dil. Factor:	**2.33**	**Date of Analysis: 6/19/11 09:44 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.23	54
Methane	0.00023	31
Helium	0.12	Not Detected
Carbon Dioxide	0.023	12

Container Type: 1 Liter Summa Canister (100% Certified)

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-3-6911

Lab ID#: 1106259B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9061908**	**Date of Collection: 6/9/11 10:58:00 AM**	
Dil. Factor:	**2.47**	**Date of Analysis: 6/19/11 10:11 AM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Nitrogen	0.25	74
Methane	0.00025	0.88
Helium	0.12	Not Detected
Carbon Dioxide	0.025	23

Container Type: 1 Liter Summa Canister (100% Certified)

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-4-6911

Lab ID#: 1106259B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9061910**	**Date of Collection: 6/9/11 11:31:00 AM**	
Dil. Factor:	**2.52**	**Date of Analysis: 6/19/11 10:59 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.25	80
Methane	0.00025	Not Detected
Helium	0.13	Not Detected
Carbon Dioxide	0.025	1.7

Container Type: 1 Liter Summa Canister (100% Certified)

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-5-6911

Lab ID#: 1106259B-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9061911**	**Date of Collection: 6/9/11 12:16:00 PM**	
Dil. Factor:	**20.2**	**Date of Analysis: 6/19/11 11:24 AM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Nitrogen	2.0	89
Methane	0.0020	1.5
Helium	1.0	Not Detected
Carbon Dioxide	0.20	1.0

Container Type: 1 Liter Summa Canister (100% Certified)

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-6-6911

Lab ID#: 1106259B-06A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9061917**	**Date of Collection: 6/9/11 12:57:00 PM**	
Dil. Factor:	**2.38**	**Date of Analysis: 6/19/11 02:05 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.24	83
Methane	0.00024	6.1
Helium	0.12	Not Detected
Carbon Dioxide	0.024	7.2

Container Type: 1 Liter Summa Canister (100% Certified)

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-1B-6911

Lab ID#: 1106259B-07A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9061912**	**Date of Collection: 6/9/11 2:02:00 PM**	
Dil. Factor:	**2.58**	**Date of Analysis: 6/19/11 11:47 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.26	94
Methane	0.00026	0.024
Helium	0.13	Not Detected
Carbon Dioxide	0.026	4.8

Container Type: 1 Liter Summa Canister (100% Certified)

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-2B-6911

Lab ID#: 1106259B-08A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9061918**	**Date of Collection: 6/9/11 2:27:00 PM**	
Dil. Factor:	**2.47**	**Date of Analysis: 6/19/11 02:27 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.25	55
Methane	0.00025	30
Helium	0.12	Not Detected
Carbon Dioxide	0.025	12

Container Type: 1 Liter Summa Canister (100% Certified)

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-3B-6911

Lab ID#: 1106259B-09A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9061914**	**Date of Collection: 6/9/11 2:52:00 PM**	
Dil. Factor:	**2.52**	**Date of Analysis: 6/19/11 12:32 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Nitrogen	0.25	75
Methane	0.00025	0.82
Helium	0.13	Not Detected
Carbon Dioxide	0.025	22

Container Type: 1 Liter Summa Canister (100% Certified)

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-6B-6911

Lab ID#: 1106259B-10A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9061915**	**Date of Collection: 6/9/11 4:11:00 PM**	
Dil. Factor:	**2.38**	**Date of Analysis: 6/19/11 01:17 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.24	81
Methane	0.00024	4.9
Helium	0.12	0.45
Carbon Dioxide	0.024	6.2

Container Type: 1 Liter Summa Canister (100% Certified)

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Dup-01-6911

Lab ID#: 1106259B-11A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9061916**	**Date of Collection: 6/9/11 3:45:00 PM**	
Dil. Factor:	**2.33**	**Date of Analysis: 6/19/11 01:41 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.23	81
Methane	0.00023	4.7
Helium	0.12	0.51
Carbon Dioxide	0.023	5.9

Container Type: 1 Liter Summa Canister (100% Certified)

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Equip-Blank-01

Lab ID#: 1106259B-12A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9061905**	**Date of Collection: 6/10/11 3:40:00 PM**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/19/11 08:56 AM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Nitrogen	0.10	100
Methane	0.00010	Not Detected
Helium	0.050	Not Detected
Carbon Dioxide	0.010	Not Detected

Container Type: 1 Liter Summa Canister (100% Certified)

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: SV-4B-6911

Lab ID#: 1106259B-13A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9061913**	**Date of Collection: 6/9/11**	
Dil. Factor:	**2.58**	**Date of Analysis: 6/19/11 12:10 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.26	80
Methane	0.00026	Not Detected
Helium	0.13	Not Detected
Carbon Dioxide	0.026	1.7

Container Type: 1 Liter Summa Canister (100% Certified)

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1106259B-14A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9061904**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/19/11 08:22 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Nitrogen	0.10	Not Detected
Methane	0.00010	Not Detected
Carbon Dioxide	0.010	Not Detected

Container Type: NA - Not Applicable

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: Lab Blank

Lab ID#: 1106259B-14B

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9061903b**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/19/11 07:57 AM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.050	Not Detected

Container Type: NA - Not Applicable

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCS

Lab ID#: 1106259B-15A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9061902**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/19/11 07:34 AM**	

Compound	%Recovery
Nitrogen	101
Methane	97
Helium	93
Carbon Dioxide	101

Container Type: NA - Not Applicable

Air Toxics LTD.
Laboratory Services Since 1989

Client Sample ID: LCSD

Lab ID#: 1106259B-15AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9061919**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/19/11 02:51 PM**	

Compound	%Recovery
Nitrogen	101
Methane	98
Helium	93
Carbon Dioxide	100

Container Type: NA - Not Applicable

1106259

JPM June 10, 2011

1 OF 2

ARCADIS
Infrastructure · Water · Environment · Buildings

2033 N. Main Street, Suite 340
Walnut Creek, CA 94596
T. 925.296.7857 | F. 925.274.1103

LABORATORY CLIENT: ARCADIS U.S., Inc.	CLIENT PROJECT NAME / NUMBER: Former BP #4931 / GP09BPNA.C110.C0000
P.O. NO.:	
ADDRESS: 2033 N. Main Street, Suite 340	PROJECT CONTACT: Ben McKenna
LAB CONTACT OR QUOTE NO.:	
CITY: Walnut Creek STATE: CA ZIP: 94596	SAMPLER(S): (SIGNATURE) Jamey Peterson
TEL: 925.296.7857 FAX: 925.274.1103 E-MAIL: Benino.McKenna@arcadis-us.com	LAB USE ONLY

TURNAROUND TIME: ☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY): ☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS:
1) Please send Log-ins and Results to email listed above
2) PID recordings collected during sampling (ppm); Posted to assist analyst in order minimize elevating the reporting limits
3) Please make effort to keep Reporting Limits as low as possible

REQUESTED ANALYSIS / Canister Pressure/Vacuum

LAB USE ONLY	SAMPLE ID	SUMMA CANISTER ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Please list tests required	BTEX, MTBE by USEPA TO-15	TPH-G by USEPA TO-15	Helium, Carbon Dioxide, Methane by ASTM D-1946	Nitrogen, Methane by ASTM D-1946	Naphthalene by USEPA TO-15	PID (ppm)	Initial	Final	Receipt	Final
01A	SV-1-6911	14527	6/9/11	9:31	SOIL GAS	1		X	X	X	X	X	12	25	5		
02A	SV-2-6911	36399		10:27	SOIL GAS	1		X	X	X	X	X	17.8	28	5		
03A	SV-3-6911	35675		10:58	SOIL GAS	1		X	X	X	X	X	539	29	5		
04A	SV-4-6911	36524		11:31	SOIL GAS	1		X	X	X	X	X	0.7	29	5		
05A	SV-5-6911	33407		12:16		1		X	X	X	X	X	11.9	29	27		
06A	SV-6-6911	36561		12:57		1		X	X	X	X	X	370	29	5		
07A	SV-1B-6911	31786		14:02		1		X	X	X	X	X	10.1	28	5		
08A	SV-2B-6911	13390		14:27		1		X	X	X	X	X	90	30	4		
09A	SV-3B-6911	3020		14:52		1		X	X	X	X	X	523	29	6		
10A	SV-6B-6911	34110		16:11	Soil gas	1		X	X	X	X	X	—	26	5		

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
[signature] - ARCADIS 6/10/11 @ 16:20	[signature]	6/11/11	0920
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

02/24/10 Revision

FedEx

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1106259

June 10, 2011

2 OF 2

ARCADIS
Infrastructure · Water · Environment · Buildings

2033 N. Main Street, Suite 340
Walnut Creek, CA 94596
T. 925.296.7857 | F. 925.274.1103

LABORATORY CLIENT: ARCADIS U.S., Inc.

ADDRESS: 2033 N. Main Street, Suite 340

CITY: Walnut Creek STATE: CA ZIP: 94596

TEL: 925.296.7857 FAX: 925.274.1103 E-MAIL: Benino.McKenna@arcadis-us.com

CLIENT PROJECT NAME / NUMBER: Former BP #4931 / GP09BPNA.C110.C0000

P.O. NO.:

PROJECT CONTACT: Ben McKenna

LAB CONTACT OR QUOTE NO.:

SAMPLER(S): (SIGNATURE)

LAB USE ONLY

TURNAROUND TIME:
☐ SAME DAY ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAYS ☒ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ___/___/___

SPECIAL INSTRUCTIONS:
1) Please send Log-ins and Results to email listed above
2) PID recordings collected during sampling (ppm); Posted to assist analyst in order minimize elevating the reporting limits
3) Please make effort to keep Reporting Limits as low as possible

LAB USE ONLY	SAMPLE ID	SUMMA CANISTER ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NO. OF CONT.	Please list tests required: BTEX, MTBE by USEPA TO-15	TPH-G by USEPA TO-15	Helium, Carbon Dioxide, Methane by ASTM D-1946	Nitrogen, Methane by ASTM D-1946	Naphthalene by USEPA TO-15	PID	Canister Pressure/Vacuum: Initial	Final	Receipt	Final
11A	Dup-01-6911	2079	6.9.11	15:45	SOIL GAS	1	X	X	X	X	X	-	26	5		
12A	Equip-Blank-01	37423	6.10.11	15:40	SOIL GAS	1						-	see tag			
					SOIL GAS											
					SOIL GAS											

Relinquished by: (Signature) - ARCADIS 6/10/11 @ 16:20
Received by: (Signature)
Date: 6/11/11 Time: 0920

Relinquished by: (Signature)
Received by: (Signature)
Date: Time:

Relinquished by: (Signature)
Received by: (Signature)
Date: Time:

02/24/10 Revision

Fedex
CUSTODY SEAL INTACT? Y N NONE TEMP MA

Moisture-Density-Porosity Report
Cooper Testing Labs, Inc. (ASTM D 2937)

CTL Job No:	634-026	**Project No.**	72006277	**By:**	RU
Client:	Test America	**Date:**	06/14/11		
Project Name:	BP #4931, Oakland	**Remarks:**			

Boring: / **Sample:** / **Depth, ft:**	SV-1-5 FT	SV-2-5 FT	SV-3-5 FT	SV-4-5 FT	SV-5-5 FT	SV-6-5 FT		
Visual Description:	Olive Brown Clayey SAND	Olive Brown CLAY w/ CaCO3	Mottled Reddish Brown CLAY	Gray GRAVEL w/ Silt & Sand	Olive Brown CLAY w/ Sand (possibly disturbed)	Olive Brown Clayey SAND w/ Gravel		
Actual G_s	2.69	2.69	2.70	2.76	2.70	2.70		
Assumed G_s								
Moisture, %	16.0	21.6	18.7	5.1	17.9	15.1		
Wet Unit wt, pcf	117.8	111.3	129.8	114.9	107.4	110.5		
Dry Unit wt, pcf	101.6	91.6	109.4	109.3	91.1	96.0		
Dry Bulk Dens.• b, (g/cc)	1.63	1.47	1.75	1.75	1.46	1.54		
Saturation, %	65.7	69.6	93.1	24.4	56.9	53.9		
Total Porosity, %	39.5	45.5	35.2	36.6	46.0	43.1		
Volumetric Water Cont,• w	26.0	31.7	32.7	8.9	26.2	23.2		
Volumetric Air Cont., • a	13.6	13.9	2.4	27.7	19.8	19.9		
Void Ratio	0.65	0.84	0.54	0.58	0.85	0.76		
Series	1	2	3	4	5	6	7	8

Note: All reported parameters are from the as-received sample condition unless otherwise noted. If an assumed specific gravity (Gs) was used then the saturation, porosities, and void ratio should be considered approximate.

The Zero Air-Voids curves represent the dry density at 100% saturation for each value of specific gravity

Specific Gravity by Pycnometer
ASTM D 854m

CTL Job#:	634-026	**Project Name:**	BP #4931, Oakland	**Date:**	06/14/11
Client:	Test America	**Project No.:**	72006277	**Run By:**	MD
				Checked	DC

Boring:	SV-1-5FT	SV-2-5FT	SV-3-5FT	SV-4-5FT	SV-5-5FT	SV-6-5FT		
Sample:								
Depth, ft.:								
Pan No.:								
Soil Description (visual)	Olive Brown Clayey SAND	Olive Brown CLAY w/ CaCO3	Mottled Reddish Brown CLAY	Gray GRAVEL w/ Silt & Sand	Olive Brown CLAY w/ Sand	Olive Brown Clayey SAND w/ Gravel		
Dish No.								
Air-Dry Weight, gm	46.93	47.93	53.24	52.11	42.72	45.03		
Oven-Dry Weight., gm	46.63	47.62	52.91	51.71	42.24	44.71		
Dish Weight, gm	11.81	11.74	11.72	11.73	11.74	11.82		
Hydroscopic MC, %	0.9	0.9	0.8	1.0	1.6	1.0		
Pycnometer No.:								
Wt Pycn., Soil & H2O (Wb), g	725.2	733.9	738.5	727.0	733.6	737.8		
Test Temp. (T), ^{o}C	21.9	22.0	21.5	22.8	23.4	23.2		
Wt Pycn. & H2O @ T (Wa), g	662.7	671.4	675.5	662.6	671.2	675.4		
Wt of Air-Dried Soil (Wm), g	100.37	100.41	100.82	101.9	100.5	100.14		
Wt of Oven-Dried Soil (Wo), g	99.51	99.55	100.02	100.89	98.94	99.18		
Temp. Corr. Factor (K)	0.99959	0.99957	0.99968	0.99938	0.99924	0.99929		
Specific Gravity (20^{o}C) $Gs = \frac{K\ Wo}{Wo+Wa-Wb}$	**2.69**	**2.69**	**2.70**	**2.76**	**2.70**	**2.70**		

720-35531

13/763

ARCADIS
Infrastructure, environment, buildings

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 1 of 1

Lab Work Order #

Send Results to:

Contact & Company Name: Ben McKenna / ARCADIS
Telephone:
Address:
Fax:
City State Zip
E-mail Address: on file

Project Name/Location (City, State): BP #4391 (Oakland, CA)
Project #: GP09BPNA.C110.C0000
Sampler's Printed Name: Miljan Draganic
Sampler's Signature:

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	Dry bulk density, porosity, water filled porosity	Preservative	Filtered (✓)	# of Containers	Container Information
							None	NO	1	Sleeve
1 SV-1-5FT	5/31/11	1000		X	SOIL	X				
2 SV-2-5FT		1055		X	SOIL	X				
3 SV-3-5FT		1235		X	SOIL	X				
4 SV-4-5FT		1420		X	SOIL	X				
5 SV-5-5FT	6/1/11	0900		X	SOIL	X				
6 SV-6-5FT	6/1/11	1115		X	SOIL	X				

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: _____
10. Other: _____

Matrix Key:
SO - Soil | SE - Sediment | NL - NAPL/Oil
W - Water | SL - Sludge | SW - Sample Wipe
T - Tissue | A - Air | Other: _____

PARAMETER ANALYSIS & METHOD

REMARKS

Special Instructions/Comments:

☐ Special QA/QC Instructions(✓):

3.8°C

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name: Test America	Cooler Custody Seal (✓)	Printed Name: Miljan Draganic	Printed Name: David Motha	Printed Name: David Motha	Printed Name:
☒ Cooler packed with ice (✓)	☐ Intact ☐ Not Intact	Signature:	Signature: TASF	Signature:	Signature:
Specify Turnaround Requirements: Standard	Sample Receipt:	Firm: ARCADIS	Firm/Courier: 06/2/11 @ 1019	Firm/Courier: TASF	Firm: TASF
Shipping Tracking #:	Condition/Cooler Temp: _____	Date/Time: 6/1/11 1019	Date/Time:	Date/Time: 06/02/11 @ 1230	Date/Time: 6/2/11 1230

20730826 CofC AR Form 01.12.2007

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by ARCADIS

ARCADIS

Appendix D

Field Documentation

ARCADIS

Soil Gas Sample Collection Log

Date:	6/9/11	Sample ID:	SV-1
Client:	BP-ARCO	Tubing Information:	teflon
Project:	BP-4931	Misc. Equipment:	–
Location:	731 W. Mac Arthur Oakland	Subcontractor:	—
Project #:	GP09BPNA.C112.C0000	Moisture Content of Sampling Zone:	Dry (circled) / Moist
Samplers:	Jimmy Peterson	Purge Method:	Pump
Sample Point Location:	SV-1	Appx. Purge Volume:	521 ml
Sampling Depth:	5 ft	Tracer Gas Manufacturer:	Airgas
Time of Collection:	9:31 /		
Tracer Gas:	Helium		

Canister Size:	1-L Summa	Canister ID:	14527
Flow Controller ID:	14527		

Duplicate Canister Size:	X	Duplicate Canister ID:	X
Duplicate Flow Controller ID:	X		

Time	Canister Pressure (Inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (~~ft/min~~) Wind	Pressure Differential (Inches of H_2O)	PID (ppm or ppb)
9:26	-25	57	80	6 mph	—	12
9:31	-5	57	80	6 mph	–	12

Nearby Groundwater Monitoring Wells/Water Levels

Well ID	Depth to Groundwater (ft.)
A-9	6.91 on 5.31.10
A-8	--

General Observations/Notes

Sample Train: 8ft (96") Volume: 173.66 mL
purge time: 52 seconds x3
= 156 sec (2 minutes 40 sec)

- Bentonite in well box is very Moist
- Sample tubing from Well SV-1 has brittle-feel; no visible ~~crak~~ cracks observed.
  JP

Helium Concentration Range: 10% - 20%

Sample ID: SV-1-6911@9:31

ARCADIS

Soil Gas Sample Collection Log

Date:	6/8/11	Sample ID:	SV-2
Client:	BP-ARCO	Tubing Information:	teflon
Project:	BP-4931	Misc. Equipment:	-
Location:	Oakland, CA	Subcontractor:	-
Project #:	GP09BPNA.C11D	Moisture Content of Sampling Zone:	(Dry) / Moist
Samplers:	J. Peterson	Purge Method:	Pump
Sample Point Location:	SV-2	Appx. Purge Volume:	521 ml
Sampling Depth:	5 Ft	Tracer Gas Manufacturer:	Air Gas
Time of Collection:	10:27		
Tracer Gas:	Helium		

Canister Size:	1-Liter	Canister ID:	36399
Flow Controller ID:	36399		

Duplicate Canister Size:	N/A	Duplicate Canister ID:	N/A
Duplicate Flow Controller ID:			

Time	Canister Pressure (inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min) MPH	Pressure Differential (inches of H_2O)	PID (ppm or ppb)
10:19	28	57	80	6	-	10
10:27	5	"	"	"	"	17.8

Nearby Groundwater Monitoring Wells/Water Levels

Well ID	Depth to Groundwater (ft.)
AR-1	8.79 on 5.31.11
A-5	7.75 on 5.31.11

General Observations/Notes

Sample Train = ~8 Ft (96 in) Volume: 173.66 X 3 = 521 ml purge Volume

purge time 52.10 sec X 3 =
= 156 sec Purge time
= 2 min 40 sec

- Well tubing has brittle feel; no cracks observed

Helium Concentration Range: 10% - 20%

Sample ID - SV-2-6911 @ 10:27

ARCADIS

Soil Gas Sample Collection Log

Date:	6/9/11	Sample ID:	SV-3		
Client:	BP-ARCO	Tubing Information:	Teflon		
Project:	BP-4931	Misc. Equipment:	-		
Location:	Oakland, CA	Subcontractor:	NONE		
Project #:	GP09BPNA.C110	Moisture Content of Sampling Zone:	(Dry) / Moist		
Samplers:	Jamey Peterson	Purge Method:	Pump		
Sample Point Location:	SV-3	Appx. Purge Volume:	521 ml		
Sampling Depth:	5 ft	Tracer Gas Manufacturer:	Air Gas		
Time of Collection:	10:58				
Tracer Gas:	Helium				

Canister Size:	1-Liter Summa	Canister ID:	35675
Flow Controller ID:	35675		

Duplicate Canister Size:	N/A	Duplicate Canister ID:	N/A
Duplicate Flow Controller ID:			

Time	Canister Pressure (inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min) mph-Wind	Pressure Differential (inches of H_2O)	PID (ppm or ppb)
10:50	29	57	80	6	-	0.9
10:58	5	"	"	"	"	539

Nearby Groundwater Monitoring Wells/Water Levels

Well ID	Depth to Groundwater (ft.)
A-4	7.65 on 5.31.11
A-7	7.24 on 5.31.11

General Observations/Notes

Sample Train Length: 8Ft (96") Volume: 173.66 ml x 3 = 521 ml purge volume
Purge time: 52.10 sec x 3 =
= 156 sec purge time

Helium Concentration Range: 10% - 20%

Sample ID: SV-3-6911 @ 10:58

ARCADIS — Soil Gas Sample Collection Log

Date:	6/9/11	Sample ID:	SV-4
Client:	BP-ARCO	Tubing Information:	teflon
Project:	BP 4931	Misc. Equipment:	-
Location:	OAKLAND, CA	Subcontractor:	NONE
Project #:	GP09BPNA.C110	Moisture Content of Sampling Zone:	(Dry) / Moist
Samplers:	Jamey Peterson	Purge Method:	pump
Sample Point Location:	SV-4	Appx. Purge Volume:	521 ml
Sampling Depth:	5-ft	Tracer Gas Manufacturer:	Air Gas
Time of Collection:	1131		
Tracer Gas:	Helium		

Canister Size:	1-Liter Summa	Canister ID:	36524
Flow Controller ID:	36524		

Duplicate Canister Size:	N/A	Duplicate Canister ID:	N/A
Duplicate Flow Controller ID:			

Time	Canister Pressure (Inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min) mpH-wind	Pressure Differential (inches of H_2O)	PID (ppm or ppb)	
11:24	29	60	80	6	-	0.9	pre-purge
11:31	5	"	"	"	"	0.7	

Nearby Groundwater Monitoring Wells/Water Levels

Well ID	Depth to Groundwater (ft.)
A-13	8.29 on 5.31.11

General Observations/Notes

Sample Train Length: 8 ft (96") Volume = 173.66 ml
Purge time: 52.10 sec x 3
= 156 sec purge time
= 2 min 40 sec " "

* Bentonite on tubing and end cap
* threads appear gritty - challenge in screwing them on
Flush (nut @ well tubing)
* Well Box is moist
* Well tubing has brittle feel; No cracks observed

Sample ID: SV-4-6911 @ 11:31

ARCADIS — Soil Gas Sample Collection Log

Date:	6/9/11	Sample ID:	SV-5
Client:	BP-ARCO	Tubing Information:	teflon
Project:	4931	Misc. Equipment:	
Location:	Oakland, CA	Subcontractor:	N/A
Project #:	6109BRNA.C110	Moisture Content of Sampling Zone:	(Dry) / Moist
Samplers:	Jamey Peterson	Purge Method:	pump
Sample Point Location:	SV-5	Appx. Purge Volume:	521 ml
Sampling Depth:	5-ft	Tracer Gas Manufacturer:	Air Gas
Time of Collection:	12:16		
Tracer Gas:	Helium		

Canister Size:	1-Liter Summa	Canister ID:	33407
Flow Controller ID:	33407		

Duplicate Canister Size:	N/A	Duplicate Canister ID:	N/A
Duplicate Flow Controller ID:			

Time	Canister Pressure (Inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min) Mfl-w ind	Pressure Differential (inches of H_2O)	PID (ppm or ppb)
11:51	29	60	80	6		13.7
12:16	27	"	"	"		11.9

Nearby Groundwater Monitoring Wells/Water Levels

Well ID	Depth to Groundwater (ft.)
AR-1	8.79 on 5.31.11
AR-2	6.98 on 5.31.11

General Observations/Notes

Sample Train Length: 8ft (96-in) Volume: 173.66 ml x 3 = = 521 ml Purge Volume

Purge time: 52.10 sec x 3 = 156 sec

* During Sampling Well-side pressure gauge gave reading of 4 in Hg
* Flow into Summa very slow (very slow drop in Summa pressure)
- At 12:15 (~25 minutes) stop Sample. Summa @ 28.5 in Hg
  - Well side pressure remains at 4 in Hg
  - Stop Sample at 12:16; Summa at 27 in Hg

He concentration Range: 10% - 20%

Sample ID: SV-5-6911 @ 12:16

ARCADIS — Soil Gas Sample Collection Log

Date:	6/9/11	Sample ID:	SV-6
Client:	BP-ARCO	Tubing Information:	teflon
Project:	4931	Misc. Equipment:	-
Location:	OAKLAND, CA	Subcontractor:	N/A
Project #:	609BPNA.C110	Moisture Content of Sampling Zone:	(Dry) / Moist
Samplers:	Jamey Peterson	Purge Method:	Pump
Sample Point Location:	SV-6	Appx. Purge Volume:	521 ml
Sampling Depth:	5-ft	Tracer Gas Manufacturer:	Air Gas
Time of Collection:	12:57		
Tracer Gas:	Helium		

Canister Size:	1-Liter Summa	Canister ID:	3656
Flow Controller ID:	3656		

Duplicate Canister Size:	N/A	Duplicate Canister ID:	N/A
Duplicate Flow Controller ID:			

Time	Canister Pressure (inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min) Wind	Pressure Differential (inches of H_2O)	PID (ppm or ppb)	
12:49	29	65	80	9 X-mph		398	pre-purge
12:57	5	65	80	9-mph		370	post Sample

Nearby Groundwater Monitoring Wells/Water Levels

Well ID	Depth to Groundwater (ft.)
A-3	6.84 on 5.31.11
AR-2	6.98 on 5.31.11

General Observations/Notes

Sample Train Length: 96-in Volume: 173.66 ml
Purge time = 52.10 x 3
= 156 sec purge time

* Well-Side Pressure = 0 in Hg (No Reading)

* Well tubing appears brittle, no visible cracks

* Very wet Bentonite in well box; Bentonite all-over portions of sample tubing in well box

*Helium Concentration Range: 10%-20%

SAMPLE ID: SV-6-6911 @ 12:57

ARCADIS — Soil Gas Sample Collection Log

Date:	6/9/11	Sample ID:	SV-1B-6911
Client:	BP-ARCO	Tubing Information:	Teflon
Project:	4931	Misc. Equipment:	-
Location:	OAKLAND, CA	Subcontractor:	N/A
Project #:	GP09BPNA.C110	Moisture Content of Sampling Zone:	(Dry) / Moist
Samplers:	Jamey Peterson	Purge Method:	Pump
Sample Point Location:	SV-1	Appx. Purge Volume:	521 ml
Sampling Depth:	5-ft	Tracer Gas Manufacturer:	Air Gas
Time of Collection:	1402 /		
Tracer Gas:	Helium		

JP

Canister Size:	1-liter Summa	Canister ID:	~~ID~~ 31786
Flow Controller ID:	31786		

Duplicate Canister Size:	N/A	Duplicate Canister ID:	N/A
Duplicate Flow Controller ID:			

Time	Canister Pressure (inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min) melt-wind	Pressure Differential (inches of H_2O)	PID (ppm or ppb)	
13:54	28	65°	60%	9		10.1	← pre-purge
14:02	5	"	"	"		10.1	← post sample

Nearby Groundwater Monitoring Wells/Water Levels

Well ID	Depth to Groundwater (ft.)
A-9	6.91 on 5.31
A-8	N/A

General Observations/Notes

Sample Train Length = 96 in Volume = 173.66ml x 3
Purge time 52.10 sec x 3 = 521 ml purge vol.
= 156 sec purge time

Wellhead well-side pressure = 5 in Hg during sampling; drops to 3 in Hg toward completion of purge

- He concentration = 10%-20%

Sample ID- SV-1B-6911 @ 1402

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Soil Gas Sample Collection Log

Date:	6/9/11	Sample ID:	SV-2B
Client:	BP-ARCO	Tubing Information:	teflon
Project:	4931	Misc. Equipment:	-
Location:	OAKLAND, CA	Subcontractor:	N/A
Project #:	609RPNA.C110	Moisture Content of Sampling Zone:	(Dry) / Moist
Samplers:	J. Peterson	Purge Method:	Pump
Sample Point Location:	SV-2	Appx. Purge Volume:	521 ml
Sampling Depth:	5-ft	Tracer Gas Manufacturer:	Air Gas
Time of Collection:	14:27		
Tracer Gas:	Helium		

Canister Size:	1-Liter	Canister ID:	13390
Flow Controller ID:	13390		

Duplicate Canister Size:	N/A	Duplicate Canister ID:	N/A
Duplicate Flow Controller ID:			

Time	Canister Pressure (Inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min) mph-wind	Pressure Differential (Inches of H_2O)	PID (ppm or ppb)
14:21	30	68	60	9	-	90 - Pre-purge
14:27	4	"	"	"	"	90 - post Sample

Nearby Groundwater Monitoring Wells/Water Levels

Well ID	Depth to Groundwater (ft.)
AR-1	8.79 on 5.31.11
A-5	7.75 " "

General Observations/Notes

Sample train Length: 96 in Volume: 173.66 ml x 3 = 521 ml purge volume

Purge time: 52.10 sec x 3 = 156 sec 3 well volumes

Well Side Pressure: 0.5 in Hg during sampling

He concentration range: 10% - 20%

Sample ID: SV-2B-6911 @ 14:27

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Soil Gas Sample Collection Log

Date:	6/9/11	Sample ID:	SV-3B

Client:	BP-ARCO	Tubing Information:	teflon
Project:	4931	Misc. Equipment:	-
Location:	OAKLAND, CA	Subcontractor:	N/A
Project #:	GP09BPNA.C110	Moisture Content of Sampling Zone:	(Dry) / Moist
Samplers:	J. Peterson	Purge Method:	Pump
Sample Point Location:	SV-3	Appx. Purge Volume:	521 ml
Sampling Depth:	5-ft	Tracer Gas Manufacturer:	AirGas
Time of Collection:	14:52		
Tracer Gas:	Helium		

Canister Size:	1-Liter Summa	Canister ID:	3020
Flow Controller ID:	3020		

Duplicate Canister Size:	N/A	Duplicate Canister ID:	
Duplicate Flow Controller ID:			

Time	Canister Pressure (inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min)	Pressure Differential (inches of H_2O)	PID (ppm or ppb)
14:46	29	68	60	10	-	521 - pre-sample
14:52	6	68	60	10	-	523 - post sample

Nearby Groundwater Monitoring Wells/Water Levels

Well ID	Depth to Groundwater (ft.)

General Observations/Notes

Sample Train Length: 96" Volume: 173.66 ml x 3 = 521 ml Purge Volume

Purge Time 52.10 sec x 3 = 156 sec 3 well volumes Purge time

Well side pressure: 0 in Hg

He Concentration Range: 10-20%

Sample ID: SV-3B-0911 @ 14:52

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Soil Gas Sample Collection Log

Date:	6/9/11	Sample ID:	SV-4B
Client:	BP-ARCO	Tubing Information:	teflon
Project:	4931	Misc. Equipment:	-
Location:	OAKLAND, CA	Subcontractor:	N/A
Project #:	609BPNA.C110	Moisture Content of Sampling Zone:	(Dry) / Moist
Samplers:	J. Peterson	Purge Method:	Pump
Sample Point Location:	SV-4	Appx. Purge Volume:	521 ml
Sampling Depth:	5-ft	Tracer Gas Manufacturer:	Air Gas
Time of Collection:	15:18 /		
Tracer Gas:	Helium		

Canister Size:	1-Liter	Canister ID:	37412
Flow Controller ID:	37412		

Duplicate Canister Size:	N/A	Duplicate Canister ID:	N/A
Duplicate Flow Controller ID:			

Time	Canister Pressure (Inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min)	Pressure Differential (Inches of H_2O)	PID (ppm or ppb)	
				my H-Win			
15:10	28.5	68°	60	10	-	5.3	pre-purge
15:18	5	"	"	"	-	5.3	

Nearby Groundwater Monitoring Wells/Water Levels

Well ID	Depth to Groundwater (ft.)

General Observations/Notes

Sample Train Length: 96 in Volume: 173.66 ml x 3 = 521 ml purge volume

Purge time: 52.10 sec x 3: 156 sec (3 well volumes)

Well-Side Pressure: 0 in Hg

He Concentration Range: 10% - 20%

Sample ID: SV-4B-6911 @ 15:18

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Soil Gas Sample Collection Log

Date:	6.9.11	Sample ID:	SV-5B

Client:	BP-ARCO	Tubing Information:	teflon
Project:	BP 4931	Misc. Equipment:	-
Location:	OAKLAND, CA	Subcontractor:	-
Project #:	GP09BPNA.C110	Moisture Content of Sampling Zone:	Dry / (Moist)
Samplers:	Jamey Peterson	Purge Method:	Pump
Sample Point Location:	SV-5	Appx. Purge Volume:	-
Sampling Depth:	5-ft	Tracer Gas Manufacturer:	-
Time of Collection:	— /		
Tracer Gas:	-		

Canister Size:	1-Liter	Canister ID:	-
Flow Controller ID:	-		

Duplicate Canister Size:	N/A	Duplicate Canister ID:	
Duplicate Flow Controller ID:			

Time	Canister Pressure (Inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min)	Pressure Differential (Inches of H_2O)	PID (ppm or ppb)
			N/A			

Nearby Groundwater Monitoring Wells/Water Levels

Well ID	Depth to Groundwater (ft.)
~~SB-1A~~	
AR-1	8.79 on 5.31.11
AR-2	6.98 on 5.31.11

JP

General Observations/Notes

* During purge set-up observe water coming up well tubing during PID screening. Water reached up of tubing prior to PID shut off/removal from sample train. Water reached top of tubing very quickly.
- Did not observe water in sample tubing during first round of sampling at this well.
- Encountered 6.5P well-side pressure and no decrease in vacuum in SUMMA during first round at SV-5

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Soil Gas Sample Collection Log

Date:	6/9/11	Sample ID:	SV-6B

Client:	BP ARCO	Tubing Information:	teflon
Project:	4931	Misc. Equipment:	-
Location:	OAKLAND, CA	Subcontractor:	None
Project #:	609BPNA-C110	Moisture Content of Sampling Zone:	(Dry) / Moist
Samplers:	Jamey Peterson	Purge Method:	Pump
Sample Point Location:	SV-6	Appx. Purge Volume:	521 ml
Sampling Depth:	5-ft	Tracer Gas Manufacturer:	Air Gas
Time of Collection:	16:11		
Tracer Gas:	Helium		

Canister Size:	1-Liter	Canister ID:	34110
Flow Controller ID:	34110		

Duplicate Canister Size:	1-Liter	Duplicate Canister ID:	2079
Duplicate Flow Controller ID:	2079	splitter banded to Summa 2079	

Time	Canister Pressure (inches of Hg)	Temperature (°F or °C)	Relative Humidity (%)	Air Speed (ft/min) mpH-wind	Pressure Differential (inches of H_2O)	PID (ppm or ppb)
16:00	26	70	60	10		
16:11	5	70	60	10		

Nearby Groundwater Monitoring Wells/Water Levels

Well ID	Depth to Groundwater (ft.)

General Observations/Notes

Sample Train Length: 96in Volume 173.66 ml

Purge Time: 52.11 sec x 3 x3= 521 ml purge Vol
= 156 sec (3 well volumes)

Well Side Pressure: 0 in Hg

He Concentration Range: 10%-20%

Sample ID: SV-6B-6911 @ 16:11

2nd Duplicate: Dup-01-6911 @ 15:45 ← dummy time collected at 16:11

DAILY LOG

Well(s)/Boring(s) SV Installation Project Name and No. GP09BPNA.C110.00001

Site Location 731 W MacArthur Blvd Oakland CA

Prepared by Miljan Draganic

Date/Time	Description of Activities
5/31/11 0700	At the office: pick up supplies, equipment, etc.
0715	Leave for the site.
0730	On site.
0745	Begin taking the water levels
0800	Gregg Drilling on site
	Health and Safety tailgate & Site Walk / Scope
0845	Begin hand augur SV-1
0910	Observed gravel at SV-2 during coring: attept to hand auger
	through fill; water at 3 ft - will step out
	*clear locations 2-5 (concrete & asphalt)
1000	SV-1 sample collected - begin well construction
	Alameda County inspector on Site.
	* Permit issue ??? (boring vs. well) Can't reach Ben
	but have permission from inspector to continue
1040	Begin to hand augur SV-2
1055	SV-2 sampled, begin well construction
1135	SV-2 complete, will take brief lunch break
1220	Begin hand augur SV-3
1235	Sample SV-3, begin well construction
1315	Begin boring SV-4 - wet at 4 ft in backfill - will step out
1345	Begin boring SV-4 (break through asphalt again)
1420	SV-4 sampled, begin well construction.
1500	Well box SV-4 complete.

DAILY LOG

Well(s)/Boring(s) Continued Project Name and No. GP09BPNA.C110.00001

Site Location —

Prepared by —

Date/Time	Description of Activities
5/31/11 1510	Patch SV-5 - will step out of concrete to asphalt tomorrow as water has been observed under all concrete locations
1520	Begin clean up
1535	Left the site
1550	Back at the office.
Note:	Rained all day

ARCADIS

DAILY LOG

Well(s)/Boring(s) SV installation **Project Name and No.** GP09BPNA.C110.00001

Site Location 731 W MacArthur Blvd Oakland CA

Prepared by Miljan Draganic

Date/Time		Description of Activities
6/1/11	0745	Leave for the site
	0800	On Site ; Gregg Drilling on Site as well
	0805	Health and Safety tailgate
	0810	Set-up on SV-5
	0900	SV-5 sampled, begin well construction
	1005	Set-up on SV-6
		Concrete under asphalt – step out
	1015	Concrete under asphalt – step out
	1020	Concrete under asphalt – step out
	1025	Pipe at 2 ft – step out
	1030	Concrete under asphalt – step out
	1040	Concrete under asphalt – step out
	1050	SV-6 location finally good.
	1100	Grout / County inspector briefly on site.
	1115	SV-6 sample collected, begin well construction
	1135	Setting well box ; complete COC
	1200	Continuing to patch up all step out locations
	1245	Leave the Site.
	1300	Back at the office

Draganic, Miljan

From: support@usan.org
Sent: Monday, May 23, 2011 10:49 AM
To: Draganic, Miljan
Subject: USAN 2011/05/23 #00000 0160641-000 NORM NEW

00000 USAN 05/23/11 10:48:55 0160641 NORMAL NOTICE

Message Number: 0160641 Received by USAN at 10:44 on 05/23/11 by KRS

Work Begins: 05/31/11 at 07:00 Notice: 046 hrs Priority: 2
Night Work: N Weekend Work: N

Expires: 06/20/11 at 23:59 Update By: 06/16/11 at 16:59

Caller: MILJAN DRAGANIC
Company: ARCADIS-US, INC
Address: 1900 POWELL ST, FLOOR 12
City: EMERYVILLE State: CA Zip: 94608
Business Tel: 510-596-9522 Fax: 510-652-2246
Email Address: MILJAN.DRAGANIC@ARCADIS-US.COM

Nature of Work: VERTICAL BORING INST SOIL VAPOR WELLS
Done for: BP AMOCO CORPORATION Explosives: N
Foreman: UNKNOWN
Field Tel: Cell Tel:
Area Premarked: Y Premark Method: WHITE PAINT
Permit Type: NO
Vac / Pwr Equip Use In The Approx Location Of Member Facilities Requested: N Excavation Enters Into Street Or Sidewalk Area: N

Location:
SE Corner of: W MACARTHUR BLVD
And: WEST ST

WRK EXT 120' S INTO PROP AT ADDR 71 W MACARTHUR BLVD

Place: OAKLAND County: ALAMEDA State: CA

Long/Lat Long: -122.27327 Lat: 37.826301 Long: -122.27005 Lat: 37.828855

Sent to:
CTYOAK = CITY OAKLAND CONST DEPT
COMOAK = COMCAST-OAKLAND
EBWCMS = EAST BAY WATER
PBTHAY = PACIFIC BELL HAYWARD
PGEUET = PG&E UNDERGROUND ELECTRI
PGEOAK = PGE DISTR OAKLAND
SPRINT = SPRINT

Member Contact Information

Member Utility	Main Contact #	Vacuum Contact #	Emergency #	After hours #
CITY OAKLAND C	(510)238-7262			
	(510)238-7288			
COMCAST-OAKLAN	(925)424-0181			
EAST BAY WATER	(510)287-0600			

PROJECT NAME BP #4391
CLIENT BP
PROJECT LOCATION Oakland, CA
PROJECT NUMBER GP09BPNA-C110
LOCATION 731 W McArthur Blvd.
OVA EQUIPMENT PID
GROUND ELEVATION — HOLE DIAMETER 4"
TOP OF CASING ELEVATION — HOLE DEPTH 5'
FIRST ENCOUNTERED WATER N/A
STABILIZED WATER N/A
LOGGED BY MD. DATE 5/31/11

LOG OF BORING / WELL SV-1

PAGE 1 OF 1

DRILLING CONTRACTOR Gregg Drilling
DRILLING METHOD Hand augur
STAMP (IF APPLICABLE) AND/OR NOTES

DEPTH (feet)	SAMPLE TYPE NUMBER	SAMPLE RECOVERY	BLOW COUNTS (per 6 inches)	U.S.C.S.	GRAPHIC LOG	DEPTHS	LITHOLOGIC DESCRIPTION	PID or OVA (ppm)	WELL DIAGRAM	DEPTH (feet)
							Asphalt and fill	0.0	flush mount well box	
				CL			Dry, green compacted clay	0.3	Wet Bentonite	
				ML			Light brown and loose silts with trace clay. Dry	0.4	Dry bentonite	
								0.2		
5	SV-1-5ft			ML			Light brown sandy silts with trace clay. minor orange and black staining.	0.4	probe tubing Sand	5
							End boring @ 5ft			
10										10
15										15
20										20

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APPROVED BY: _____ DATE: _____

LFR

BORING+WELL 2006 FIELD BLANK LFR TEST PROJ AUG2006.GPJ LFR SEPT 2006.GDT 8/29/06

PROJECT NAME BP #4391
CLIENT BP

LOG OF BORING / WELL SV-2

PROJECT LOCATION Oakland, CA
PROJECT NUMBER
LOCATION 731 W McArthur Blvd.
OVA EQUIPMENT PID
GROUND ELEVATION — HOLE DIAMETER 4"
TOP OF CASING ELEVATION — HOLE DEPTH 5'
FIRST ENCOUNTERED WATER 3 - step out
STABILIZED WATER —
LOGGED BY MD DATE 5/31/11

DRILLING CONTRACTOR Gregg Drilling
DRILLING METHOD Hand augur
STAMP (IF APPLICABLE) AND/OR NOTES

DEPTH (feet)	SAMPLE TYPE NUMBER	SAMPLE RECOVERY	BLOW COUNTS (per 6 inches)	U.S.C.S.	GRAPHIC LOG	DEPTHS	LITHOLOGIC DESCRIPTION	PID or OVA (ppm)	WELL DIAGRAM	DEPTH (feet)
							Asphalt with silty gravely fill	13.9	flush mound well box; Wet Bentonite	
				CL			Bluish green clay with strong odor and some black staining. Dry.	84.7	tubing	
								57.4		
				ML			Clayey silts with strong odor. Dark bluish color and dry.	160	Dry bentonite	
								223		
5	SV-2-5ft			ML			Green sandy silts with strong odor. dry.	212	probe; Sand	5
								172		
							End boring @ 5 ft			
10										10
15										15
20										20

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APPROVED BY: DATE:

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BORING+WELL 2006 FIELD BLANK LFR TEST PROJ AUG2006.GPJ LFR SEPT 2006.GDT 8/29/06

PROJECT NAME BP #4391
CLIENT BP

LOG OF BORING / WELL SV-3

PAGE 1 OF 1

PROJECT LOCATION Oakland, CA
PROJECT NUMBER GP09BPNA-C110
LOCATION 731 W McArthur Blvd.
OVA EQUIPMENT PID
GROUND ELEVATION — HOLE DIAMETER 4"
TOP OF CASING ELEVATION — HOLE DEPTH 5'
FIRST ENCOUNTERED WATER N/A
STABILIZED WATER N/A
LOGGED BY MD DATE 5/31/11

DRILLING CONTRACTOR Gregg Drilling
DRILLING METHOD Hand augur
STAMP (IF APPLICABLE) AND/OR NOTES

DEPTH (feet)	SAMPLE TYPE NUMBER	SAMPLE RECOVERY	BLOW COUNTS (per 6 inches)	U.S.C.S.	GRAPHIC LOG	DEPTHS	LITHOLOGIC DESCRIPTION	PID or OVA (ppm)	WELL DIAGRAM	DEPTH (feet)
							Concrete with gravely fill	0.2	flush mound well box; Wet	
				CL			Thick green clays with some black staining and dry.	7.8	Bentonite	
								1.1		
							Sandy silts with clay	0.4	Dry Bentonite	
5	SV-3-5ft			ML			Fine sandy silts with trace clay orange/light brown in color with some black staining with some greenish shading.	0.7	probe tubing; Sand	5
							End boring @ 5-ft			
10										10
15										15
20										20

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BORING+WELL 2006 FIELD BLANK LFR TEST PROJ AUG2006.GPJ LFR SEPT 2006.GDT 8/29/06

PROJECT NAME BP #4391
CLIENT BP

LOG OF BORING / WELL SV-4

PAGE 1 OF 1

PROJECT LOCATION Oakland, CA
PROJECT NUMBER GP09BPNA.C110
LOCATION 731 W McArthur Blvd.
OVA EQUIPMENT PID
GROUND ELEVATION — HOLE DIAMETER 4"
TOP OF CASING ELEVATION — HOLE DEPTH 5'
FIRST ENCOUNTERED WATER ~4.5 - step out
STABILIZED WATER N/A
LOGGED BY MD DATE 5/31/11

DRILLING CONTRACTOR Gregg Drilling
DRILLING METHOD Hand augur
STAMP (IF APPLICABLE) AND/OR NOTES

DEPTH (feet)	SAMPLE TYPE NUMBER	SAMPLE RECOVERY	BLOW COUNTS (per 6 inches)	U.S.C.S.	GRAPHIC LOG	DEPTHS	LITHOLOGIC DESCRIPTION	PID or OVA (ppm)	WELL DIAGRAM	DEPTH (feet)
							Asphalt with gravely backfill underneath --- brown and dry.	0.0	flush mound well box; wet Bentonite	
					ML		Clayey Silts, brown in color and dry.	0.1		
								0.5	tubing	
							Sandy Silts - brown and dry	0.2	Dry Bentonite	
5	SV-4-5ft				ML			0.1	probe; Sand	5
							End boring @ 5ft			
10										10
15										15
20										20

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BORING+WELL 2006 FIELD BLANK LFR TEST PROJ AUG2006.GPJ LFR SEPT 2006.GDT 8/29/06

PROJECT NAME BP # 4391
CLIENT BP

LOG OF BORING / WELL SV-5

PAGE 1 OF 1

PROJECT LOCATION Oakland, CA
PROJECT NUMBER GP09BPNA.C110
LOCATION 731 W McArthur Blvd.
OVA EQUIPMENT PID
GROUND ELEVATION — HOLE DIAMETER 4"
TOP OF CASING ELEVATION — HOLE DEPTH 5'
FIRST ENCOUNTERED WATER —
STABILIZED WATER N/A
LOGGED BY MD DATE 6/1/11

DRILLING CONTRACTOR Gregg Drilling
DRILLING METHOD Hand Augur
STAMP (IF APPLICABLE) AND/OR NOTES
5 ft from boring 1A.

DEPTH (feet)	SAMPLE TYPE NUMBER	SAMPLE RECOVERY	BLOW COUNTS (per 6 inches)	U.S.C.S.	GRAPHIC LOG	DEPTHS	LITHOLOGIC DESCRIPTION	PID or OVA (ppm)	WELL DIAGRAM	DEPTH (feet)
							Layer of asphalt with gravely fill underneath	0.2	flush mount well box; wet bentonite	
								3.6		
				CL			Thick bluish green clay with some silt; some black staining at 3 feet bgs	7.1	tubing	
								3.9		
								2.1	dry bentonite	
								8.2		
5	SV-5-5FT			ML			Green clayey silts begin around 3.5 ft. Easily crumbles, minor brown/orange staining. minor odor as well.	6.9	probe; sand	5
							End boring @ 5 ft			
10										10
15										15
20										20

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BORING+WELL 2006 FIELD BLANK LFR TEST PROJ AUG2006.GPJ LFR SEPT 2006.GDT 8/29/06

PROJECT NAME BP #4391
CLIENT BP

LOG OF BORING / WELL SV-6

PAGE 1 OF 1

PROJECT LOCATION Oakland, CA
PROJECT NUMBER GP09BPNA.C110
LOCATION 731 W MacArthur Blvd.
OVA EQUIPMENT PID
GROUND ELEVATION — HOLE DIAMETER 2"
TOP OF CASING ELEVATION — HOLE DEPTH 5'
FIRST ENCOUNTERED WATER —
STABILIZED WATER —
LOGGED BY MD DATE 6/1/11

DRILLING CONTRACTOR Gregg Drilling
DRILLING METHOD Hand Augur
STAMP (IF APPLICABLE) AND/OR NOTES

DEPTH (feet)	SAMPLE TYPE NUMBER	SAMPLE RECOVERY	BLOW COUNTS (per 6 inches)	U.S.C.S.	GRAPHIC LOG	DEPTHS	LITHOLOGIC DESCRIPTION	PID or OVA (ppm)	WELL DIAGRAM	DEPTH (feet)
							Layer of asphalt and silty gravel backfill underneath.		flush mount well box	
								2.7		
							Bluish green silty clay with	13.9	wet bentonite	
				CL			minor odor. Dry	17.5		
									Dry bentonite	
							Stained light brown clayey	11.1		
5	SV-6-5FT			ML			silts, dry.	7.4	probe tubing Sand	5
10										10
15										15
20										20

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BORING+WELL 2006 FIELD BLANK LFR TEST PROJ AUG2006.GPJ LFR SEPT 2006.GDT 8/29/06

WATER-LEVEL MEASUREMENTS LOG

Project No. BP # 4391 Date 5/31/2011 Page 1 of 1

Project Name BP # 4391 Day: ☐ Sun ☐ Mon ☒ Tues ☐ Weds ☐ Thurs ☐ Fri ☐ Sat

Field Personnel Miljan Draganic

General Observations A lot of In-and-Out traffic and its raining!

WELL / LOCATION ID	TIME WELL OPENED	TIME DEPTH TO WATER MEASURED	DEPTH TO WATER		WELL SECURE?		REMARKS (UNITS = FEET)
			1	2	Y	N	
A-10	—	0745	8.72	8.72	X		well box flooded
AR-3	—	↓	8.22	8.22	X		
A-9	—		6.91	6.91	X		
A-5	—		7.75	7.75	X		
A-7	—		7.24	7.24	X		well box flooded
A-6	—		—	—	X		well not found
A-13	—		8.29	8.29	X		
A-4	—		7.65	7.65	X		
AR-1	—		8.79	8.79	X		
A-3	—		6.84	6.84	X		
AR-2	—		6.98	6.98	X		
A-2	—		4.56	4.56	X		
A-11	—		—	—	X		Well parked on
A-12	—	↓	—	—	X		Well parked on
A-8	—	0815	—	—	X		Could not open well box