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ENVIRONMENT

Ms. Dilan Roe, P.E.
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502

Subject:
ACEH Low Threat Closure Policy Checklist and Site Conceptual Model
Former Atlantic Richfield Company Station No. 4931
731 West MacArthur Boulevard
Oakland, California 94609

Date:
June 28, 2013

Contact:
Hollis Phillips

Phone:
415.432.6903

Email:
hollis.phillips@arcadis-us.com

Our ref:
GP09BPNA.C110.N0000

Dear Ms. Roe:

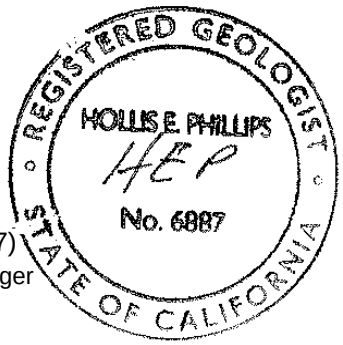
ARCADIS U.S., Inc (ARCADIS) has prepared this report on behalf of BP Remediation Management, a BP affiliated company, for the former BP service station listed below.

BP Facility No.	ACEH Site No.	Location
4931	RO0000076	731 West MacArthur Blvd. Oakland, California

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

Sincerely,

ARCADIS U.S., Inc.



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

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Executive Summary

This Alameda County Environmental Health (ACEH) Low Threat Closure (LTC) Policy Checklist and Site Conceptual Model (SCM) was prepared by ARCADIS U.S., Inc. (ARCADIS) on behalf of Atlantic Richfield Company, a BP affiliated company (ARCO), for the former ARCO service station No.4931 located at 731 W. MacArthur Boulevard in Oakland, California (the Site; Appendix A). This report has been prepared in response to discussions between ARCADIS and ACEH during a meeting on March 26, 2013. In the meeting ACEH presented ARCADIS with a draft version of ACEH's LTC Policy Checklist and stated that the LTC Policy Checklist, along with a SCM would be required to determine if the Site is a candidate for closure as a low-threat fuel site.

This report package presents relevant site background information, summarizes previous site investigations, lists the removal action activities and results, presents an assessment of risk to public health and the environment, and includes an evaluation of site conditions relevant to the State Water Resources Control Board (State Water Board) *Low-Threat Underground Storage Tank Case Closure Policy*, adopted by the State Water Board on May 1, 2012 (State Water Board 2012) per the ACEH-provided LTC Policy Checklist.

The objective of this report is to provide the documentation required for ACEH to approve site closure as a low-risk fuel site as described in the LTC Policy (State Water Board 2012). This report is organized into the following sections:

Section 1 - Executive Summary

Section 2 – SCM with relevant appendices

Section 3 – ACEH LTC Policy Checklists

- General Criteria A through H
- Media Specific Criteria – Groundwater
- Media Specific Criteria – Petroleum Vapor Intrusion to Indoor Air
- Media Specific Criteria – Direct Contact and Outdoor Air Exposure

Section 4 – Supplemental ACEH SCM Forms

- Site Well Construction Details
- Well Survey

Site data collected to date has demonstrated that both the general and applicable media-specific criteria are satisfied according to the measures within State Water Board LTC Policy, and therefore, the leaking underground storage tank (UST) case is generally considered to present a low threat to human health, safety, and the environment:

- Petroleum hydrocarbon sources, including free product and other potential secondary sources, have been removed to the extent practical.

- Current groundwater concentrations of site constituents of potential concern (COPCs) are: Gasoline Range Organics (GRO) ranging from below detection (<50 micrograms per liter [µg/L]) to 890 µg/L, benzene ranging from below detection (<0.50 µg/L) to 6 µg/L, methyl tert-butyl ether (MTBE) ranging from below detection (<0.50 µg/L) to 240 µg/L, and tertiary butyl alcohol (TBA) ranging from below detection (<4.0 µg/L) to 1,600 µg/L. Based on the groundwater data collected across the Site, concentrations of the four COPCs (GRO, benzene, MTBE, and TBA) are non-detect, below San Francisco Bay – Regional Water Quality Control Board (SF-RWQCB) Environmental Screening Levels (ESLs), or are not sampled due to historical non-detect results at 12 of the 15 site wells. At all other locations COPCs are decreasing or stable.

- The Site has been adequately characterized.

- The dissolved GRO, benzene, MTBE, and TBA plumes are stable and/or decreasing and do not exceed the maximum extents from the point of release as specified in the LTC Policy.

- Sensitive receptors are not likely to be impacted, including surface-water bodies, municipal wells and drinking water sources based on the stability and limited historical extent of the dissolved-phase GRO, benzene, MTBE, and TBA plumes.

- The Site presents no current or potential risk to human health or the environment.

Petroleum-hydrocarbon affected groundwater appears to be limited to monitoring wells A-4 and A-8 which have reported the highest groundwater concentrations of any site wells for the past five years of monitoring. Both of these monitoring wells are located onsite and in the immediate vicinity of fuel dispenser islands and associated product conveyance lines.

In 45 monitoring events conducted between the Second Quarter 2000 through the First Quarter 2013 a west or west-southwest groundwater flow direction has been observed at the Site in 43 events (Appendix B).

All the wells that contain (or recently contained) COPC concentrations in groundwater indicate decreasing or stable trends. Groundwater samples collected from A-8 during the most recent sampling event (First Quarter 2013) generally contained the lowest petroleum-hydrocarbon concentrations ever observed in this well's monitoring history. Additionally, the dissolved petroleum-hydrocarbon plume does not appear to be migrating as downgradient wells A-11 and A-12 have been have been non-detect or below ESLs since at least September 2004.

Site data collected to date has demonstrated that both the general and applicable media-specific criteria are satisfied according to the measures within State Water Board LTC Policy, and therefore, the leaking UST case is generally considered to present a low threat to human health, safety, and the environment. As presented in Section 3 of this report, the site fulfills each of the *General Media Specific* criteria (classes A through H) in accordance with the State Water Board LTC Policy. Class A of the *Groundwater-Media Specific* criteria is fulfilled according to available site data. The Site qualifies for an exemption from the *Petroleum Vapor Intrusion to Indoor Air* criteria as the Site is an active commercial fueling facility and the historical release characteristics are comparatively insignificant relative to exposures from small surface spills and fugitive vapor releases that typically occur at active fueling facilities. The Site satisfies the *Direct Contact and Outdoor Air Exposure* criteria as it fulfills the requirements in the Soil: 0 to 5 feet bgs, 5 to 10 feet bgs, and 0 to 10 feet bgs scenarios and Volatilization to Outdoor Air scenario.

Available data from the Site suggests that the Site is adequately characterized and there are no additional data gaps. The Site appears to be a candidate for closure as a low-risk fuel site as described in the State Water Board LTC Policy. ARCADIS recommends that a status of no further action (NFA) be received, and the Site be granted regulatory closure. During case closure evaluation ARCADIS requests the following:

- Suspension of groundwater monitoring and reporting, which includes the August 2013 sampling event, pending approval of site closure by the ACEH.

- Preparation of a work plan for monitoring well decommissioning upon site closure approval by ACEH.

Table 1
Site Conceptual Model
Former ARCO #4931
731 West MacArthur Boulevard Oakland, California
ACEH Case #RO0000076

CSM Element	CSM Sub-Element	Description	Potential Data Gap(s)	How to Address
Geology and Hydrogeology	Regional	According to the East Bay Plain Groundwater Basin Beneficial Use Evaluation Report [1], the Site is located within the Oakland Sub-Area of the East Bay Plain of the San Francisco Basin. The Site Location and Site Plan are included in Appendix A. The Oakland Sub-Area contains a sequence of alluvial fans. The alluvial fill thickness ranges from 300 to 700 feet below ground surface (bgs). There are no well-defined aquitards such as estuarine muds. The largest and deepest wells in this sub-area historically pumped one to two million gallons per day from depths greater than 200 feet. Overall, sustainable yields are low due in part to low recharge potential. The Merrit sand in West Oakland was an important part of the early water supply for the City of Oakland. It is shallow (up to 60 feet), but before the turn of the last century, septic systems contaminated the water supply wells[1]. Throughout most of the Alameda County portion of the East Bay Plain, from Hayward north to Albany, water level contours show that the general direction of groundwater flow is from east to west or from the Hayward Fault to the San Francisco Bay. Groundwater flow direction generally correlates to topography. Flow direction and velocity are also influenced by buried stream channels that typically are oriented in an east to west direction. Historic groundwater flow direction at the Site has been predominantly towards the west or west-southwest (Appendix B). The nearest natural drainage is Glen Echo Creek, located approximately 4,600 feet southeast of the Site. However, this creek is predominately an underground culvert with only a few exposed, non-culverted sections. Glen Echo Creek flows generally northeast to southwest into Lake Merritt[2].	None	NA
	Site	***Geology:*** The Site is approximately 60 feet above mean sea level (msl) and gently slopes toward the west. A nearly continuous clay layer (clay, clayey sand, and gravelly clay) extends from the surface to approximately 18 to 20 feet bgs. The clay layer is typically underlain by an approximately 4-foot thick intermittent sand/gravel layer which has been encountered between 18 and 23 feet bgs.	None	NA
		Hydrogeology: Groundwater is first encountered during drilling events between approximately 20 and 25 feet bgs and roughly correlates to the intermittent sand/gravel layer that underlays the clay layer. Available soil boring logs for the Site are included in Appendix C. Since 2000, groundwater elevation at the Site has historically ranged from 42.37 to 57.76 feet above msl. Depth to water recordings have ranged in site monitoring wells from 1.82 feet below top of casing (btoc) at AR-2 on February 28, 2008 to 10.77 feet btoc at A-11 on September 23, 2001. The average site depth to water since 2000 is approximately 8 feet btoc. Depth to water during the most recent groundwater monitoring event on February 8, 2013 ranged from 4.51 feet btoc at A-2 to 8.47 feet btoc at A-11[3]. Groundwater flow at the Site has been predominately to the west measured during 45 monitoring events conducted between the Second Quarter of 2000 and the First Quarter of 2013 (Appendix B). Groundwater flow during the groundwater monitoring for the Third Quarter 2012 and First Quarter 2013 was to the west at an approximate gradient of 0.01 feet per foot (ft/ft) and 0.02 ft/ft, respectively. Groundwater elevations from AR-2 have typically not been used for groundwater elevation contouring in semi-annual monitoring reports. A review of the data indicates this may be attributed to the survey data for this well location and the well's likely placement in former underground storage tank (UST) backfill material. All site wells were resurveyed sometime between November 2003 and February 2004. Top of casing elevation for AR-2 went from 54.77 to 59.18. Top of casing elevations also increased for nearby wells A-2 and A-3, however, the new survey at these locations increased by over 5 feet at A-2 (approximately 15 feet away from AR-2), and over 4.5 feet at A-3 (approximately 20 feet away from AR-2). AR-2 is also located in the former UST basin in the east portion of the Site. AR-2's soil boring log indicates that a fill-like, fine gravel-material is present from the surface to approximately 15.5 feet bgs (Appendix C). Native soils at the Site are described as a nearly continuous clay layer which extends from the surface to approximately 18 to 20 feet bgs. The more permeable, fill material at AR-2 likely facilitates the observed shallower depth to water readings and corresponding higher groundwater elevations, when compared to depth to water and groundwater elevation recordings at nearby monitoring wells A-2 and A-3.	None	NA
Surface Water Bodies	--	The nearest surface water body appears to be Glen Echo Creek approximately 4,600 feet southeast (upgradient). However, the creek in this area is predominately shown as an underground culvert[4]. The nearest downgradient surface water body is San Francisco Bay and is located approximately 1.4 miles west (downgradient) of the Site.	None	NA

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Nearby Wells	--	Results of previous well surveys identified surrounding facilities or environmental features that may be affected by or may have an effect on subsurface conditions at the Site. Additionally, information regarding well surveys performed at the nearby Alameda County Environmental Health (ACEH) leaking underground fuel tank (LUFT) cases has been incorporated in the findings below. Due to the recent dates of the well surveys and their close proximity, ARCADIS considers these well surveys applicable to the Site. Distances to potential sensitive receptors identified in previous well surveys were re-calculated and are presented below in distance from the Site. The nearest municipal water supply well is operated by East Bay Municipal Utility District (EBMUD) and is located at 2600 Grant Avenue in San Leandro, located over 15 miles southwest of the Site. This well operates to supplement the surface water supply during prolonged drought periods and uses the deep aquifer at approximately 500 feet bgs[5]. The nearest non-municipal water production wells include: • Irrigation well identified by ARCADIS for the former BP-11127, located at 5425 Martin Luther King, Oakland, CA[6]: -Irrigation well approximately 4,000 feet north (crossgradient) of the Site • Domestic well identified for the 76 Station #0746, located at 3943 Broadway, Oakland, CA[7]: -Domestic well approximately 3,000 ft northeast (downgradient/crossgradient) of the Site None of the wells identified in the well survey are located within the path of the local groundwater flow and are therefore not considered potential receptors.	None	NA

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CSM Element	CSM Sub-Element	Description	Potential Data Gap(s)	How to Address
Constituents of Potential Concern	--	***Soil:*** The constituents of potential concern (COPCs) in soil at the Site include gasoline range organics (GRO) and benzene.	None	NA
		Groundwater: The COPCs in groundwater beneath the Site include GRO, benzene, and Methyl tertiary-butyl ether (MTBE).	None	NA
		Soil Vapor: Analytical results suggest that residual petroleum-hydrocarbon-impacted soil vapor is primarily affected by GRO and benzene.	None	NA
Potential Sources	--	The possible source of COPCs at the Site include historical releases to soil from former gasoline USTs, associated conveyance piping, and/or fuel dispensers, and overfills. A super unleaded product leak was reported to have occurred in November 1982 at the Site[8], however the quantity of product released is unknown as it is not found in available files. All site USTs and associated conveyance piping were replaced between November 1991 and April 1992[9]. The removed USTs were formerly located in the east portion of the Site and include: • One 12,000-gallon single-walled fiberglass tank; • Two 8,000-gallon single-walled steel tanks; and, • One 6,000-gallon single-walled steel tank.	None	NA
Potential Presence of SPH	--	Available groundwater monitoring data indicate that measureable SPH were last observed at the Site in November 1994, suggesting that the petroleum system repairs/upgrades, soil excavation, remediation, and natural attenuation processes have reduced the source area mass.	None	NA
Previous Remedial Activities	--	Portions of the petroleum-affected soil and groundwater have been removed from the Site including: • Between November 1991 and April 1992, approximately 1,900 cubic yards of soil was excavated as a result of the removal of the former USTs and conveyance piping and the excavation of the current UST pit[9]; • The Groundwater Extraction Treatment System (GWETS) operated from November 1992 to July 1995 and included SPH-product and groundwater extraction. The GWETS removed approximately 4,643,696 gallons of groundwater and approximately 2.74 pounds (0.45 gallons) of TPH-G and 0.46 pound (0.06 gallons) of benzene during system operation. As of December 31, 1995, 23 pounds (3.75 gallons) of separate phase hydrocarbons (SPH) had been removed from the Site either by the GWETS or by hand bailing[10]. • In October 2002 an unknown volume of soil was removed during the product conveyance lines upgrades at the Site. The product lines were excavated, removed, inspected, and replaced. No observable cracks or deterioration of the former product lines was reported. The new product lines were replaced within the same trenches. Available records do not indicate the volume of soil removed during these activities[11].		

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CSM Element	CSM Sub-Element	Description	Potential Data Gap(s)	How to Address
Nature and Extent of Environmental Impacts	Extent in Soil	Previous investigations have identified the presence of petroleum hydrocarbons in vadose zone soil, primarily at onsite locations in the vicinity of the former ARCO USTs and nearby product conveyance lines. Excavations associated with UST upgrades in November 1991 through April 1992 and product conveyance lines in October 2002 likely removed a significant volume of affected mass from the Site. Approximately 1,900 cubic yards of soil was excavated during removal of the site USTs between November 1991 and April 1992[9]. Additional source removal occurred during replacement of the product conveyance lines in October 2002 when additional over-excavation was conducted due to observed soil staining and hydrocarbon odors[11]. These removal activities likely removed a significant volume of source-mass that affected the subsurface beneath the Site. Soil samples collected from the Site in October 2010 indicated that current concentrations of GRO and benzene in soil show at least an order of magnitude drop in concentrations of GRO and two orders of magnitude in concentrations for benzene when compared to historical soil sample results from corresponding areas of the Site. For example, soil sample L6 was collected at 3.5 feet bgs during the UST/product line upgrades conducted in 1991-1992 contained concentrations of TPH-G and benzene at 8,300 milligrams per kilogram (mg/kg) and 3.1 mg/kg, respectively, prior to overexcavation in this area. SB-5-5 which was collected at 5 feet bgs from the L6-area in October 2010 did not contained concentrations of GRO and benzene above the reporting limits of <0.24 mg/kg and <0.0048 mg/kg, respectively. None of the reported concentrations in the October 2010 soil samples collected from the Site exceed the commercial San Francisco Bay - Regional Water Quality Control Board (SF-RWQCB) environmental screen levels (ESLs)[12] for shallow soil, with the exception of one soil sample collected at 10 feet bgs (SB-6-10) and two other soil samples collected at- and below 20 feet bgs (SB-1A-20 and SB-01-25). These soil samples are likely more indicative of groundwater conditions as the collected depths are below the recently observed water table which has ranged from 1.82 feet btoc to 10.70 feet btoc since 2008. Available soil data collected from the Site is presented in Appendix D.	None	NA
	Extent in Groundwater	The extent of petroleum hydrocarbons in groundwater is presented in Appendix E as measured during the two most recent semi-annual groundwater monitoring events in August 2012 and February 2013. The results are also included with the historical groundwater monitoring results in Appendix E. Petroleum-hydrocarbon affected groundwater appears to be limited to monitoring wells A-4 and A-8 which have reported the highest groundwater concentrations for the past five years of monitoring. Both of these monitoring wells are located onsite and in the immediate vicinity of fuel dispenser islands and associated product conveyance lines. All the wells that contain (or recently contained) concentrations in groundwater indicate a decreasing trends. Additionally, the dissolved petroleum-hydrocarbon plume does not appear to be migrating as downgradient wells have been have been non-detect or below ESLs since at least September 2004.	Do COPC trends in groundwater demonstrate decreasing contaminant concentratio	Conduct a statistical evaluation of the available Site groundwater monitoring data to estimate concentration trend
	Extent in Soil Vapor	The extent of petroleum hydrocarbons in soil vapor has been primarily detected in the vicinity of the former ARCO USTs and nearby product conveyance lines. The magnitude of the concentrations detected in soil vapor samples collected from the Site indicates significant attenuation of individual petroleum constituents from groundwater through the vadose zone. Laboratory analysis of samples collected from the soil vapor probes in January and February 2013 indicates that the three deep (5 feet bgs) soil vapor probes (SV-2, SV-3 and SV-6) and one sub-slab probe (SS-SV-2) contain GRO and benzene concentrations that exceed residential and commercial/industrial SF-RWQCB ESLs. With the exception of SS-SV-2, soil vapor data collected from the sub-slab vapor probes indicated the presence of significant attenuation of concentrations of petroleum hydrocarbons to levels below ESLs from the 5-foot depth to the near surface depth. The soil vapor sample collected from sub-slab soil vapor probes SS-SV-1 and SS-SV-3 did not contain concentrations of GRO or benzene above the residential or commercial ESLs. Petroleum-hydrocarbon concentrations detected in SS-SV-2 may be more indicative of shallow groundwater as water has been observed in this probe[13]. Additionally TPH-G and benzene concentrations detected in the sub-slab soil vapor probes were between three and five orders of magnitude lower than their corresponding deeper soil vapor pairs. For example, TPH-G and benzene were detected at SV-2 at concentrations of 49,000,000 micrograms per cubic meter (µg/m^3) and 150,000 µg/m^3, respectively, while adjacent sub-slab vapor point SS-SV-1 contained concentrations of TPH-G and benzene at 740 µg/m^3 and 2.0 µg/m^3, respectively. Soil vapor sample results indicate that petroleum hydrocarbon vapors likely attenuate to concentrations that do not exceed health-based screening criteria, which regulatory agencies consider to be protective of human health from potential vapor intrusion exposures for residents and commercial workers[13]. Additionally, the Site is an active, commercial petroleum fueling facility. Exposures to petroleum vapors associated with historical fuel system releases are comparatively insignificant relative to exposures from small surface spills and fugitive vapor releases that typically occur at active fueling facilities[14]. The State Water Resources Control Board (State Water Board) Low Threat Closure (LTC) Policy states that satisfaction of the Media-Specific Criteria for petroleum vapor migration to indoor air is not required at active commercial petroleum fueling facilities, except in cases where release characteristics can be reasonably believed to pose an unacceptable health risk, which is not the case. Soil vapor sample results are shown in Appendix F.	None	NA

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CSM Element	CSM Sub-Element	Description	Potential Data Gap(s)	How to Address
Migration Pathways	Potential Conduits	Prior to initiating intrusive subsurface work to uncover A-13 on February 8, 2013, underground utilities and other potential subsurface obstructions in the vicinity of the well were located and marked. The utility survey included identifying the Site using white paint and obtaining an Underground Service Alert (USA-North) ticket prior to intrusive activities. Additionally, a private third-party utility locator screened the area around A-13 to determine the location of nearby underground utilities. During the utility survey, the utility location contractor identified several utilities at and nearby the Site including, sanitary sewer laterals, water, gas, and electrical lines. Subsurface utilities at the Site are generally placed between 2 to 4 feet below surface grade. Subsurface utilities are likely to be below or at the approximate depth of historical and current groundwater measurements, therefore, do not likely intersect groundwater and or act as a potential conduit for hydrocarbon migration. A site map show onsite utilities is presented in Appendix A. Based on the spatial distribution of GRO and benzene in groundwater and soil vapor (Appendices E and F), it does not appear that petroleum hydrocarbons have been released to the subsurface via the on-site sewer lateral or any other subsurface utilities beneath the Site.	None	NA
Potential Release Mechanisms	Volatilization	A potential release mechanism at the Site may include volatilization of COPCs in subsurface soil to indoor air of current and future on-site commercial buildings, outdoor air, or air within a trench used by a future on-site utility worker. Another potential release mechanism at the Site may include volatilization of COPCs in groundwater to indoor air of current and future on-site commercial buildings, outdoor air, and/or off-site commercial buildings or future off-site residences, or air within a trench used by a future on-site utility worker. Although the COPCs may volatilize from subsurface soil and/or groundwater to outdoor air or air within a utility trench and may be inhaled by onsite or offsite potential receptors, this exposure pathway is considered to be insignificant given the atmospheric dilution effects from wind.	None	NA
	Leaching to Groundwater	Petroleum hydrocarbons released from USTs and associated piping also may leach from soil to groundwater. This release mechanism is likely responsible for the majority of historic groundwater impacts. However, decreasing petroleum hydrocarbon concentration trends in groundwater indicate that this release mechanism has likely been mitigated through the removal of impacted soil, weathering, remediation, and natural attenuation.	None	NA
	Direct Contact with Groundwater	Groundwater at the Site is not used as a potable source at this time. The closest municipal groundwater production well to the Site is over 15 miles away and is located up-gradient/cross-gradient (to the southwest) of the Site. The closest domestic wells to the Site include an irrigation well approximately 4,000 feet north (crossgradient) of the Site and a domestic well approximately 3,000 ft northeast (downgradient/crossgradient) of the Site. None of the wells identified in the well survey are located within the path of the local groundwater flow and are therefore not considered potential receptors. Therefore, potential direct contact exposures to COPCs in groundwater, such as tap water ingestion, dermal contact with tap water and inhalation of volatile organic compounds (VOCs) released from tap water, are not expected to occur for current and future on-site commercial workers, and current and future off-site commercial workers and residents. In the future, on-site construction workers may be directly exposed to groundwater while performing routine utility activities in subsurface trenches. Typical utility trenches are located at a depth no greater than 8 feet bgs. During the February 2013 groundwater monitoring event, groundwater was encountered at depths ranging from approximately 4.5 to 8.5 feet, however, first encountered wet formation materials, indicating groundwater levels, have been observed during drilling from 20 to 25 feet bgs. Typically at construction sites when groundwater is exposed, dewatering occurs or workers are not required to work in standing water. Thus, it is unlikely that future on-site utility trench workers will be directly exposed to constituents in groundwater.	None	NA
	Direct Contact with Soil	Constituents adhered onto dust particles may migrate from exposed subsurface soil by wind erosion to outdoor air and be breathed by potential on-site and off-site receptors. This transport mechanism is unlikely given that re-development of the Site is not planned, and the Site is either covered with a building, fuel dispensers, landscaping or asphalt pavement and soil is not exposed at the surface. However, potential receptors including future on-site construction/utility trench workers may be directly exposed to constituents in surface and subsurface soil via incidental ingestion, dermal contact and inhalation of dust particles in trench air.	None	NA
Potential Receptors	Potential Ecological Receptors	Since the Site is devoid of ecological habitat and surface water is absent, it is reasonable to assume that ecological receptors are absent from the Site and will also not be present in the future. The Site is located approximately 4,600 feet southwest (downgradient) of Glen Echo Creek, which is predominately an underground culvert. The nearest downgradient surface water body is San Francisco Bay and is located approximately 1.4 miles west (downgradient) of the Site. Based on the approximate groundwater flow direction at the Site (west; Appendix B), it is possible that groundwater from the Site may migrate towards the surface water receptor, with subsequent exposures to aquatic organisms. However, given the sizable distance to the Bay, the high volume of other LUFT cases located between the Site and the Bay, and the potential for COPCs to bioattenuate and dilute, this transport mechanism is considered insignificant. Based on this analysis, potential exposure pathways for ecological receptors are incomplete.	None	NA
	On-site and Off-site	Potential receptors were identified based on current and future land use(s) at the Site. Current and reasonably anticipated future land use at the Site is commercial (i.e., continued operation as a service station). Potential current and future human receptors at the Site include: • On-site commercial workers, • Off-site commercial workers on adjacent, downgradient properties, and • Future on-site construction/utility workers. Although the nearest residents to the Site are located south and east (cross-gradient) and down-gradient monitoring wells and soil vapor probes have not had petroleum-hydrocarbons at concentrations above laboratory reporting limits or ESLs, Current and Future hypothetical off-site residents are considered potential receptors to support risk-based decision making for the Site. Potentially complete exposure pathways for current and future on-site and off-site receptors are summarized below.	None	NA

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Former ARCO #4931
731 West MacArthur Boulevard Oakland, California
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CSM Element	CSM Sub-Element	Description	Potential Data Gap(s)	How to Address
Exposure Pathway Evaluation	Current and Future On-Site Commercial Workers	•No complete exposure pathways The COPCs may volatilize from soil and groundwater to soil gas and migrate to the indoor air of on-site building structures. Inhalation of volatile COPCs in indoor air by on-site commercial workers at this site may be a potentially complete exposure pathway. However, the potential vapor migration exposure pathway for current and future onsite indoor service station workers is likely to be insignificant compared to routine exposures associated with the profession. The workplace vapor concentrations are routinely much higher than any levels expected from vapor migration from the subsurface. Given the presence of indoor and exterior building sources of petroleum hydrocarbons, and the fact that fuel operations are currently conducted at the Site and that operations at the Site are likely to remain the same in the future, subsurface residual impacts are unlikely to contribute significantly to indoor VOC levels. Thus, inhalation of volatile COPCs in indoor air by current and future on-site commercial workers is not a significant exposure pathway.	None	NA
	Current and Future Off-Site Commercial Workers	•Groundwater transport off-site and vapor migration into indoor air The COPCs may volatilize from groundwater to soil gas and migrate to the indoor air of off-site building structures. Inhalation of volatile COPCs in indoor air by current and future off-site commercial workers is a potentially complete exposure pathway. However, given that the most downgradient soil vapor probe (SV-1) did not contain petroleum-hydrocarbon concentrations above either laboratory detection limits or above ESLs during the most recent soil vapor sampling event (January 4, 2013), inhalation of volatile COPCs in indoor air by current and future off-site commercial workers is not a significant exposure pathway. Direct-contact exposure pathways (i.e., ingestion, dermal contact, and inhalation of volatile emissions from tap water) from groundwater are currently incomplete, since the community uses municipal-supplied water for potable uses. It is assumed that current land and beneficial water uses will continue in the foreseeable future. Therefore, these pathways are also assumed to be incomplete in the reasonably foreseeable future for off-site commercial workers located on downgradient, adjacent properties. Additionally,the furthest downgradient monitoring wells A-11 and A-12 had remained non-detect for COPCs since groundwater monitoring began in 1988, indicating that the plume had stabilized and downgradient migration was minimal.	None	NA
	Future On-Site Construction/ Utility Workers	•Inhalation (outdoor air) of vapors •Inhalation (outdoor air) of dust particles •Incidental ingestion of surface and subsurface soil •Dermal contact with surface and subsurface soil Potential future on-site utility trench workers may be directly exposed to COPCs in surface and subsurface soil via incidental ingestion, dermal contact and inhalation of dust particles in trench air. Since soil data indicates that the Site satisfies the Direct Contact and Outdoor Air Exposure – Utility Worker (soil: 0 to 10 feet bgs) criteria stated in theState Water Board LTC Policy[14], these pathways are also assumed to be incomplete in the reasonably foreseeable future for utility workers located on onsite.	None	NA
	Current and Future Hypothetical Off-Site Residents	•Groundwater transport off-site and vapor migration into indoor air The COPCs may volatilize from groundwater to soil gas and migrate to the indoor air of off-site building structures. Inhalation of volatile COPCs in indoor air by future hypothetical off-site residents is a potentially complete exposure pathway. However, given that the most downgradient soil vapor probe (SV-1) did not contain petroleum-hydrocarbon concentrations above either laboratory detection limits or above ESLs during the most recent soil vapor sampling event (January 4, 2013), inhalation of volatile COPCs in indoor air by current and future off-site residents is not a significant exposure pathway. •Direct contact with groundwater (hypothetical exposure scenario) Direct-contact exposure pathways (i.e., ingestion, dermal contact, and inhalation of volatile emissions from tap water) from groundwater are currently incomplete, since the community uses municipal-supplied water for potable uses. It is assumed that current land and beneficial water uses will continue in the foreseeable future. Therefore, these pathways are also assumed to be incomplete in the reasonably foreseeable future for off-site residents located on downgradient, adjacent properties.	None	NA

Table 1
Site Conceptual Model
Former ARCO #4931
731 West MacArthur Boulevard Oakland, California
ACEH Case #RO0000076

CSM Element	CSM Sub-Element	Description	Potential Data Gap(s)	How to Address

Notes:

1. California Regional Water Quality Control Board – San Francisco Bay Region, 1999. East Bay Plain Groundwater Basin Beneficial Use Evaluation Report. June.
2. Broadbent & Associates, Inc., 2009. Soil & Groundwater Investigation Work, Plan, Atlantic Richfield Company Station #4931, 731 West MacArthur Boulevard, Oakland, California, ACEH Case # RO000076. July 14.
3. ARCADIS U.S., Inc. (ARCADIS), 2013. Fourth Quarter 2012 and First Quarter 2013 - Semi-Annual Groundwater Monitoring Report, Former Atlantic Richfield Company Station #4931, 731 West MacArthur Boulevard, Oakland, California, ACEH Case #RO0000076. April 11.
4. The Oakland Museum of California Creek and Watershed Information Source. Guide to San Francisco Bay Area Creeks. Viewed online on May 22, 2013: http://museumca.org/creeks/1160-OMTemescal.html#.
5. AECOM, 2013. Chevron Site No. 351642 (Former Unocal Service Station No. 3538) 411 West MacArthur Boulevard, Oakland, California ACEH Case No. RO0000251, Subject: Low-Threat Case Closure Request. March 27.
6. ARCADIS, 2010. Re: Case Closure Summary Report Former British Petroleum Station #11127, 5425 Martin Luther King Jr. Way, Oakland, California 94609, ACEH Case # RO0000241. August 6.
7. Delta Consultants, 2009. Re: Sensitive Receptor Survey, Addendum, Delta Project No C100746, RO# 0203, AOC 1085. April 24.
8. GeoStrategies, Inc. for Gettler-Ryan, Inc., 1991. Remedial Action Plan, ARCO Service Station No. 4931, 731 W. MacArthur Boulevard, Oakland, California. May 15.
9. Roux Associates, 1992. Underground Storage Tank Removal and Soil, Sampling, ARCO Facility No. 4931, 731 West MacArthur Boulevard, Oakland, California. July 20.
10. Pacific Environmental Group, Inc. (PEG), 1996. Final Groundwater Monitoring Report – Permit 502-62131, Termination of Account, ARCO Service Station 4931, 731 West MacArthur Boulevard, Oakland, California. July 25.
11. ARCADIS, 2010. Site Investigation Report, Former Atlantic Richfield Company Station No. 4931, 731 West MacArthur Boulevard, Oakland, California, ACEH Case # RO0000076. November 11.
12. San Francisco Regional Water Quality Control Board (SF-RWQCB). 2013. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater. Interim Final – February. Viewed online on May 21, 2013: http://www.waterboards.ca.gov/rwqcb2/water_issues/programs/esl.shtml
13. ARCADIS, 2013. Soil Vapor Monitoring Report - First Quarter 2013, Former Atlantic Richfield Company Station No. 4931, 731 West MacArthur Boulevard, Oakland, California 94609. TBD.
14. State Water Resources Control Board (State Water Board). 2012. Water Quality Control Policy for Low-Threat Underground Storage Tank Case Closure. Viewed online on August 15, 2012: http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2012/rs2012_0016atta.pdf

Abbreviations

bgs = below ground surface
msl = mean sea level
ft/ft = feet per foot
btoc = below top of casing
ACEH = Alameda County Environmental Health
LUFT = leaking underground fuel tank
EBMUD = East Bay Municipal Utility District
COPCs = constituents of potential concern
GRO/TPH-G = Total Petroleum Hydrocarbons as Gasoline Range Organics
MTBE = Methyl tertiary-butyl ether
USTs = underground storage tanks
GWETS = groundwater extraction treatment system
SPH = separate phase hydrocarbons
SF-RWQCB = San Francisco Bay - Regional Water Quality Control Board
ESLs = environmental screen levels
mg/kg = milligrams per kilogram
$\mu g/m^3$ = micrograms per cubic meter
VOCs = volatile organic compounds
State Water Board = State Water Resources Control Board
LTC Policy = Low-Threat Closure Policy

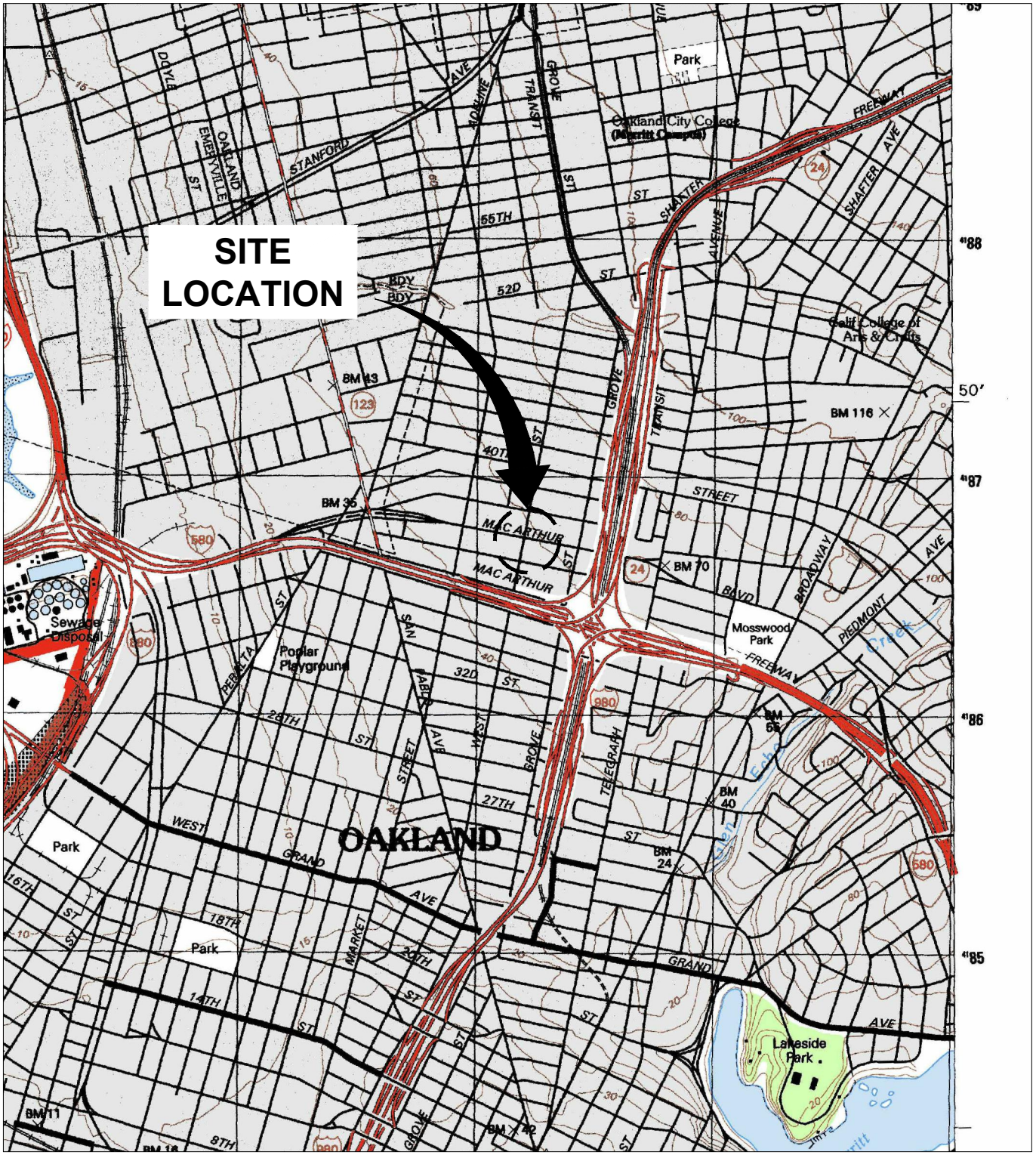
List of Appendices

Appendix A – Site Location and Site Plan Figures
Appendix B – Groundwater Flow Direction Figures
Appendix C – Soil Boring Logs
Appendix D – Soil Data
Appendix E – Groundwater Data and Figures
Appendix F – Soil Vapor Data and Figures

ARCADIS

Appendix A

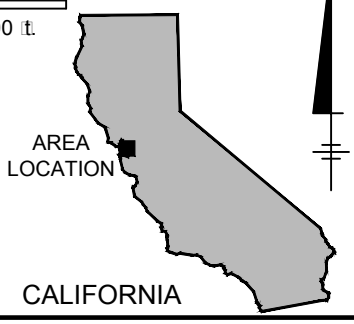
Site Location and Site Plan Figures



REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., OAKLAND WEST, CALIFORNIA, 1993.

0 2000 4000

Approximate Scale: 1 in. = 2000 ft.



FORMER ARCO STATION 4931
731 WEST MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

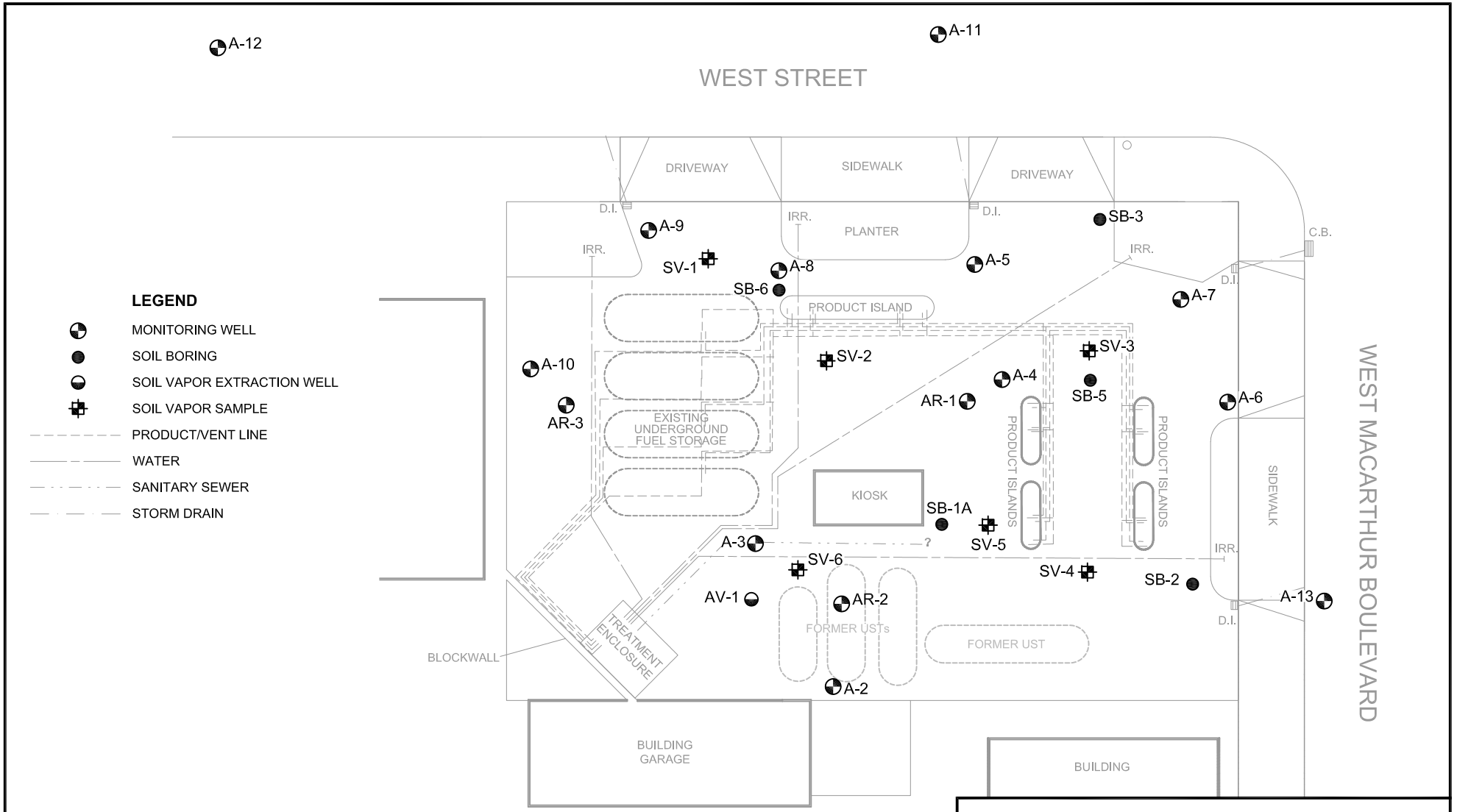
SITE LOCATION MAP

ARCADIS

FIGURE
1

CITY: PETALUMA, CA DIV/GROUP: ENV DB: J. HARRIS
C:\Users\jharris\Desktop\ENVCAD\RETURN-TO\EMERYVILLE, CA\GP09BPNAIC110N000003Q12\DWG\GP09BPNAC110-N01.dwg LAYOUT: 1 SAVED: 10/1/2012 11:40 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: SETUP1 PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 10/1/2012 11:59 AM BY: HARRIS, JESSICA
XREFS: IMAGES: PROJECTNAME: ---
Oa la d West. pg

CITY: PETALUMA, CA DIV/GROUP: ENV DB: J. HARRIS
C:\Users\jharris\Desktop\ENVCAD\RETURN-TO\EMERYVILLE, CA\GP09BPNA\C110\N0000\3Q12\DWG\GP09BPNAC110-B01.dwg LAYOUT: 2 SAVED: 10/1/2012 1:14 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: SETUP1 PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 10/1/2012 1:15 PM BY: HARRIS, JESSICA



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

FORMER ARCO STATION #4931
731 WEST MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

SITE PLAN

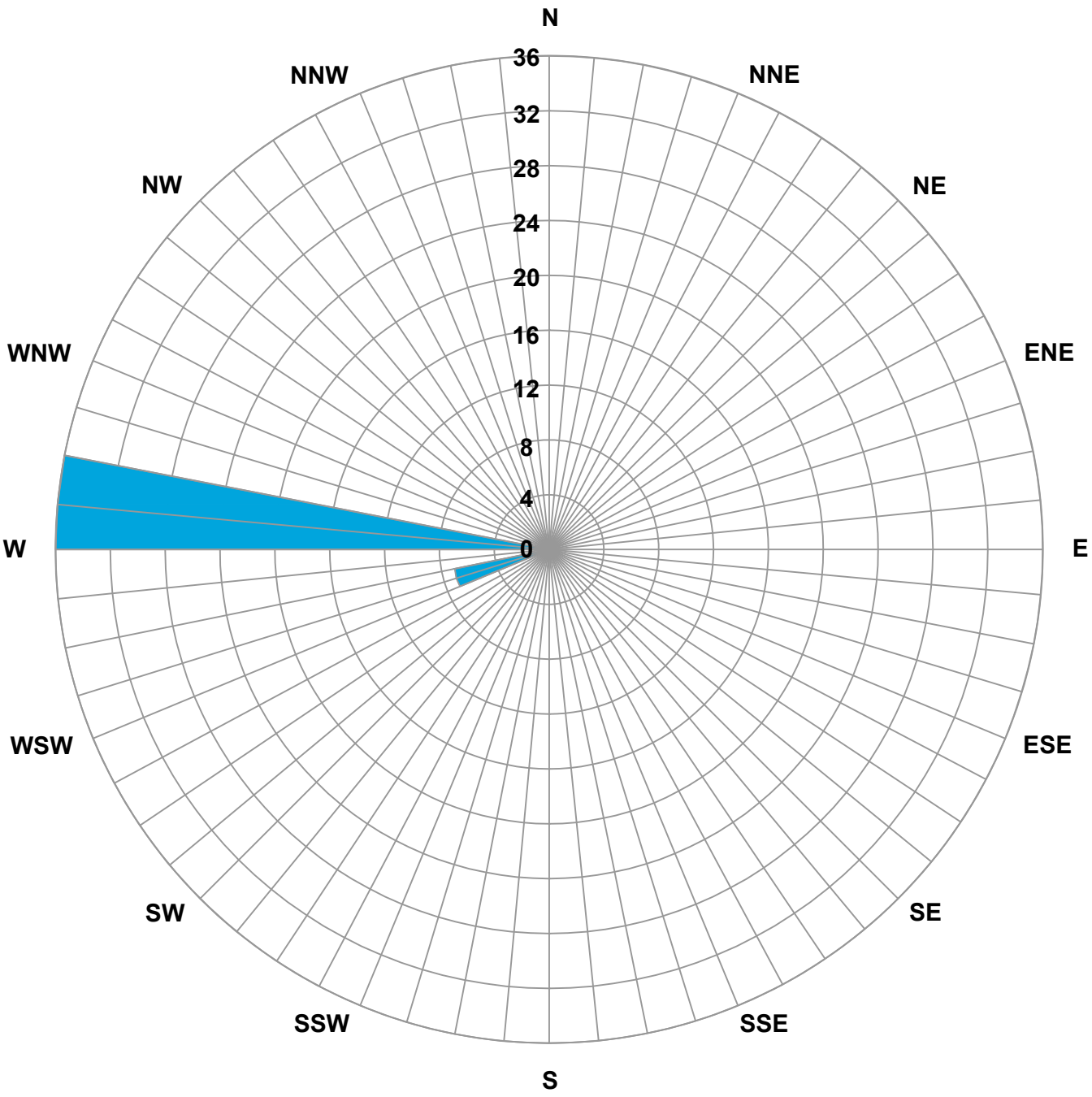
ARCADIS

FIGURE
2

ARCADIS

Appendix B

Groundwater Flow Direction Figures



LEGEND

CONCENTRIC CIRCLES REPRESENT 45 MONITORING EVENTS CONDUCTED BETWEEN THE SECOND QUARTER 2000 THROUGH THE FIRST QUARTER 2013.

GROUNDWATER FLOW DIRECTION

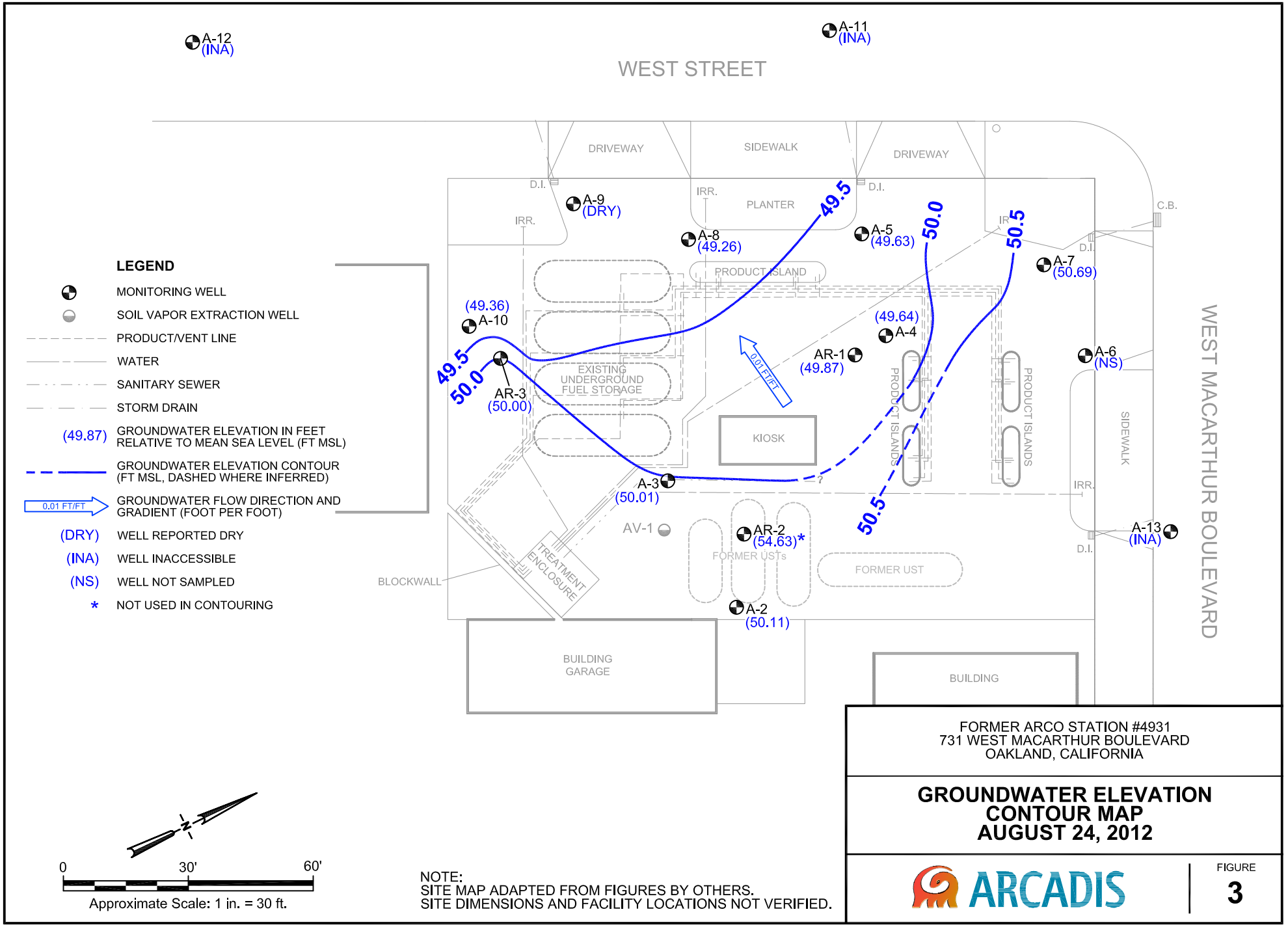
FORMER ARCO STATION No. 4931
731 WEST MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

GROUNDWATER FLOW DIRECTION ROSE DIAGRAM

ARCADIS

FIGURE
5

CITY: PETALUMA, CA DIV/GROUP: ENV DB: J. HARRIS
C:\Users\jharris\Desktop\ENVCAD\RETURN-TO\EMERYVILLE, CA\GP09BPNA\C110\N0000\3Q12\DWG\GP09BPNAC110-W01.dwg LAYOUT: 3 SAVED: 10/8/2012 3:20 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: SETUP1 PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 10/8/2012 3:20 PM BY: HARRIS, JESSICA



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

FORMER ARCO STATION #4931
731 WEST MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

GROUNDWATER ELEVATION CONTOUR MAP AUGUST 24, 2012

ARCADIS

FIGURE 3

LEGEND:

- GROUNDWATER MONITORING WELL
- SOIL BORING
- SOIL VAPOR EXTRACTION WELL
- SOIL VAPOR SAMPLE LOCATION
- SUB-SLAB SOIL VAPOR SAMPLING LOCATION
- (xx.xx) GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
- FF.dd GROUNDWATER ELEVATION CONTOUR LINE (DASHED WHERE INFERRED)
- GROUNDWATER FLOW DIRECTION (FOOT PER FOOT)
- (INA) WELL INACCESSIBLE

0 30 60

SCALE IN FEET

FORMER BP STATION No. 04931
731 WEST MACARTHUR BOULEVARD,
OAKLAND, CALIFORNIA

GROUNDWATER ELEVATION MAP
FEBRUARY 2013

ARCADIS

FIGURE
3

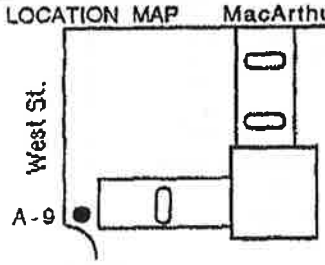
CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: sbell LD: PIC: PM: TM:
PROJECT: PATH: V:\CA\CA04931\GIS\MXD\CA-04931-Fig3_GWE.mxd DATE: 3/7/2013 5:35:50 PM

ARCADIS

Appendix C

Soil Boring Logs

LOCATION MAP MacArthur



PACIFIC ENVIRONMENTAL GROUP, INC.

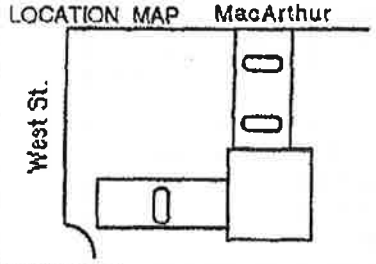
WELL / A-9
BORING NO.
PAGE 1 OF 1

PROJECT NO. 130-12.03
LOGGED BY: MD
DRILLING METHOD: HSA
SAMPLING METHOD: CAL MOD
CASING TYPE: Sch 40 PVC
SLOT SIZE: 0.020
GRAVEL PACK: 12 X 20 SAND

CLIENT: G.R. ARCO
DATE DRILLED: 12-15-87
LOCATION: MacArthur & West
HOLE DIAMETER: 12"
HOLE DEPTH: 45'
WELL DEPTH: 40'
WELL DIAMETER: 6"

WELL COMPLETION	MOISTURE CONTENT	TIP	PENETRATION RESISTANCE (BLOWS/FT)	DEPTH (FEET)	SAMPLE	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
BENTONITE / CONCRETE / 12 X 20 SAND	Dp		P	2–4			CL	ASPHALT & GRAVEL _ FILL. CLAY; tan; silty; 10-15% fine to coarse sand; trace fine gravel; iron oxide stains; trace organics. @3 1/2'; no product odor.
	Mst		8	8–10				@9'; as above; no sand or gravel; gray mottle around rootholes; rootholes moist; stiff; faint product odor.
	Wt		25	12–16			SW	SAND; dark brown-gray; trace to 10% fines; fine to coarse grained; mostly coarse sand; trace fine gravel; angular to sub rounded; medium dense. @14'; no product odor. @19'; as above; medium dense; no product odor.
	Wt		24	18–20				
	Wt		35	22–24				@24'; as above; dense; no product odor.
	Wt		14	26–30			SP/ CL	INTERBEDDED SAND & CLAY; SAND: tan; 10-15% low plasticity fines; very fine grained; iron oxide stains; CLAY: tan; iron oxide stains; silty; trace fine to coarse sand; bedds up to 8" thick. @30'; no product odor.
	Wt		23	32–34			SC-CL	CLAY to CLAYEY SAND; brick red; 50% fine to coarse sand; trace fine gravel; sand and gravel rounded.
	Wt		25	36–40			SC	CLAYEY SAND; medium brown; iron oxide stains; 25-35% low plasticity fines; fine to medium grained; medium dense. @39'; no product odor.
				42–44				BOTTOM OF BORING AT ~45'

LOCATION MAP MacArthur



PACIFIC ENVIRONMENTAL GROUP, INC.

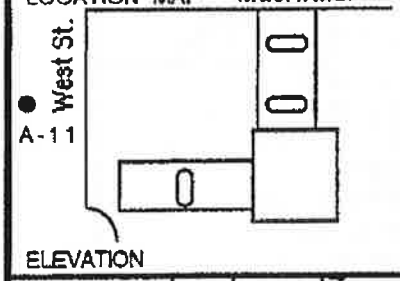
WELL / A-10
BORING NO.
PAGE 1 OF 1

PROJECT NO. 130-12.03
LOGGED BY: MD
DRILLING METHOD: HSA
SAMPLING METHOD: CAL MOD
CASING TYPE: Sch 40 PVC
SLOT SIZE: 0.020
GRAVEL PACK: 12 X 20 SAND

CLIENT: G.R. ARCO
DATE DRILLED: 12-15-87
LOCATION: MacArthur & West
HOLE DIAMETER: 8"
HOLE DEPTH: 30 1/2'
WELL DEPTH: 30'
WELL DIAMETER: 3"

WELL COMPLETION	MOISTURE CONTENT	TIP	PENETRATION RESISTANCE (BLOWS/FT)	DEPTH (FEET)	SAMPLE	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
BENTONITE, CONCRETE, 12 X 20 SAND	Dp		P	2–4			ML	ASPHALT & GRAVEL - FILL. SILT; tan; iron oxide stains; trace clay; 5-15% fine to coarse gravel; trace organics. @3 1/2'; no product odor.
	Dp		7	8–10			CL	CLAY; tan; iron oxide stains; silty; trace fine sand; rootholes. @9'; no product odor.
	Mst		21	12–14				@14'; as above; 20-30% sand; 5-10% fine to coarse gravel; very stiff; no product odor.
	Wt		26	16–20			SW	SAND; medium brown; 10-15% low plasticity fines; fine to coarse grained; well graded; 5-10% fine to medium gravel; angular; medium dense. @19'; no product odor.
	Wt		26	22–24				@24'; as above; predominantely coarse sand; medium dense; no product odor.
	Wt		14	26–30				@29'; as above; no product odor.
				30–32			CL	CLAY; tan; iron oxide stains; 5-15% fine to medium sand; trace coarse sand; trace organics; silty.
				34–44				BOTTOM OF BORING AT 30 1/2'

LOCATION MAP MacArthur



PACIFIC ENVIRONMENTAL GROUP, INC.

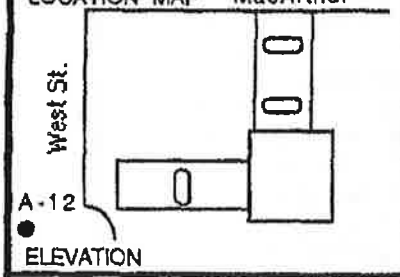
WELL / A-11
BORING NO.
PAGE 1 OF 1

PROJECT NO. 130-12.03
LOGGED BY: MD
DRILLING METHOD: HSA
SAMPLING METHOD: CAL MOD
CASING TYPE: Sch 40 PVC
SLOT SIZE: 0.020
GRAVEL PACK: 12 X 20 SAND

CLIENT: G.R. ARCO
DATE DRILLED: 12-16-87
LOCATION: MacArthur & West
HOLE DIAMETER: 8"
HOLE DEPTH: 30 1/2'
WELL DEPTH: 30'
WELL DIAMETER: 3"

WELL COMPLETION	MOISTURE CONTENT	TIP	PENETRATION RESISTANCE (BLOWS/FT)	DEPTH (FEET)	SAMPLE	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
				2			CL	ASPHALT & GRAVEL - FILL. CLAY; tan-orange; iron oxide stains; silty; trace fine sand; rootholes; gray mottle at rootholes; trace organics.
CONCRETE	Dp		P	4				@3 1/2'; no product odor.
BENTONITE				6				
				8				
	Mst		10	10				@9'; as above; water in rootholes; stiff; no product odor.
				12				
	Wt		28	14				@14'; as above; medium brown; 5-10% fine to coarse sand; trace fine gravel; water in rootholes; very stiff; no product odor.
				16				
				18				
12 X 20 SAND	Wt		41	20			SW	SAND; dark reddish brown; 5% low plasticity fines; fine to coarse grined; 5% fine to medium gravel; angular to sub rounded; dense. @19'; no product odor.
				22				
	Wt		51	24				@24'; as above; very dense; no product odor.
				26				
				28			SP/ CL	INTERBEDDED CLAY & SAND; CLAY: tan; iron oxide stains; silty; trace fine sand; low plasticity; SAND: tan; iron oxide stains; 10-15% low plasticity fines; very fine grained; bedds ~ 4-6" thick in sample tube.
	Wt		15	30				@29'; no product odor.
				32				
				34				
				36				BOTTOM OF BORING AT 30 1/2'
				38				
				40				
				42				
				44				

LOCATION MAP MacArthur



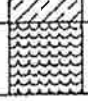
PACIFIC ENVIRONMENTAL GROUP, INC.

WELL / A-12
BORING NO.
PAGE 1 OF 1

PROJECT NO. 130-12.03
LOGGED BY: MD
DRILLING METHOD: HSA
SAMPLING METHOD: CAL MOD
CASING TYPE: Sch 40 PVC
SLOT SIZE: 0.020
GRAVEL PACK: 12 X 20 SAND

CLIENT: G.R. ARCO
DATE DRILLED: 12-16-87
LOCATION: MacArthur & West
HOLE DIAMETER: 8"
HOLE DEPTH: 30 1/2'
WELL DEPTH: 30'
WELL DIAMETER: 3"

WELL COMPLETION	MOISTURE CONTENT	TIP	PENETRATION RESISTANCE (BLOWS/FT)	DEPTH (FEET)	SAMPLE	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
BENTONITE / CONCRETE / 12 X 20 SAND								ASPHALT.
	Dp		P	2–4			CL	CLAY; tan; silty; 10-15% fine sand; trace organics; roots; rootholes; rootholes dry. @3 1/2'; no product odor.
	Mst		14	8–10				@9'; as above; trace sand; no organics; rootholes mottled gray; rootholes wet; stiff; no product odor.
	Wt		15	12–14			SW	SAND; medium brown; 10-15% low plasticity fines; fine to coarse grained; trace fine gravel; angular to sub rounded; well graded; medium dense. @14'; no product odor.
	Wt		28	18–20				@19'; as above; thin interbedds of medium grained sand; medium dense; no product odor.
	Wt		16	22–24				
				26			CL	CLAY; tan; iron oxide stains; trace fine sand; silty; very stiff; no product odor.
	Wt		24	28–30			SW	SAND; as above; some 2" clay interbedds; medium dense. @29'; no product odor.
				32–44				BOTTOM OF BORING AT 30 1/2'

MAJOR DIVISIONS					TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 15% FINES	GM		SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC		CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 15% FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
			OL		ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC SILTS OR CLAYS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT		PEAT AND OTHER HIGHLY ORGANIC SOILS

LL	- Liquid Limit (%)
PI	- Plastic Index (%)
PID	- Volatile Vapors in ppm
MA	- Particle Size Analysis
2.5 YR 6/2	- Soil Color according to Munsell Soil Color Charts (1975 Edition)
5 GY 5/2	- GSA Rock Color Chart

☒	- No Soil Sample Recovered
■	- "Undisturbed" Sample
⊠	- Bulk or Classification Sample
▽	- First Encountered Ground Water Level
▼	- *Piezometric Ground Water Level*
Penetration	- Sample drive hammer weight - 140 pounds falling 30 inches. Blows required to drive sampler 1 foot are indicated on the logs

GeoStrategies Inc.

Unified Soil Classification - ASTM D 2488-85 and Key to Test Data

Field location of boring: (See Plate 2)	Project No.: 790909	Date: 1/17/92	Boring No.: AV-1
	Client: ARCO Service Station No. 4931		
	Location: 731 W. MacArthur		
	City: Oakland, California		Sheet 1 of 1
	Logged by: R.S.Y.	Driller: W. Hazmat	
Drilling method: Hollow Stem Auger	Casing installation data:		
Hole diameter: 8-inches	Top of Box Elevation:	Datum:	

	Water Level			
	Time			
	Date			

PID (ppm)	Blows/ft.* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				1				PAVEMENT SECTION - 1 ft.
				2				
				3				SANDY CLAY (CL) - yellowish brown (10YR 5/3), medium stiff, moist; 35%-40% medium to coarse sand; trace angular gravel; medium plasticity.
				4				
				5				
			AV-1-	6				CLAYEY SAND (SC) - dark yellow brown (10YR 4/3), very dense, moist; 70% medium to coarse sand; 20% clay; 10% angular fine gravel.
0	64	S&H	6.5	7				
				8				
				9				
				10				CLAYEY GRAVEL with SAND (GC) - dark yellow brown (10YR 4/3), medium dense, moist; 60% fine to coarse subround gravel; 25% clay; 15% sand.
			AV-1-	11				
0	26	S&H	11	12				
				13				CLAYEY SAND (SC) - dark yellow brown (10YR 4/6), medium dense, moist, voids with moisture; 60% medium to coarse sand; 30% clay; 10% fine gravel.
				14				
				15				
			AV-1-	16				
0	17	S&H	16	17				Bottom of Boring at 16 ft. 1/17/92
				18				
				19				
				20				

Remarks:

*Converted to equivalent Standard Penetration blows/ft.

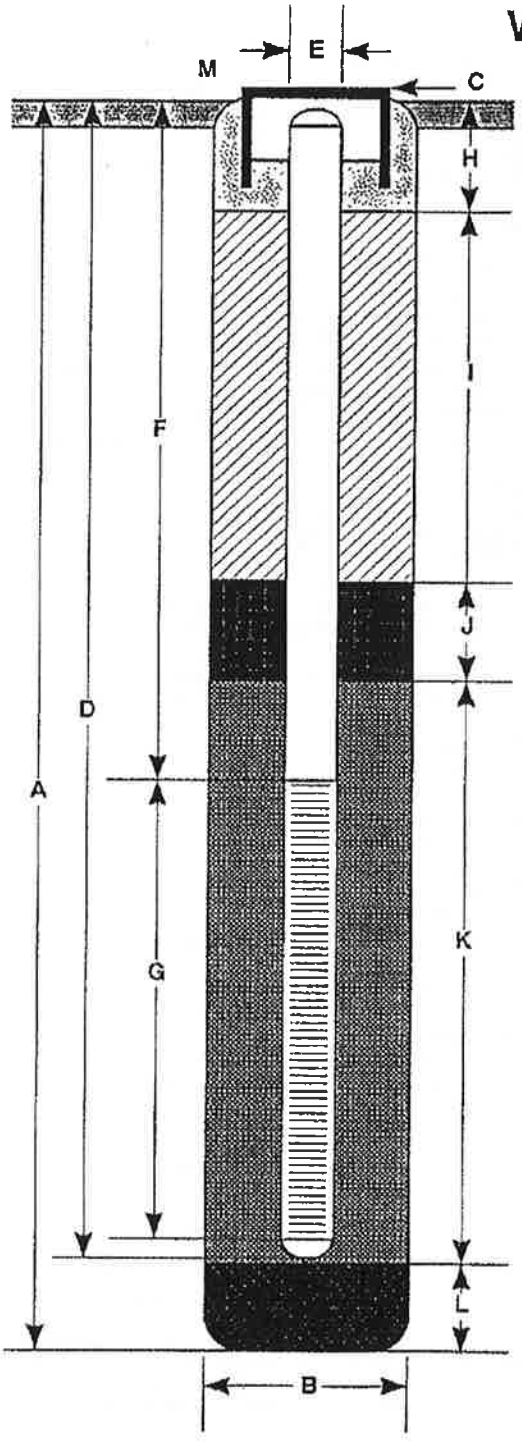
GSI GeoStrategies Inc.

Log of Boring

BORING NO. AV-1

JOB NUMBER	REVIEWED BY/RG/CEG	DATE	REVISED DATE	REVISED DATE
790909		1/92		

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 16.0 ft.

B Diameter of Boring 8 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation N/A ft.
☐ Referenced to Mean Sea Level
☐ Referenced to Project Datum

D Casing Length 15 ft.
Material Schedule 40 PVC

E Casing Diameter 2 in.

F Depth to Top Perforations 5 ft.

G Perforated Length 10 ft.
Perforated Interval from 5 to 15 ft.
Perforation Type Factory slot
Perforation Size 0.020 in.

H Surface Seal from 0.0 to 1.5 ft.
Seal Material Concrete grout

I Backfill from 1.5 to 3.5 ft.
Backfill Material Cement grout

J Seal from 3.5 to 4.5 ft.
Seal Material Bentonite powder

K Gravel Pack from 4.5 to 15 ft.
Pack Material Lonestar #2/12 sand

L Bottom Seal 1.0 ft.
Seal Material Native

M Traffic-rated box with locking well cap and lock.

Note: Depths measured from initial ground surface.

GSI GeoStrategies Inc.

Well Construction Detail

WELL NO.
AV-1

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
790909		1/92		

MAJOR DIVISIONS					TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 15% FINES	GM		SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC		CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 15% FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS
			OL		ORGANIC SILTS OR CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC SILTS OR CLAYS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT		PEAT AND OTHER HIGHLY ORGANIC SOILS

LL - Liquid Limit (%)

PI - Plastic Index (%)

PID - Volatile Vapors in ppm

MA - Particle Size Analysis

2.5 YR 6/2 - Soil Color according to Munsell Soil Color Charts (1975 Edition)

5 GY 5/2 - GSA Rock Color Chart

 - No Soil Sample Recovered

 - "Undisturbed" Sample

 - Bulk or Classification Sample

 - First Encountered Ground Water Level

 - Piezometric Ground Water Level

Penetration - Sample drive hammer weight - 140 pounds falling 30 inches. Blows required to drive sampler 1 foot are indicated on the logs

GeoStrategies Inc.

Unified Soil Classification - ASTM D 2488-85 and Key to Test Data

Field location of boring:

(See Plate 2)

Project No.:	790908	Date: 6/15/92	Boring No: AR-1
Client:	ARCO Products Company SS#4931		
Location:	731 W. MacArthur Boulevard		
City:	Oakland, California		Sheet 1 of 2
Logged by:	RCM	Driller: W. Hazmat	

Casing installation data:

Drilling method: Hollow Stem Auger

Hole diameter: 12- Inches

Top of Box Elevation: 54.72' Datum: MSL

Water Level	13.5'	11.3'	
Time	11:02	16:25	
Date	6/15/92	6/15/92	

PID (ppm)	Blows/ft.* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				1				PAVEMENT SECTION - 1.0 ft.
				2				CLAY (CL) - greenish grey (5 GY 5/1); medium stiff; damp; 90% clay; 5% silt; 5% fine sand.
				3				
	300	S&H		4				SILT (ML) - light olive brown (2.5 Y 5/6); medium stiff; damp; 90% silt; 10% clay.
	300		AR-1					
1178	300		5.0	5				
				6				
				7				
				8				
		S&H		9				Increase fine gravel to 5%; stiff; moist; greenish grey (5 BG 5/1) discoloration at 8.5 ft.
			AR-1					
62	12		10.0	10				
				11				
				12				
				13				
		S&H		14				Very stiff; saturated at 13.5 ft.
			AR-1					
18	18		15.0	15				
				16				
				17				
				18				GRAVEL with SAND (GW) - olive (5 Y 5/3); medium dense; saturated; 55% angular, fine to medium gravel; 40% subangular, fine to coarse sand; 5% fines.
		S&H		19				SILT (ML) - dark yellowish brown (10 YR 5/6); very stiff; saturated; 90% silt; 5% fine sand; 5% clay.
			AR-1					
837	26		20.0	20				

Remarks:

* Converted to equivalent standard penetration blows/ft.

GSI GeoStrategies Inc.

Log of Boring

BORING NO. AR-1

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
790908				

Field location of boring: (See Plate 2)	Project No.: 790908	Date: 6/15/92	Boring No.: AR-1
	Client: ARCO Products Company SS#4931		
	Location: 731 W. MacArthur Boulevard		
	City: Oakland, California		Sheet 2 of 2
	Logged by: RCM	Driller: W. Hazmat	
Drilling method: Hollow Stem Auger	Casing installation data:		
Hole diameter: 12- Inches	Top of Box Elevation: 54.72'		Datum: MSL

	Water Level			
	Time			
	Date			

PID (ppm)	Blows/ft.* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				21				
				22				
				23				
		S&H		24				GRAVEL with SILT and SAND (GW-GM) - dark yellowish
			AR-1					brown (10 YR 4/6); medium dense; saturated; 60%
400	25		25.0	25				subangular to subrounded, fine to coarse
				26				gravel; 30% fine to coarse sand; 10% silt.
				27				
				28				
		S&H		29				SAND with CLAY (SW-SC) - pale olive (5 Y 6/3); dense;
			AR-1					saturated; 90% fine to coarse sand; 10% clay.
4.5	34		30.0	30				CLAYEY SAND (SC) - pale olive (5 Y 6/3); dense;
				31				saturated; 75% fine sand; 25% clay.
				32				
				33				Bottom of boring at 30.0 ft.
				34				6/15/92.
				35				
				36				
				37				
				38				
				39				
				40				

Remarks:

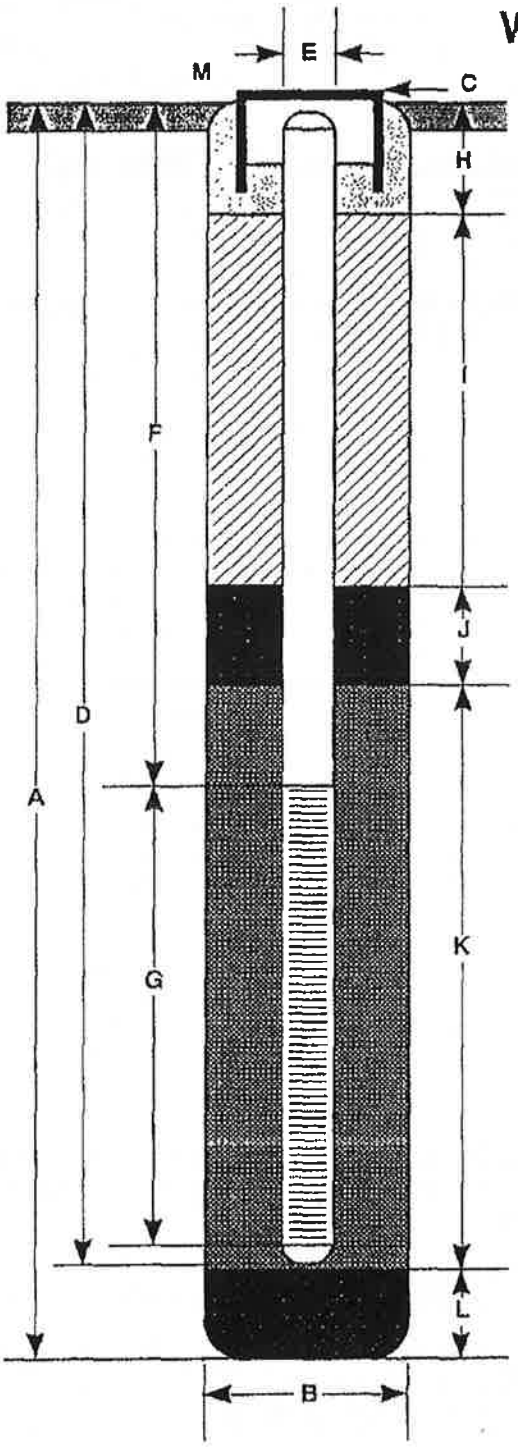
GeoStrategies Inc.

Log of Boring

BORING NO. AR-1

JOB NUMBER	REVIEWED BY BG/CEG	DATE	REVISED DATE	REVISED DATE
790908		6/92		

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 30.0 ft.

B Diameter of Boring 12 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation 54.72 ft.
[X] Referenced to Mean Sea Level
[ ] Referenced to Project Datum

D Casing Length 30 ft.
Material Schedule 40 PVC

E Casing Diameter 6 in.

F Depth to Top Perforations 10.0 ft.

G Perforated Length 20.0 ft.
Perforated Interval from 10.0 to 30.0 ft.
Perforation Type Continuous Wrap
Perforation Size 0.020 in.

H Surface Seal from 0 to 1.0 ft.
Seal Material Concrete

I Backfill from 1.0 to 7.0 ft.
Backfill Material Neat Cement

J Seal from 7.0 to 8.0 ft.
Seal Material Bentonite

K Gravel Pack from 8.0 to 30.0 ft.
Pack Material Lonestar #2/12 Graded Sand

L Bottom Seal ft.
Seal Material

M Underground vault box with waterproof locking cap and lock

Note: Depths measured from initial ground surface.

GeoStrategies Inc.

Well Construction Detail

WELL NO.
AR-1

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
790908		6/92		

Field location of boring:

(See Plate 2)

Project No.:	790908	Date: 6/15/92	Boring No: AR-2
Client:	ARCO Products Company SS#4931		
Location:	731 W. MacArthur Boulevard		
City:	Oakland, California		Sheet 1 of 2
Logged by: RCM	Driller: W. Hazmat		

Casing installation data:

Drilling method: Hollow Stem Auger

Hole diameter: 12- Inches

Top of Box Elevation: 54.77' Datum: MSL

Water Level	14.5'	6.8'
Time	13:07	16:40
Date	6/15/92	6/16/92

PID (ppm)	Blows/ft.* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				1				GRAVEL (GP) - greenish gray (5 Y 5/1); loose; damp; 100% fine gravel (Fill).
				2				
				3				
				4				
				5				
				6				
				7		▼		
				8				
				9				
				10				
				11				
				12				
				13				
				14				
		S&H		15		▽		
			AR-2					CLAYEY SILT (ML/CL) - dark yellowish brown (10 YR 4/1); stiff; saturated; 60% silt; 30% clay; 10% very fine sand.
49	14		16.0	16				
				17				
				18				Increase fine gravel to 15%; iron oxide staining at 18.5 ft.
		S&H		19				SAND with CLAY (SW-SC) - dark yellowish brown (10 YR 4/4); medium dense; saturated; 70% fine to medium sand; 20% fine subrounded gravel; 10% clay.
			AR-2					
11	21		20.0	20				

Remarks:

* Converted to equivalent standard penetration blows/ft.

GeoStrategies Inc.

Log of Boring

BORING NO

AR-2

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
790908	JA	6/92		

Field location of boring: (See Plate 2)	Project No.: 790908	Date: 6/15/92	Boring No: AR-2
	Client: ARCO Products Company SS#4931		
	Location: 731 W. MacArthur Boulevard		
	City: Oakland, California		Sheet 2 of 2
	Logged by: RCM	Driller: W. Hazmat	
Drilling method: Hollow Stem Auger	Casing installation data:		
Hole diameter: 12- Inches	Top of Box Elevation: 54.77'		Datum: MSL

								Water Level				
								Time				
								Date				
PID (ppm)	Blows/ft.* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description				
				21								
				22								
				23								
		S&H		24				SAND (SP) - brown (10 YR 4/3); very dense; saturated;				
			AR-2					95% fine sand; 5% fines.				
4	58		25.0	25				GRAVEL with SAND (GW) - dark yellowish brown (10 YR				
								4/4); very dense; saturated; 60% subangular to				
				26				subrounded, fine to medium gravel; 35% fine to coarse				
				27				sand; 5% fines.				
				28				SAND with CLAY (SW-SC) - yellowish brown (10 YR 5/4);				
		S&H		29				medium dense; saturated; 75% fine to medium sand;				
			AR-2					15% fine gravel; 10% clay.				
1	23		30.0	30				SANDY CLAY (CL) - pale olive (5 Y 6/3); very stiff; moist;				
				31				60% clay; 35% fine sand; 5% fine gravel.				
				32								
				33				Bottom of boring at 30.0 ft.				
				34				6/15/92.				
				35								
				36								
				37								
				38								
				39								
				40								

Remarks:

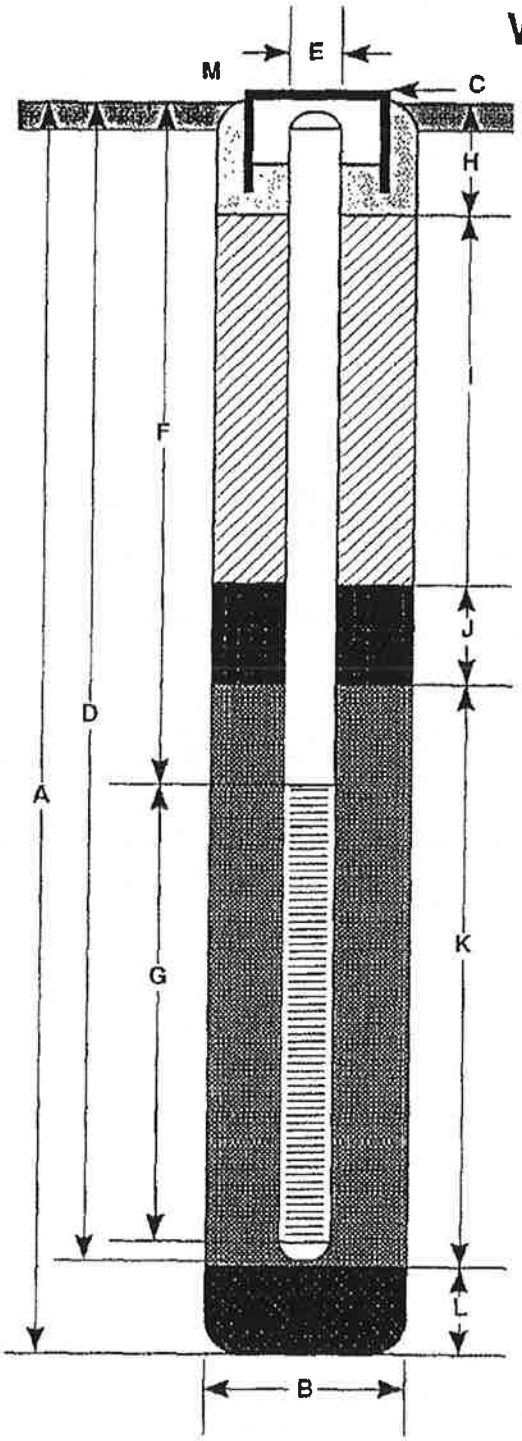
GSI GeoStrategies Inc.

Log of Boring

BORING NO AR-2

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
790908	JTV	6/92		

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 30.0 ft.

B Diameter of Boring 12 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation 54.77 ft.
[x] Referenced to Mean Sea Level
[ ] Referenced to Project Datum

D Casing Length 28.0 ft.
Material Sch. 40 PVC & Carbon Steel

E Casing Diameter 6 in.

F Depth to Top Perforations 10.0 ft.

G Perforated Length 20.0 ft.
Perforated Interval from 8.0 to 28.0 ft.
Perforation Type Continuous Wrap
Perforation Size 0.020 in.

H Surface Seal from 0 to 1.0 ft.
Seal Material Concrete

I Backfill from 1.0 to 5.0 ft.
Backfill Material Neat Cement

J Seal from 5.0 to 6.0 ft.
Seal Material Bentonite

K Gravel Pack from 6.0 to 28.0 ft.
Pack Material Lonestar #2/12 Graded Sand

L Bottom Seal 2.0 ft.
Seal Material Native Material

M Underground vault box with waterproof locking cap and lock.

Note: Depths measured from initial ground surface.

GeoStrategies Inc.

Well Construction Detail

WELL NO. AR-2

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
790908		6/92		

Field location of boring: (See Plate 2)	Project No.: 790908	Date: 6/16/92	Boring No.: AR-3
	Client: ARCO Products Company SS#4931		
	Location: 731 W. MacArthur Boulevard		
	City: Oakland, California		Sheet 1 of 2
	Logged by: RCM	Driller: W. Hazmat	
	Casing installation data:		
Drilling method: Hollow Stem Auger			
Hole diameter: 10 - Inches	Top of Box Elevation: 54.19'		Datum: MSL

Water Level	13.5'	10.5'	
Time	13:55	16:50	
Date	6/16/92	6/16/92	

PID (ppm)	Blows/ft. or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				1				PAVEMENT SECTION - 1.0 ft.
				2				CLAY (CL) - very dark gray (10 YR 3/1); stiff; damp; 80% clay; 20% fine sand.
				3				
		S&H		4				COLOR CHANGE to light olive brown (2.5 Y 5/4) at 3.5 feet.
			AR-3					
3	32		5.0	5				CLAYEY SAND (SC) - yellowish brown (10 YR 5/6); dense; moist; 60% fine to medium sand; 30% clay; 10% fine gravel; iron oxide stains.
				6				
				7				
				8				
		S&H		9				No sample recovery at 8.5 feet; gravel stuck in shoe of sampler.
	28			10				
				11		▼		
				12				
				13				
		S&H		14		▽		Saturated; dense at 13.5 ft.
			AR-3					
0	37		15.0	15				
				16				
				17				
				18				
		S&H		19				CLAYEY GRAVEL (GC) - dark yellowish brown (10 YR 4/6); dense; saturated; 60% fine to medium gravel; 20% fien to coarse sand; 20% clay.
			AR-3					
0	32		20.0	20				

Remarks:

* Converted to equivalent standard penetration blows/ft.

GeoStrategies Inc.

Log of Boring

BORING NO. AR-3

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
790908	JPV	6/92		

Field location of boring: (See Plate 2)	Project No.: 790908	Date: 6/16/92	Boring No.: AR-3
	Client: ARCO Products Company SS#4931		
	Location: 731 W. MacArthur Boulevard		
	City: Oakland, California		Sheet 2 of 2
	Logged by: RCM	Driller: W. Hazmat	
Drilling method: Hollow Stem Auger	Casing installation data:		
Hole diameter: 10- Inches	Top of Box Elevation: 54.19'		Datum: MSL

	Water Level			
	Time			
	Date			

PID (ppm)	Blows/ft. or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				21				
				22				
				23				
		S&H		24				SAND with CLAY (SW-SC) - brown (10 YR 4/3); very dense; saturated; 70% fine to coarse sand; 20% gravel; 10% clay.
			AR-3					
3	80		25.0	25				GRAVEL with CLAY (GW-GC) - brown (10YR 4/3) very dense; saturated; 60% fine to coarse, subangular to subrounded gravel; 30% medium to coarse sand; 10% clay.
				26				
				27				Softer drilling at 26.0 ft.
				28				
		S&H		29				CLAY with SAND (CL) - reddish brown (5 YR 4/3); hard; moist; 70% clay; 30% fine to coarse sand.
			AR-3					
0	35		30.0	30				
				31				
				32				Bottom of boring at 30.0 ft. 6/16/92.
				33				
				34				
				35				
				36				
				37				
				38				
				39				
				40				

Remarks:

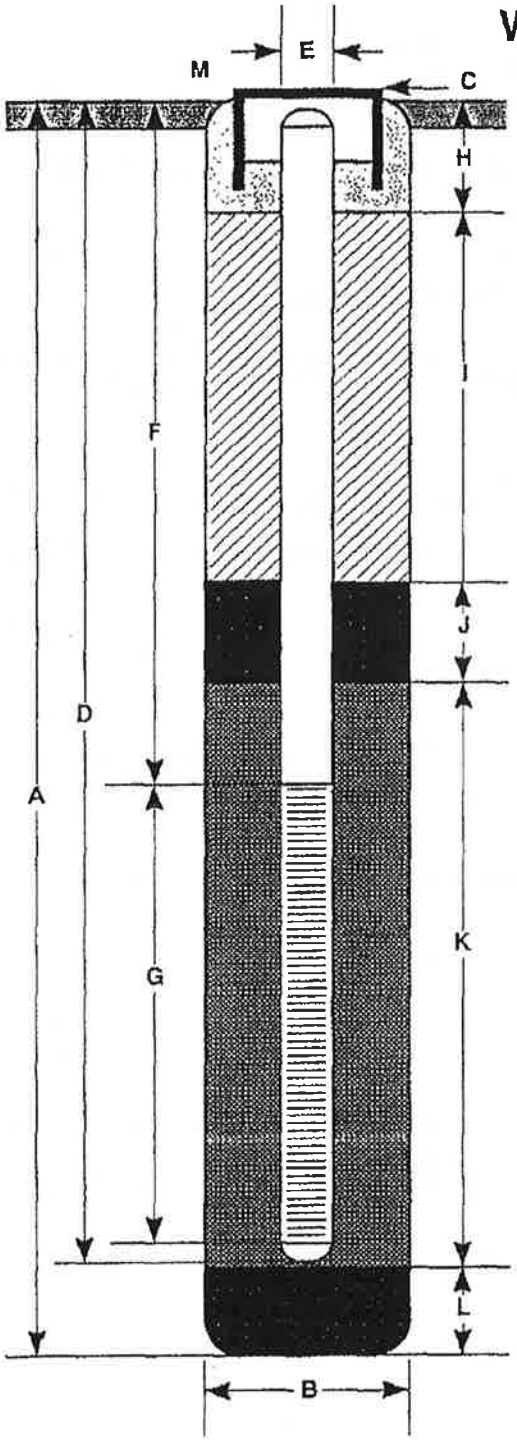
GeoStrategies Inc.

Log of Boring

BORING NO. AR-3

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
790908		6/92		

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 30.0 ft.

B Diameter of Boring 10 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation 54.19 ft.
[X] Referenced to Mean Sea Level
[ ] Referenced to Project Datum

D Casing Length 30.0 ft.
Material Sch. 40 PVC & Carbon Steel

E Casing Diameter 4 in.

F Depth to Top Perforations 10.0 ft.

G Perforated Length 20.0 ft.
Perforated Interval from 10.0 to 30.0 ft.
Perforation Type Continuous Wrap
Perforation Size 0.020 in.

H Surface Seal from 0 to 1.0 ft.
Seal Material Concrete

I Backfill from 1.0 to 7.0 ft.
Backfill Material Neat Cement

J Seal from 7.0 to 8.0 ft.
Seal Material Bentonite

K Gravel Pack from 8.0 to 30.0 ft.
Pack Material Lonestar #2/12 Graded Sand

L Bottom Seal ft.
Seal Material

M Underground vault box with waterproof locking cap and lock

Note: Depths measured from initial ground surface.

GeoStrategies Inc.

Well Construction Detail

WELL NO.
AR-3

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
790908	JPV	6/92		

Field location of boring:

(See Plate 2)

Project No.: 790908	Date: 6/15/92	Boring No: A-13	
Client: ARCO Products Company SS#4931			
Location: 731 W. MacArthur Boulevard			
City: Oakland, California		Sheet 1 of 2	
Logged by: RCM	Driller: W. Hazmat		

Drilling method: Hollow Stem Auger

Hole diameter: 10- inches

Casing installation data:

Top of Box Elevation: 55.11' Datum: MSL

Water Level	14.5'	10.2'		
Time	10:32	17:25		
Date	6/16/92	6/16/92		

PID (ppm)	Blows/ft.* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				1				PAVEMENT SECTION - 1.0 ft.
				2				CLAY (CL) - light olive brown (2.5 Y 5/4); medium stiff; damp; 80% clay; 10% silt; 10% fine sand.
				3				
	300	S&H	A-13	4				Increase fine to coarse sand to 25%; moist at 4.0 ft.
0	300	(push)	4.5	5				COLOR CHANGE to yellowish brown (10 YR 5/6) at 4.5 ft.
	380			6				
				7				
				8				
	250	S&H		9				Gray (5 Y 6/1) discoloration in small voids at 8.5 ft.
	300	(push)	A-13	10		▼		
0	350		10.0	11				
				12				
				13				
		S&H		14				
			A-13	15		▽		CLAYEY SAND (SC) - dark yellowish brown (10 YR 4/4); medium dense; saturated; 60% medium to coarse, subrounded sand; 35% clay; 5% fine gravel.
1	19		15.0	16				
				17				
				18				
		S&H	A-13	19				Increase sand to 75% at 18.5 ft.
3			19.5	20				
	42							

Remarks:

* Converted to equivalent standard penetration blows/ft.

GSI GeoStrategies Inc.

Log of Boring

BORING NO. A-13

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
790908		6/92		

Field location of boring:

(See Plate 2)

Project No.: 790908	Date: 6/15/92	Boring No: A-13	
Client: ARCO Products Company SS#4931			
Location: 731 W. MacArthur Boulevard			
City: Oakland, California		Sheet 2 of 2	
Logged by: RCM	Driller: W. Hazmat		

Casing installation data:

Drilling method: Hollow Stem Auger

Hole diameter: 10- Inches

Top of Box Elevation: 55.11' Datum: MSL

Water Level				
Time				
Date				

PID (ppm)	Blows/ft.* or Pressure (psi)	Type of Sample	Sample Number	Depth (ft.)	Sample	Well Detail	Soil Group Symbol (USCS)	Description
				21				
				22				
				23				
		S&H		24				SAND with CLAY (SW-SC) - dark yellowish brown (10 YR 4/4); dense; saturated; 80% fine to coarse sand; 10% clay; 10% fine gravel.
			A-13					
0	33		25.0	25				
				26				
				27				
				28				
		S&H		29				
			A-13					SANDY CLAY (CL) - pale olive (5 Y 6/3); very stiff; moist; 60% clay; 40% fine sand.
0	30		30.0	30				
				31				
				32				Bottom of boring at 30.0 ft. 6/16/92.
				33				
				34				
				35				
				36				
				37				
				38				
				39				
				40				

Remarks:

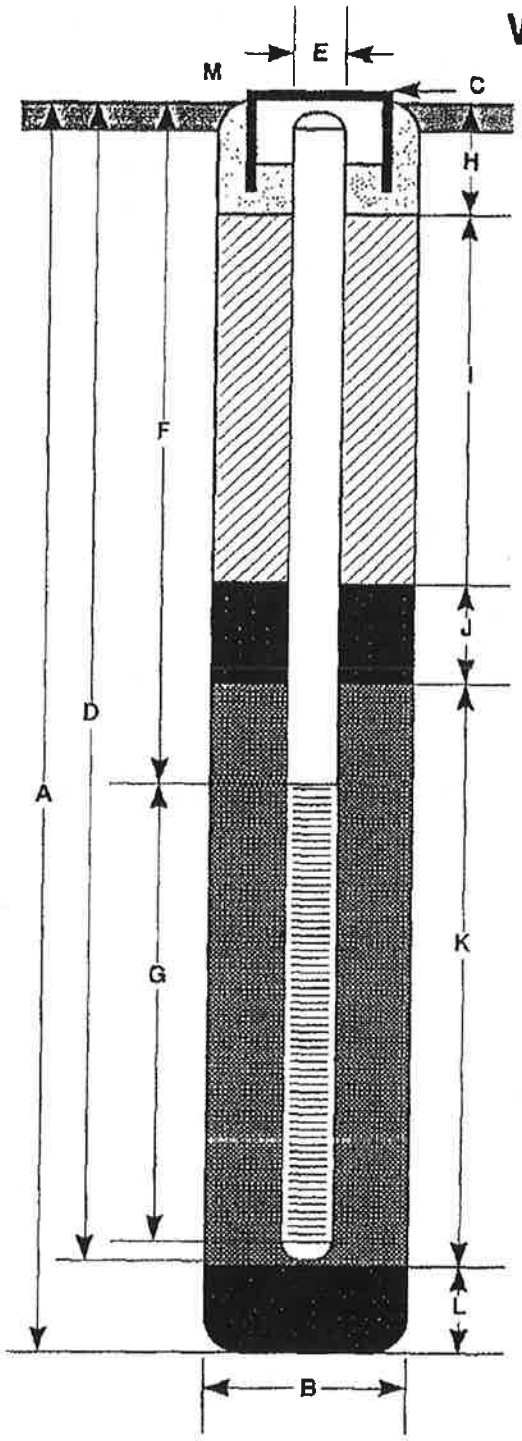
GeoStrategies Inc.

Log of Boring

BORING NO. A-13

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
790908	JPV	6/92		

WELL CONSTRUCTION DETAIL



A Total Depth of Boring 30.0 ft.

B Diameter of Boring 10 in.
Drilling Method Hollow Stem Auger

C Top of Box Elevation 55.11 ft.
[X] Referenced to Mean Sea Level
[ ] Referenced to Project Datum

D Casing Length 30.0 ft.
Material Schedule 40 PVC

E Casing Diameter 3 in.

F Depth to Top Perforations 10.0 ft.

G Perforated Length 20.0 ft.
Perforated Interval from 10.0 to 30.0 ft.
Perforation Type Factory Slotted
Perforation Size 0.020 in.

H Surface Seal from 0 to 1.0 ft.
Seal Material Concrete

I Backfill from 1.0 to 7.0 ft.
Backfill Material Neat Cement

J Seal from 7.0 to 8.0 ft.
Seal Material Bentonite

K Gravel Pack from 8.0 to 30.0 ft.
Pack Material Lonestar #2/12 Graded Sand

L Bottom Seal ft.
Seal Material

M Traffic rated vault box with waterproof locking cap and lock

Note: Depths measured from initial ground surface.

GeoStrategies Inc.

Well Construction Detail

WELL NO.
A-13

JOB NUMBER	REVIEWED BY PG/CEG	DATE	REVISED DATE	REVISED DATE
790908	JPV	6/92		

Date Start/Finish: 10/19/2010
Drilling Company: WDC Exploration & Wells
Driller's Name: WDC Exploration & Wells
Drilling Method: Hand Auger / Direct Push
Bit Size: NA
Auger Size: NA
Rig Type: Geoprobe
Sampling Method:
Acetate Sleeve

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 35 ft
Surface Elevation: NA

Description By: R. Moniz
Reviewed By: Hollis Phillips, PG

Well/Boring ID: SB-1A

Client: British Petroleum

Location: Former ARCO Station #4931
731 West MacArthur Boulevard
Oakland, California

DEPTH	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0								Asphalt	
								FILL	
					1			(GLEY2 6/5B) CLAY (CL), plastic, firm, moist	
		HA			3	X			
5								SAA, bluish gray (GLEY2 6/5B) and brown (10YR 5/3), trace granules, plastic, hard, moist	
	1	DP	5		2				
					41				
					41				
					16	X			
10					7				
					4			2" angular pebble lense	
	2	DP	5		1.6			SAA, 10% bluish gray (GLEY2 6/5B) and 90% strong brown (7.5YR 5/6)	
					41	X			
					11				
15					4				
					13				
	3	DP	5		7				
					31	X			
20								GRAVELLY CLAY (GC) medium pebble, angular, hard, moist	

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Infrastructure, environment, buildings

Remarks: bgs = below ground surface; DP = direct push; ft = feet; HA = hand auger; in = inch; NA = not applicable; PG = professional geologist; PID = photoionization detector; ppm = parts per million; SAA = same as above

Hand auger boring to 5 ft bgs; direct push from 5 ft to 35 ft bgs.

Analtyical samples were collected at 5, 10, 14, 20, 25, 30, and 35 feet.

Date Start/Finish: 10/19/2010
Drilling Company: WDC Exploration & Wells
Driller's Name: WDC Exploration & Wells
Drilling Method: Hand Auger / Direct Push
Bit Size: NA
Auger Size: NA
Rig Type: Geoprobe
Sampling Method: Acetate Sleeve

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 35 ft
Surface Elevation: NA

Description By: R. Moniz
Reviewed By: Hollis Phillips, PG

Well/Boring ID: SB-1A

Client: British Petroleum

Location: Former ARCO Station #4931
731 West MacArthur Boulevard
Oakland, California

DEPTH	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
20					806				
					2,550				
					250			Medium- to coarse-grained SAND (SP), trace silt, trace gravels, loose, wet	
	4	DP	5		180				
					450				
25					400			Gravelly sand with clay, firm, wet	
					5				
					4			CLAY (CL), brown (10YR 5/3), trace sand and gravel, firm, wet	
	5	DP	5		16			CLAYEY SAND (SC), black (N3), trace gravel	
					3				
30					7			SILT (ML), pale yellow (2.5Y 7/3) trace sand and clay, very fine-grained, low plasticity, firm, moist	
					6			Possible slough	
								CLAY (CL), pale yellow (2.5Y 7/3), trace granules, plastic, moist	
	6	DP	5		1				
					4				
35					6			End of boring at 35 ft bgs.	
40									

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; DP = direct push; ft = feet; HA = hand auger; in = inch; NA = not applicable; PG = professional geologist; PID = photoionization detector; ppm = parts per million; SAA = same as above

Hand auger boring to 5 ft bgs; direct push from 5 ft to 35 ft bgs.

Analtyical samples were collected at 5, 10, 14, 20, 25, 30, and 35 feet.

Date Start/Finish: 10/19/2010
Drilling Company: WDC Exploration & Wells
Driller's Name: WDC Exploration & Wells
Drilling Method: Hand Auger / Direct Push
Bit Size: NA
Auger Size: NA
Rig Type: Geoprobe
Sampling Method: Acetate Sleeve

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 25 ft
Surface Elevation: NA

Description By: R. Moniz
Reviewed By: Hollis Phillips, PG

Well/Boring ID: SB-2

Client: British Petroleum

Location: Former ARCO Station #4931
731 West MacArthur Boulevard
Oakland, California

DEPTH	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0								Asphalt	
								FILL	
								CLAY (CL), bluish gray (GLEY2 6/5B) and yellowish brown (10YR 5/4) trace granules, hard, moist	
		HA							
5								CLAY (CL), 40% bluish gray (GLEY2 6/5B) and 60% yellowish brown (10YR 5/4) trace granules, hard, moist	
	1	DP	5		2 14 26 42				
								SAA, 20% bluish gray (GLEY2 6/5B) and 80% yellowish brown (10YR 5/4)	
10					53				
								SAA, 20% bluish gray (GLEY2 6/5B) and 80% yellowish brown (10YR 4/4)	
	2	DP	5		25 15 9 9				
15					17				
								CLAY (CL), light olive brown (2.5Y 5/4), trace granules, firm, moist	
	3	DP	3.5		6 1.8 8				
								SAND (SP), dark yellowish brown (10YR 4/4), trace clay and gravel, firm, wet	
					18			No recovery	
20									

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; DP = direct push; ft = feet; HA = hand auger; in = inch; NA = not applicable; PG = professional geologist; PID = photoionization detector; ppm = parts per million; SAA = same as above

Hand auger boring to 5 ft bgs; direct push from 5 ft to 25 ft bgs.

Analtyical samples were collected at 5, 10, 15, 19, and 25 feet.

Date Start/Finish: 10/19/2010
Drilling Company: WDC Exploration & Wells
Driller's Name: WDC Exploration & Wells
Drilling Method: Hand Auger / Direct Push
Bit Size: NA
Auger Size: NA
Rig Type: Geoprobe
Sampling Method: Acetate Sleeve

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 25 ft
Surface Elevation: NA

Description By: R. Moniz
Reviewed By: Hollis Phillips, PG

Well/Boring ID: SB-2

Client: British Petroleum

Location: Former ARCO Station #4931
731 West MacArthur Boulevard
Oakland, California

DEPTH	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
20									
	4	DP	5		23 45 7			CLAY (CL), light olive brown (2.5Y 5/4), trace granules, firm, moist	
					6			GRAVELLY SAND with clay, hard, wet	
25					1			End of boring at 25 ft bgs.	
30									
35									
40									

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; DP = direct push; ft = feet; HA = hand auger; in = inch; NA = not applicable; PG = professional geologist; PID = photoionization detector; ppm = parts per million; SAA = same as above

Hand auger boring to 5 ft bgs; direct push from 5 ft to 25 ft bgs.

Analtyical samples were collected at 5, 10, 15, 19, and 25 feet.

Date Start/Finish: 10/18/2010
Drilling Company: WDC Exploration & Wells
Driller's Name: WDC Exploration & Wells
Drilling Method: Hand Auger / Direct Push
Bit Size: NA
Auger Size: NA
Rig Type: Geoprobe
Sampling Method: Acetate Sleeve

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 25 ft
Surface Elevation: NA

Description By: R. Moniz
Reviewed By: Hollis Phillips, PG

Well/Boring ID: SB-3

Client: British Petroleum

Location: Former ARCO Station #4931
731 West MacArthur Boulevard
Oakland, California

DEPTH	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0								Asphalt	
					0			CLAY (CL), olive gray (5Y 4/2), trace silt and granules, very hard, moist, trace orange staining	
		HA			0				
					0	X			
5					0				
	1	DP	5		0				
					0	X			
10					0				
					0				
	2	DP	5		1			.5' sand lamination lense	
					0			CLAY (CL), dark yellowish brown (10YR 4/4), trace granules, firm, moist	
					0	X			
15					0				
	3	DP	5		0				
					0	X		CLAY (CL), dark yellowish brown (10YR 4/4), some rounded granules, firm	
20									

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; DP = direct push; ft = feet; HA = hand auger; in = inch; NA = not applicable; PG = professional geologist; PID = photoionization detector; ppm = parts per million; SAA = same as above

Hand auger boring to 5 ft bgs; direct push from 5 ft to 25 ft bgs.

Analtyical samples were collected at 5, 10, 15, and 20 feet.

Date Start/Finish: 10/18/2010
Drilling Company: WDC Exploration & Wells
Driller's Name: WDC Exploration & Wells
Drilling Method: Hand Auger / Direct Push
Bit Size: NA
Auger Size: NA
Rig Type: Geoprobe
Sampling Method:
Acetate Sleeve

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 25 ft
Surface Elevation: NA

Description By: R. Moniz
Reviewed By: Hollis Phillips, PG

Well/Boring ID: SB-3

Client: British Petroleum

Location: Former ARCO Station #4931
731 West MacArthur Boulevard
Oakland, California

DEPTH	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
20	4	DP	1		0			No Recovery	
25								End of boring at 25 ft bgs.	
30									
35									
40									

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; DP = direct push; ft = feet; HA = hand auger; in = inch; NA = not applicable; PG = professional geologist; PID = photoionization detector; ppm = parts per million; SAA = same as above

Hand auger boring to 5 ft bgs; direct push from 5 ft to 25 ft bgs.

Analtyical samples were collected at 5, 10, 15, and 20 feet.

Date Start/Finish: 10/18/2010
Drilling Company: WDC Exploration & Wells
Driller's Name: WDC Exploration & Wells
Drilling Method: Hand Auger / Direct Push
Bit Size: NA
Auger Size: NA
Rig Type: Geoprobe
Sampling Method:
Acetate Sleeve

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 25 ft
Surface Elevation: NA

Description By: R. Moniz
Reviewed By: Hollis Phillips, PG

Well/Boring ID: SB-5

Client: British Petroleum

Location: Former ARCO Station #4931
731 West MacArthur Boulevard
Oakland, California

DEPTH	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0								Asphalt	
					0			FILL	
		HA			0			CLAY (CL), bluish gray (GLEY 2 6/5B) and brown (10YR 5/3) trace granules, plastic, subangular to subrounded, moist	
5	1	DP	5		1 110 260 200 145				
10	2	DP	5		178 89 64 119 45			CLAY (CL), bluish gray (GLEY2 6/5B) and brown (10YR 5/3), some gravels, plastic, hard, poorly graded, moist	
15	3	DP	5		4 11 14 1 1			SAA, dark yellowish brown (10YR 4/4), trace granules, subangular to subrounded, firm, moist SAA, yellowish brown (10YR 5/4), soft	
20									

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Infrastructure, environment, buildings

Remarks: bgs = below ground surface; DP = direct push; ft = feet; HA = hand auger; in = inch; NA = not applicable; PG = professional geologist; PID = photoionization detector; ppm = parts per million; SAA = same as above

Hand auger boring to 5 ft bgs; direct push from 5 ft to 25 ft bgs.

Analtyical samples were collected at 5, 10, 15, and 20 feet.

Date Start/Finish: 10/18/2010
Drilling Company: WDC Exploration & Wells
Driller's Name: WDC Exploration & Wells
Drilling Method: Hand Auger / Direct Push
Bit Size: NA
Auger Size: NA
Rig Type: Geoprobe
Sampling Method: Acetate Sleeve

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 25 ft
Surface Elevation: NA

Description By: R. Moniz
Reviewed By: Hollis Phillips, PG

Well/Boring ID: SB-5

Client: British Petroleum

Location: Former ARCO Station #4931
731 West MacArthur Boulevard
Oakland, California

DEPTH	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
20					2				
					2				
					6				
	4	DP	5		1			SAA, trace sand, fine-grained	
					0			SAND (SP), dark yellowish brown (10YR 4/4), trace clay and gravel, subangular to rounded, hard	
25					0			End of boring at 25 ft bgs.	
30									
35									
40									

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; DP = direct push; ft = feet; HA = hand auger; in = inch; NA = not applicable; PG = professional geologist; PID = photoionization detector; ppm = parts per million; SAA = same as above

Hand auger boring to 5 ft bgs; direct push from 5 ft to 25 ft bgs.

Analtyical samples were collected at 5, 10, 15, and 20 feet.

Date Start/Finish: 10/18/2010
Drilling Company: WDC Exploration & Wells
Driller's Name: WDC Exploration & Wells
Drilling Method: Hand Auger / Direct Push
Bit Size: NA
Auger Size: NA
Rig Type: Geoprobe
Sampling Method: Acetate Sleeve

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 25 ft
Surface Elevation: NA

Description By: R. Moniz
Reviewed By: Hollis Phillips, PG

Well/Boring ID: SB-6

Client: British Petroleum

Location: Former ARCO Station #4931
731 West MacArthur Boulevard
Oakland, California

DEPTH	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0								Concrete	
					600			CLAY (CL), bluish gray (GLEY2 6/5B), plastic, firm, moist	
		HA			6	X		SANDY CLAY with silt, olive gray (5Y 4/2), some sand, trace gravel, trace orange staining	
5					32				
					140				
					380				
	1	DP	5		414			SANDY CLAY, dark greenish gray (GLEY1 4/10GY), no orange staining	
					479	X			
10									
					412			CLAY (CL), dark greenish gray (GLEY1 4/5GY), plastic, soft, moist	
					120				
	2	DP	5		106			3" SAND (SP), some gravel, little clay CLAY (CL), dark greenish gray (GLEY1 4/5GY), trace granules, very hard, trace orange staining, moist	
					6	X			
15					3				
					8				
	3	DP	5					CLAY (CL), yellowish brown (10YR 5/4), trace granules, hard, increased orange staining	
						X		SAA, but some sand, trace gravel, firm	
20									

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Infrastructure, environment, buildings

Remarks: bgs = below ground surface; DP = direct push; ft = feet; HA = hand auger; in = inch; NA = not applicable; PG = professional geologist; PID = photoionization detector; ppm = parts per million; SAA = same as above

Hand auger boring to 5 ft bgs; direct push from 5 ft to 25 ft bgs.

Analtyical samples were collected at 5, 10, 15, 20, and 25 feet.

Date Start/Finish: 10/18/2010
Drilling Company: WDC Exploration & Wells
Driller's Name: WDC Exploration & Wells
Drilling Method: Hand Auger / Direct Push
Bit Size: NA
Auger Size: NA
Rig Type: Geoprobe
Sampling Method:
Acetate Sleeve

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 25 ft
Surface Elevation: NA

Description By: R. Moniz
Reviewed By: Hollis Phillips, PG

Well/Boring ID: SB-6

Client: British Petroleum

Location: Former ARCO Station #4931
731 West MacArthur Boulevard
Oakland, California

DEPTH	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
20					25				
					6			Possible slough	
					2			CLAY (CL), dark greenish gray (GLEY1 4/10GY), some sand, moist	
	4	DP	5		1			SAND (SP) and GRAVEL (GP), olive brown (2.5Y 4/4), angular, poorly sorted, wet	
					4				
25					8			End of boring at 25 ft bgs.	
30									
35									
40									

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; DP = direct push; ft = feet; HA = hand auger; in = inch; NA = not applicable; PG = professional geologist; PID = photoionization detector; ppm = parts per million; SAA = same as above

Hand auger boring to 5 ft bgs; direct push from 5 ft to 25 ft bgs.

Analtyical samples were collected at 5, 10, 15, 20, and 25 feet.

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Appendix D

Soil Data

UNDERGROUND STORAGE TANK REMOVAL AND SOIL SAMPLING

ARCO Facility No. 4931
731 West MacArthur Boulevard
Oakland, California

July 20, 1992

Prepared for:

ARCO Products Company
P.O. Box 5811
San Mateo, California

Prepared by:

ROUX ASSOCIATES
1855 Gateway Boulevard, Suite 770
Concord, California 94520
(510) 602-2333

Doc #A134W01.1.2

TABLE 1: Summary of Soil Analyses: Former Tank Cavity
ARCO Facility No. 4931, Oakland, California

Sample Designation	Date	Depth (feet bgs)	TPH-G(1)	TPH-D (1)	O&G(1)	BTEX Distinction(1) Benzene	Toluene	Ethyl Benzene	Xylenes
SW1	11/22/91	12	15	NA	NA	0.74	0.03	0.14	0.23
SW2	11/22/91	14	16	NA	NA	0.56	0.3	0.39	2.0
SW3	11/22/91	12	5.2	NA	NA	0.088	0.094	0.12	0.84
SW4	11/22/91	12	2.3	NA	NA	0.15	0.18	0.061	0.31
SW5	11/22/91	14	ND	NA	NA	ND	ND	ND	ND
SW6	11/22/91	12	5.3	NA	NA	1.0	0.26	0.16	0.39
SW7	11/22/91	12	130	NA	NA	0.66	0.22	1.1	1.0
SW8	11/22/91	14	14	NA	NA	0.013	0.037	0.0088	0.061
SW9	11/22/91	12	28	NA	NA	0.61	0.13	0.14	0.83
SW-10*	11/22/91	12	8.6	5.8	1000	0.24	0.24	0.065	0.23
SW11*	11/22/91	12	57	15	130	0.36	0.13	0.38	1.3
SW12*	11/22/91	12	430	69	100	24	21	56	290
SW13	11/22/91	12	ND	6.2	ND	0.015	ND	ND	0.026
SW14*	12/20/91	12	91	1.7	110	1.5	2.4	1.4	6.7
SW15*	1/31/92	12	140	1.7	81	4.4	9.3	2.4	14
SW16*	1/31/92	12	130	ND	ND	3.0	7.7	3.2	17
SW17*	1/31/92	11	7.8	ND	ND	1.2	0.19	0.28	0.35
SW18	1/31/92	11	250	4.5	ND	2.7	3.8	5.4	34
SW19	2/13/92	10	4.4	NA	NA	0.27	0.37	0.088	0.45
SW20	2/13/92	10	150	NA	NA	1.1	1.2	1.9	9.2
SW21	2/13/92	9	53	NA	NA	0.69	0.3	0.68	3.5
T1A	11/22/91	13	1.3	1.2	35	0.017	0.009	ND	0.035
T1B	11/22/91	13	4.7	14	ND	0.06	0.098	0.01	0.073
ST-A	11/22/91	14	29	NA	NA	0.44	0.041	0.041	0.16
ST-B	11/22/91	15	ND	NA	NA	ND	ND	ND	ND
FT-A	1/31/92	13	ND	ND	ND	0.016	0.0093	0.015	0.056

FOOTNOTES

(1) = Concentrations reported in mg/kg (ppm)

TPH-G = Total Petroleum Hydrocarbons As Low/Medium Boiling Point Hydrocarbons (USEPA Method 8015)

TPH-D = Total Petroleum Hydrocarbons As High Boiling Point Hydrocarbons (USEPA Method 8015)

O&G = Oil and Grease (ASTM Method 5520 E & F)

BTEX Distinction (USEPA Method 8020)

* = Soil sample location over-excavated

NA = Not Analyzed

ND = Not Detected

bgs = Below ground surface

TABLE 1: Summary of Soil Analyses: Former Tank Cavity
ARCO Facility No. 4931, Oakland, California

Sample Designation	Date	Depth (feet bgs)	VOCs(2)	Metals (1)				
				Cadmium	Chromium	Lead	Nickel	Zinc
SW1	11/22/91	12	NA	NA	NA	11	NA	NA
SW2	11/22/91	14	NA	NA	NA	11	NA	NA
SW3	11/22/91	12	NA	NA	NA	NA	NA	NA
SW4	11/22/91	12	NA	NA	NA	NA	NA	NA
SW5	11/22/91	14	NA	NA	NA	NA	NA	NA
SW6	11/22/91	12	NA	NA	NA	NA	NA	NA
SW7	11/22/91	12	NA	NA	NA	12	NA	NA
SW8	11/22/91	14	NA	NA	NA	NA	NA	NA
SW9	11/22/91	12	NA	NA	NA	11	NA	NA
SW-10*	11/22/91	12	ND(4)	0.51	44	ND	58	59
SW11*	11/22/91	12	ND(4)	ND	42	5.7	52	68
SW12*	11/22/91	12	(3)	0.51	41	5.7	48	61
SW13	11/22/91	12	ND(4)	0.51	44	6.2	48	60
SW14*	12/20/91	12	NA	NA	NA	NA	NA	NA
SW15*	1/31/92	12	NA	NA	NA	NA	NA	NA
SW16*	1/31/92	12	NA	NA	NA	NA	NA	NA
SW17*	1/31/92	11	NA	NA	NA	NA	NA	NA
SW18	1/31/92	11	NA	NA	NA	NA	NA	NA
SW19	2/13/92	10	NA	NA	NA	NA	NA	NA
SW20	2/13/92	10	NA	NA	NA	NA	NA	NA
SW21	2/13/92	9	NA	NA	NA	NA	NA	NA
T1A	11/22/91	13	ND(4)	0.62	49	6.6	81	60
T1B	11/22/91	13	ND(4)	0.54	46	6.2	58	63
ST-A	11/22/91	14	NA	NA	NA	NA	NA	NA
ST-B	11/22/91	15	NA	NA	NA	NA	NA	NA
FT-A	1/31/92	13	NA	NA	NA	NA	NA	NA

FOOTNOTES

(1) = Concentrations reported in mg/kg (ppm)

(2) = Concentrations reported in ug/kg (ppb)

(3) = All compounds ND except BTEX, which is reported on page 1 of this table, and acetone, 880 ug/kg.

ND(4) = All compounds not detected except BTEX, which is reported on page 1 of this table.

VOCs = Volatile Organic Compounds (USEPA Method 8240)

* = Soil sample location over-excavated

Metals (USEPA Method 6010)

NA = Not Analyzed

ND = Not Detected

bgs = Below ground surface

TABLE 2: Summary of Soil Analyses: Product Line Trenches
ARCO Facility No. 4931, Oakland, California

Sample Designation	Date	Depth (feet bgs)	TPH-G(1)	BTEX Distinction(1)			
				Benzene	Toluene	Ethylbenzene	Xylenes
L1	12/2/91	3.5	ND	ND	ND	ND	ND
L2	12/2/91	3.5	ND	ND	ND	ND	ND
L3	12/2/91	3.5	ND	ND	ND	ND	ND
L4	12/2/91	3.5	6.6	0.54	0.012	0.034	0.026
L5	12/2/91	3.5	ND	ND	ND	ND	ND
L6*	12/2/91	3.5	8,300	3.1	23	40	300
L7*	12/2/91	3.5	1.4	0.058	0.026	0.0061	0.028
L8*	12/2/91	3.5	4.4	0.018	ND	0.0082	0.0022
L9*	12/20/92	7	ND	ND	ND	ND	ND
L10*	1/31/92	7.5	ND	0.0081	0.013	ND	0.03
L11*	1/31/92	7.5	140	1.2	0.21	2.5	5.1
L12*	1/31/92	7.5	400	2.6	0.99	6.5	43

FOOTNOTES

(1) = Concentrations reported in mg/kg (ppm)

* = Soil sample location over-excavated

TPH-G = Total Petroleum Hydrocarbons As Low/Medium Boiling Point Hydrocarbons (USEPA Method 8015)

BTEX Distinction (USEPA Method 8020)

ND = Not Detected

bgs = Below ground surface

TABLE 3: Summary of Soil Analyses: Soil Stockpiles
ARCO Facility No. 4931, Oakland, California

Sample Designation	Date	TPH-G(1)	BTEX Distinction(1)			
			Benzene	Toluene	Ethylbenzene	Xylenes
CS-1 (A-D)	11/22/91	1.5	0.006	0.016	ND	0.046
CS-2 (A-D)	11/22/91	1,400	0.57	2.3	2.6	120
CS-3 (A-D)	11/22/91	1,400	ND	2.4	1.5	140
CS-4 (A-D)	11/22/91	2,200	0.63	4.1	2.3	220
CS-5 (A-D)	11/22/91	10	0.023	0.018	0.013	0.12
CS-6 (A-D)	11/22/91	120	0.23	0.22	0.049	0.57
CS-7 (A-D)	11/22/91	2,000	1.4	17	22	210
CS-8 (A-D)	12/2/91	300	ND	ND	ND	4.2
CS-9 (A-D)	12/20/91	71	0.026	0.084	0.026	0.65
CS-10 (A-D)	12/20/91	16	ND	0.022	0.028	0.086
CS-11(A-D)	1/9/92	34	0.043	0.056	0.14	0.69
CS-12(A-D)	1/9/92	6.2	0.015	0.029	0.021	0.043
CS-13(A-D)	1/31/92	88	0.069	0.26	0.35	4.4
CS-14(A-D)	1/31/92	750	0.91	7.2	6.3	80
CS-15(A-D)	1/31/92	22	0.51	0.62	0.32	1.6
CS-16(A-D)	1/31/92	540	1.6	14	10	65
CS-17(A-D)	1/31/92	880	3.8	25	12	84
CS-18(A-D)	2/13/92	9.3	0.15	0.19	0.048	0.27
CS-19(A-D)	3/16/92	12	0.013	0.015	0.018	0.11
CS-20 (A-D)	3/16/92	ND	ND	ND	ND	ND
CS-21(A-D)	3/16/92	7.5	0.007	0.029	0.038	0.21
CS-22(A-D)	3/16/92	9.3	0.009	0.019	0.013	0.017
CS-23(A-D)	3/16/92	9.9	0.014	0.013	0.025	0.064
CS-24(A-D)	3/16/92	14	0.033	0.023	0.035	0.091
CS-25(A-D)	3/16/92	16	0.024	0.072	0.069	0.35
CS-26(A-D)	3/16/92	2.7	ND	ND	ND	0.007
CS-27(A-D)	3/16/92	5.8	0.024	0.08	0.039	0.25
CS-28(A-D)	3/16/92	4.3	ND	ND	0.01	0.009
CS-29(A-D)	3/16/92	11	0.016	0.024	0.018	0.13
CS-30(A-D)	3/16/92	84	0.09	0.12	0.085	0.89

FOOTNOTES

(1) = Concentrations reported in mg/kg (ppm)

TPH-G = Total Petroleum Hydrocarbons As Low/Medium Boiling Point Hydrocarbons (USEPA Method 8015)

BTEX Distinction (USEPA Method 8020)

ND = Not Detected

Table 1
Soil Analytical Results
Former BP Service Station 4931
731 West MacArthur Blvd, Oakland, CA

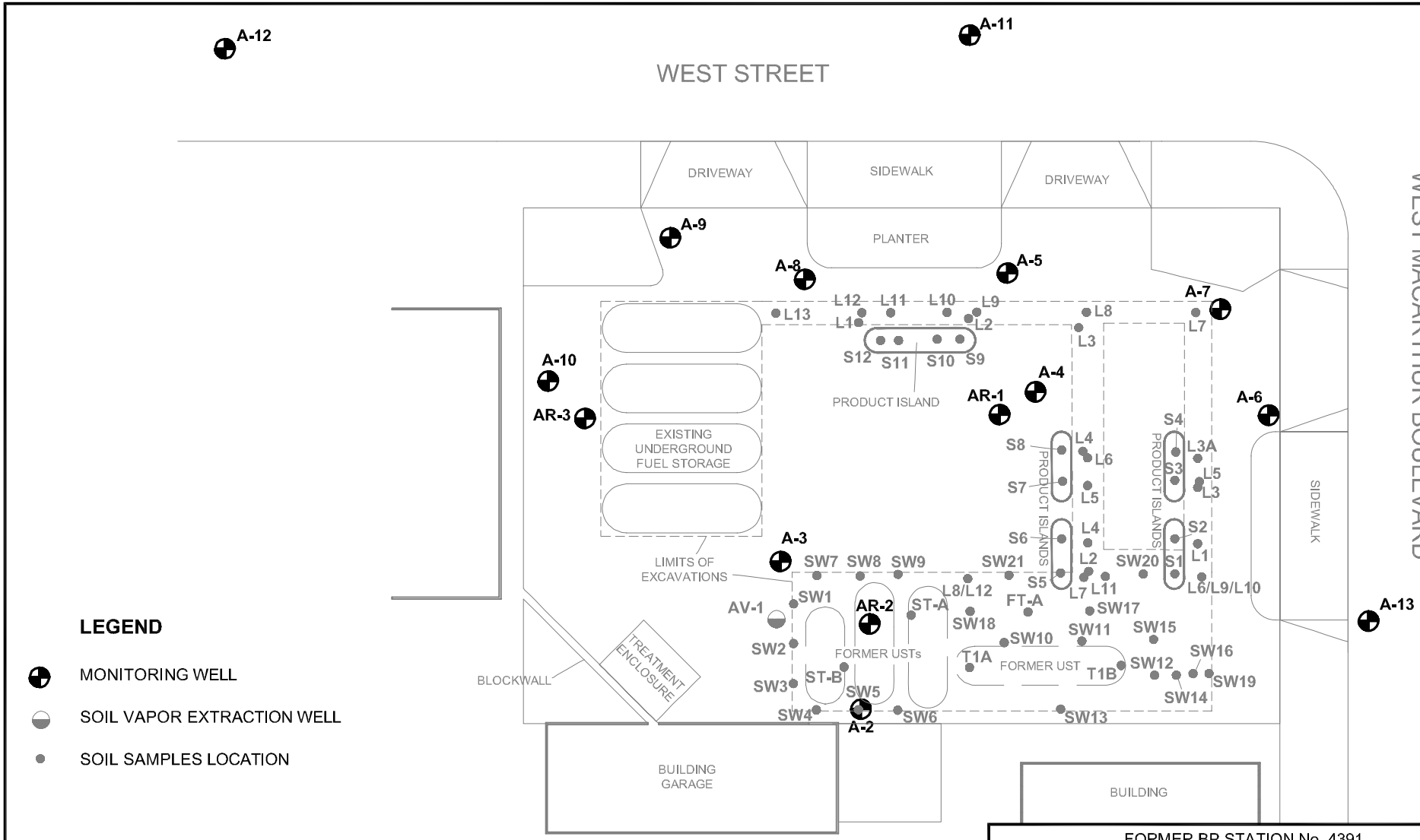
Sample Name	Sample Depth (ft bgs)	Sample Date	EPA 8260B												
			TPHg (mg/Kg)	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethylbenzene (mg/Kg)	Xylenes (mg/Kg)	TBA (mg/Kg)	MTBE (mg/Kg)	DIPE (mg/Kg)	EtBE (mg/Kg)	TAME (mg/Kg)	EDB (mg/Kg)	Ethanol (mg/Kg)	1,2 DCA (mg/Kg)
Comercial ESLs for Soil (mg/Kg)			**450**	**0.27**	**210**	**5**	**100**	**320,000**	**65**	--	--	--	--	--	**0.48**
SB-1A-5	5	10/19/10	<0.24	<0.0049	<0.0049	<0.0049	<0.0097	<0.0097	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.49	<0.0049
SB-1A-10	10	10/19/10	33	0.035	<0.025	<0.5	0.26	<0.05	<0.025	<0.025	<0.025	<0.025	<0.025	<2.5	<0.025
SB-1A-15	15	10/19/10	1.2	0.18	0.1	0.084	0.27	0.22	0.0076	<0.0047	<0.0047	<0.0047	<0.0047	<0.47	0.0049
SB-1A-20	20	10/19/10	770	<4.9	5.7	9.8	63	<0.05	<0.025	<0.025	<0.025	<0.025	<0.025	<2.5	<0.025
SB-1A-25	25	10/19/10	1,400	5.2	34	17	110	<0.05	<0.025	<0.025	<0.025	<0.025	<0.025	<2.5	<0.025
SB-1A-30	30	10/19/10	0.38	0.0061	0.027	0.012	0.075	<0.0091	<0.0046	<0.0046	<0.0046	<0.0046	<0.0046	<0.46	<0.0046
SB-1A-35	35	10/19/10	6.2	0.19	0.65	0.21	26	<0.04	<0.02	<0.025	<0.025	<0.025	<0.02	<2	<0.02
SB-2-5	5	10/19/10	<0.23	<0.0047	<0.0047	<0.0047	<0.0093	0.024	<0.0047	<0.0047	<0.0047	<0.0047	<0.0047	<0.47	<0.0047
SB-2-10	10	10/19/10	29	0.044	<0.025	0.8	<0.96	<0.05	<0.025	<0.025	<0.025	<0.025	<0.025	<2.5	<0.025
SB-2-15	15	10/19/10	110	0.058	<0.025	0.94	<0.98	<0.05	<0.025	<0.025	<0.025	<0.025	<0.025	<2.5	<0.025
SB-2-19	19	10/19/10	<0.24	<0.0049	<0.0049	0.043	<0.0097	0.028	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.49	<0.0049
SB-2-25	25	10/19/10	<0.23	<0.0046	<0.0046	0.0047	0.021	<0.0093	<0.0046	<0.0046	<0.0046	<0.0046	<0.0046	<0.46	<0.0046
SB-3-5	5	10/18/2010	<0.24	<0.0049	<0.0049	<0.0049	<0.0098	<0.0098	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.49	<0.0049
SB-3-10	10	10/18/2010	<0.24	<0.0048	<0.0048	<0.0048	<0.0097	<0.0097	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.48	<0.0048
SB-3-15	15	10/18/2010	<0.24	<0.0047	<0.0047	<0.0047	<0.0094	<0.0094	<0.0047	<0.0047	<0.0047	<0.0047	<0.0047	<0.47	<0.0047
SB-3-20	20	10/18/2010	<0.24	<0.0048	<0.0048	<0.0048	<0.0097	<0.0097	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.48	<0.0048
SB-5-5	5	10/18/2010	<0.24	<0.0048	<0.0048	<0.0048	<0.0097	0.46	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.48	<0.0048
SB-5-10	10	10/18/2010	350	<0.5	<0.5	4.7	10	0.23	0.14	<0.0048	<0.0048	0.034	<0.0048	<0.48	<0.0048
SB-5-15	15	10/18/2010	1.7	0.17	<0.0046	0.1	0.08	0.059	<0.0046	<0.0046	<0.0046	<0.0046	<0.0046	<0.46	<0.0046
SB-5-20	20	10/18/2010	<0.25	<0.0049	<0.0049	<0.0049	<0.0099	<0.0099	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.49	<0.0049
SB-5-25	25	10/18/2010	<0.23	<0.0046	<0.0046	<0.0046	<0.0093	0.27	<0.0046	<0.0046	<0.0046	<0.0046	<0.0046	<0.46	<0.0046
SB-6-5	5	10/18/2010	<0.23	<0.0046	<0.0046	<0.0046	<0.0093	0.27	<0.0046	<0.0046	<0.0046	<0.0046	<0.0046	<0.46	<0.0046
SB-6-10	10	10/18/2010	960	<2.5	<2.5	<2.5	<4.9	<0.05	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
SB-6-15	15	10/18/2010	<0.24	<0.0049	<0.0049	<0.0049	<0.0097	0.2	<0.0049	<0.0049	<0.0049	<0.0049	<0.0049	<0.49	<0.0049
SB-6-20	20	10/18/2010	<0.24	<0.0049	<0.0049	<0.0049	<0.0098	0.32	0.14	<0.0049	<0.0049	<0.0049	<0.0049	<0.49	<0.0049
SB-6-25	25	10/18/2010	<0.24	<0.0048	<0.0048	<0.0048	<0.0097	<0.0097	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.48	<0.0048

Explanation

mg/Kg	Milligrams per Kilogram
--	Not analyzed
<4.6	Not detected at concentration threshold as shown
770	Exceeds Comercial ESLs
TPHg	Total petroleum hydrocarbons as gasoline (i.e. purgeable hydrocarbons)

1,2 DCA	1,2 dichloroethane
EDB	Ethylene dibromide
DIPE	Di-isopropyl ether
ETBE	Ethyl tert-butyl ether
TAME	Tert-amyl methyl ether
TBA	Tert-butyl ether
MTBE	Methyl tert-butyl ether

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\RevWorkPlan\04391 Site Plan 1.dwg LAYOUT: 2 SAVED: 11/4/2010 2:29 PM ACADVER: 18.0S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 11/4/2010 2:49 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.

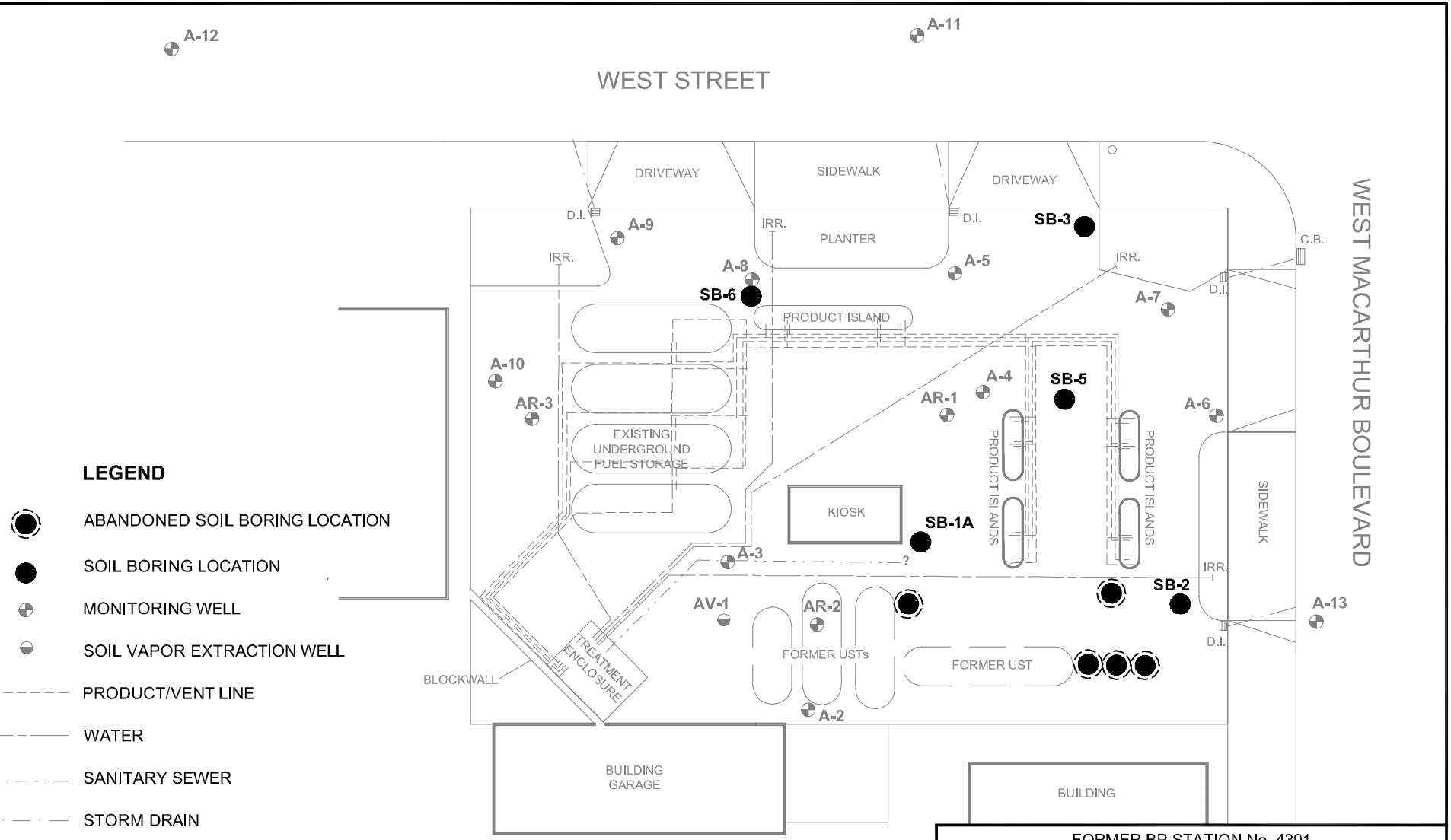
FORMER BP STATION No. 4391
731 WEST MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA
SOIL AND GROUNDWATER INVESTIGATION REPORT

SITE MAP WITH HISTORICAL SAMPLING LOCATIONS

ARCADIS

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\RevWorkPlan\04391 Site Plan 2.dwg LAYOUT: 3 SAVED: 11/4/2010 2:29 PM ACADVER: 18.0S (LMS TECH) PAGESETUP: -- PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 11/4/2010 2:47 PM BY: BEARDSLEY, DANIEL



LEGEND

- ABANDONED SOIL BORING LOCATION
- SOIL BORING LOCATION
- MONITORING WELL
- SOIL VAPOR EXTRACTION WELL
- PRODUCT/VENT LINE
- WATER
- SANITARY SEWER
- STORM DRAIN

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 AND GROUNDWATER INVESTIGATION REPORT

SITE MAP WITH BORING LOCATIONS AND UNDERGROUND UTILITIES

ARCADIS

FIGURE
3

ARCADIS

Appendix E

Groundwater Data and Figures

GeoStrategies Inc.

RECOVERY SYSTEM EVALUATION REPORT - FOURTH QUARTER 1993

ARCO Station 4931
731 West MacArthur Boulevard
Oakland, California

790970-24

February 22, 1994

TABLE 2

HISTORICAL WATER-LEVEL DATA

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (FT)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
20-Mar-89	A-2	3.45	55.38	51.93	0.00
24-May-89	A-2	6.80	55.38	48.58	0.00
18-Aug-89	A-2	10.82	55.38	44.56	0.00
27-Oct-89	A-2	8.25	55.38	47.13	0.00
15-Jan-90	A-2	4.87	55.38	50.51	0.00
04-Apr-90	A-2	7.03	55.38	48.35	0.00
30-Jul-90	A-2	10.01	55.38	45.37	0.00
29-Oct-90	A-2	11.60	55.38	43.78	0.00
16-Jan-91	A-2	9.43	55.38	45.95	0.00
12-Apr-91	A-2	3.65	55.38	51.73	0.00
10-Jul-91	A-2	9.57	55.38	45.81	0.00
21-Oct-91	A-2	11.54	55.38	43.84	0.00
01-Feb-92	A-2	11.20	55.38	44.18	0.00
28-Apr-92	A-2	7.18	55.38	48.20	0.00
28-Jul-92	A-2	11.81	55.48	43.67	0.00
29-Oct-92	A-2	11.91	55.48	43.57	0.00
26-Jan-93	A-2	5.06	55.48	50.42	0.00
01-Apr-93	A-2	5.15	55.48	50.33	0.00
06-Aug-93	A-2	15.33	55.48	40.15	0.00
14-Oct-93	A-2	15.74	55.48	39.74	0.00
16-Nov-93	A-2	14.61	55.48	40.87	0.00
16-Dec-93	A-2	5.80	55.48	49.68	0.00
20-Mar-89	A-3	7.51	54.48	46.97	0.00
24-May-89	A-3	10.29	54.48	44.19	0.00
18-Aug-89	A-3	11.60	54.48	42.88	0.00
27-Oct-89	A-3	10.16	54.48	44.32	0.00
15-Jan-90	A-3	8.55	54.48	45.93	0.00
04-Apr-90	A-3	10.66	54.48	43.82	0.00
30-Jul-90	A-3	11.26	54.48	43.22	0.00
29-Oct-90	A-3	11.86	54.48	42.62	0.00
16-Jan-91	A-3	11.46	54.48	43.02	0.00
12-Apr-91	A-3	9.28	54.48	45.20	0.00
10-Jul-91	A-3	11.29	54.48	43.19	0.00
21-Oct-91	A-3	11.51	54.48	42.97	0.00
02-Feb-92	A-3	N/A	54.48	-----	----
29-Apr-92	A-3	N/A	54.48	-----	----
29-Jul-92	A-3	11.59	54.66	43.07	0.00
28-Oct-92	A-3	12.00	54.66	42.66	0.00

TABLE 2

HISTORICAL WATER-LEVEL DATA

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (FT)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
26-Jan-93	A-3	9.82	54.66	44.84	0.00
01-Apr-93	A-3	10.61	54.66	44.05	0.00
06-Aug-93	A-3	14.90	54.66	39.76	0.00
14-Oct-93	A-3	15.11	54.66	39.55	0.00
16-Nov-93	A-3	14.72	54.66	39.94	0.00
16-Dec-93	A-3	13.37	54.66	41.29	0.00
21-Mar-86	A-4	-----	54.62	-----	3.50
07-Jan-88	A-4	-----	54.62	-----	0.02
20-Mar-89	A-4	8.13	54.62	46.49	0.00
24-May-89	A-4	11.40	54.62	43.22	0.00
18-Aug-89	A-4	11.91	54.62	42.72	0.01
27-Oct-89	A-4	11.37	54.62	43.26	0.01
15-Jan-90	A-4	9.74	54.62	44.89	0.01
04-Apr-90	A-4	11.19	54.62	43.43	0.00
30-Jul-90	A-4	11.71	54.62	42.92	0.01
29-Oct-90	A-4	12.21	54.62	42.43	0.03
16-Jan-91	A-4	11.89	54.62	42.74	0.01
12-Apr-91	A-4	9.54	54.62	45.08	0.00
10-Jul-91	A-4	11.55	54.62	43.07	0.00
20-Sep-91	A-4	12.12	54.62	42.50	0.00
21-Oct-91	A-4	11.76	54.62	42.88	0.03
02-Feb-92	A-4	11.18	54.62	43.46	0.02
29-Apr-92	A-4	10.78	54.62	43.86	0.02
29-Jul-92	A-4	11.74	54.73	43.02	0.04
28-Oct-92	A-4	11.93	54.73	42.82	0.03
26-Jan-93	A-4	10.59	54.73	44.17	0.04
01-Apr-93	A-4	10.17	54.73	44.58	0.02
06-Aug-93	A-4	15.12	54.73	39.61	0.03
14-Oct-93	A-4	15.37	54.73	39.36	0.00
16-Nov-93	A-4	14.86	54.73	39.87	0.00
16-Dec-93	A-4	13.41	54.73	41.32	0.00
20-Mar-89	A-5	8.09	54.15	46.06	0.00
24-May-89	A-5	11.13	54.15	43.02	0.00
18-Aug-89	A-5	11.58	54.15	42.57	0.00
27-Oct-89	A-5	10.68	54.15	43.47	0.00
15-Jan-90	A-5	9.24	54.15	44.91	0.00
04-Apr-90	A-5	10.93	54.15	43.22	0.00
30-Jul-90	A-5	11.48	54.15	42.67	0.00

TABLE 2

HISTORICAL WATER-LEVEL DATA

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (FT)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
29-Oct-90	A-5	11.77	54.15	42.38	0.00
16-Jan-91	A-5	11.36	54.15	42.79	0.00
12-Apr-91	A-5	9.64	54.15	44.51	0.00
10-Jul-91	A-5	11.30	54.15	42.85	0.00
21-Oct-91	A-5	11.48	54.15	42.67	0.00
02-Feb-92	A-5	10.73	54.15	43.42	0.00
29-Apr-92	A-5	10.58	54.15	43.57	0.00
29-Jul-92	A-5	11.46	54.17	42.71	0.00
28-Oct-92	A-5	11.55	54.17	42.62	0.00
26-Jan-93	A-5	10.32	54.17	43.85	0.00
01-Apr-93	A-5	10.36	54.17	43.81	0.00
06-Aug-93	A-5	14.82	54.17	39.35	0.00
14-Oct-93	A-5	14.99	54.17	39.18	0.00
16-Nov-93	A-5	14.47	54.17	39.70	0.00
16-Dec-93	A-5	12.94	54.17	41.23	0.00
20-Mar-89	A-6	6.43	55.13	48.70	0.00
24-May-89	A-6	9.43	55.13	45.70	0.00
18-Aug-89	A-6	10.10	55.13	45.03	0.00
27-Oct-89	A-6	9.16	55.13	45.97	0.00
15-Jan-90	A-6	8.02	55.13	47.11	0.00
04-Apr-90	A-6	9.29	55.13	45.84	0.00
30-Jul-90	A-6	9.93	55.13	45.20	0.00
29-Oct-90	A-6	10.42	55.13	44.71	0.00
16-Jan-91	A-6	10.15	55.13	44.98	0.00
12-Apr-91	A-6	8.05	55.13	47.08	0.00
10-Jul-91	A-6	10.03	55.13	45.10	0.00
21-Oct-91	A-6	10.30	55.13	44.83	0.00
02-Feb-92	A-6	9.81	55.13	45.32	0.00
29-Apr-92	A-6	N/A	55.13	—	—
29-Jul-92	A-6	10.40	55.17	44.77	0.00
28-Oct-92	A-6	10.55	55.17	44.62	0.00
26-Jan-93	A-6	7.50	55.17	47.62	0.00
01-Apr-93	A-6	7.59	55.17	47.58	0.00
06-Aug-93	A-6	12.32	55.17	42.85	0.00
14-Oct-93	A-6	12.82	55.17	42.35	0.00
16-Nov-93	A-6	12.34	55.17	42.83	0.00
16-Dec-93	A-6	10.40	55.17	44.77	0.00
20-Mar-89	A-7	6.29	54.67	48.38	0.00

TABLE 2

HISTORICAL WATER-LEVEL DATA

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (FT)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
24-May-89	A-7	9.26	54.67	45.41	0.00
18-Aug-89	A-7	9.97	54.67	44.70	0.00
27-Oct-89	A-7	9.02	54.67	45.65	0.00
15-Jan-90	A-7	7.90	54.67	46.77	0.00
04-Apr-90	A-7	9.15	54.67	45.52	0.00
30-Jul-90	A-7	9.80	54.67	44.87	0.00
29-Oct-90	A-7	10.30	54.67	44.37	0.00
16-Jan-91	A-7	11.35	54.67	43.32	0.00
12-Apr-91	A-7	7.90	54.67	46.77	0.00
10-Jul-91	A-7	9.82	54.67	44.85	0.00
21-Oct-91	A-7	10.12	54.67	44.55	0.00
02-Feb-92	A-7	9.28	54.67	45.39	0.00
29-Apr-92	A-7	8.85	54.67	45.82	0.00
29-Jul-92	A-7	10.09	54.71	44.62	0.00
28-Oct-92	A-7	10.31	54.71	44.40	0.00
26-Jan-93	A-7	7.33	54.71	47.38	0.00
01-Apr-93	A-7	7.35	54.71	47.36	0.00
06-Aug-93	A-7	12.67	54.71	42.04	0.00
14-Oct-93	A-7	12.52	54.71	42.19	0.00
16-Nov-93	A-7	12.13	54.71	42.58	0.00
16-Dec-93	A-7	10.18	54.71	44.53	0.00
21-Mar-86	A-8	----	53.61	----	0.02
07-Jan-88	A-8	----	53.61	----	0.18
20-Mar-89	A-8	8.21	53.61	45.93	0.66
24-May-89	A-8	11.41	53.61	43.16	1.20
18-Aug-89	A-8	10.88	53.61	43.35	0.77
27-Oct-89	A-8	11.66	53.61	43.00	1.31
15-Jan-90	A-8	9.64	53.61	44.47	0.87
04-Apr-90	A-8	11.35	53.61	42.46	0.25
30-Jul-90	A-8	10.48	53.61	44.53	1.75
29-Oct-90	A-8	11.39	53.61	42.30	0.10
16-Jan-91	A-8	11.11	53.61	42.51	0.01
12-Apr-91	A-8	9.16	53.61	44.46	0.01
10-Jul-91	A-8	10.73	53.61	42.89	0.01
21-Oct-91	A-8	10.98	53.61	42.72	0.11
02-Feb-92	A-8	10.80	53.61	43.93	1.40
29-Apr-92	A-8	11.15	53.61	43.50	1.30
29-Jul-92	A-8	11.33	53.77	42.49	0.06
28-Oct-92	A-8	Dry	53.77	-----	-----

TABLE 2

HISTORICAL WATER-LEVEL DATA

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (FT)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
26-Jan-93	A-8	Dry	53.77	---	---
01-Apr-93	A-8	9.38	53.77	44.39	0.00
06-Aug-93	A-8	Dry	53.77	---	---
14-Oct-93	A-8	13.10	53.77	40.67	0.00
16-Nov-93	A-8	Dry	53.77	---	---
16-Dec-93	A-8	13.40	53.77	40.37	0.00
20-Mar-89	A-9	6.28	52.96	46.68	0.00
24-May-89	A-9	10.12	52.96	42.84	0.00
18-Aug-89	A-9	9.51	52.96	43.45	0.00
27-Oct-89	A-9	8.56	52.96	44.40	0.00
15-Jan-90	A-9	7.20	52.96	45.76	0.00
04-Apr-90	A-9	8.78	52.96	44.18	0.00
30-Jul-90	A-9	10.16	52.96	42.80	0.00
29-Oct-90	A-9	10.71	52.96	42.25	0.00
16-Jan-91	A-9	10.44	52.96	42.52	0.00
12-Apr-91	A-9	8.69	52.96	44.27	0.00
10-Jul-91	A-9	10.23	52.96	42.73	0.00
20-Sep-91	A-9	10.47	52.96	42.49	0.00
21-Oct-91	A-9	10.39	52.96	42.57	0.00
02-Feb-92	A-9	9.05	52.96	43.91	0.00
29-Apr-92	A-9	9.56	52.96	43.40	0.00
29-Jul-92	A-9	10.43	53.04	42.61	0.00
28-Oct-92	A-9	N/A	53.04	---	---
26-Jan-93	A-9	N/A	53.04	---	---
01-Apr-93	A-9	N/A	53.04	---	---
06-Aug-93	A-9	N/A	53.04	---	---
14-Oct-93	A-9	14.11	53.04	38.93	0.00
16-Nov-93	A-9	N/A	53.04	---	---
16-Dec-93	A-9	12.10	53.04	40.94	0.00
20-Mar-89	A-10	8.52	54.16	45.64	0.00
24-May-89	A-10	11.31	54.16	42.85	0.00
18-Aug-89	A-10	11.82	54.16	42.34	0.00
27-Oct-89	A-10	10.94	54.16	43.22	0.00
15-Jan-90	A-10	9.58	54.16	44.58	0.00
04-Apr-90	A-10	N/A	54.16	-----	----
30-Jul-90	A-10	11.67	54.16	42.49	0.00
29-Oct-90	A-10	12.11	54.16	42.05	0.00
16-Jan-91	A-10	11.60	54.16	42.56	0.00

TABLE 2

HISTORICAL WATER-LEVEL DATA

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (FT)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
12-Apr-91	A-10	10.04	54.16	44.12	0.00
10-Jul-91	A-10	11.55	54.16	42.61	0.00
21-Oct-91	A-10	11.79	54.16	42.37	0.00
02-Feb-92	A-10	N/A	54.16	----	----
29-Apr-92	A-10	10.85	54.16	43.31	0.00
29-Jul-92	A-10	11.84	54.26	42.42	0.00
28-Oct-92	A-10	11.89	54.26	42.37	0.00
26-Jan-93	A-10	10.81	54.26	43.45	0.00
01-Apr-93	A-10	10.85	54.26	43.41	0.00
06-Aug-93	A-10	15.06	54.26	39.20	0.00
14-Oct-93	A-10	15.22	54.26	39.04	0.00
16-Nov-93	A-10	14.70	54.26	39.56	0.00
16-Dec-93	A-10	13.22	54.26	41.04	0.00
20-Mar-89	A-11	8.11	53.75	45.64	0.00
24-May-89	A-11	10.92	53.75	42.83	0.00
18-Aug-89	A-11	11.52	53.75	42.23	0.00
27-Oct-89	A-11	10.63	53.75	43.12	0.00
15-Jan-90	A-11	9.22	53.75	44.53	0.00
04-Apr-90	A-11	10.85	53.75	42.90	0.00
30-Jul-90	A-11	11.29	53.75	42.46	0.00
29-Oct-90	A-11	11.66	53.75	42.09	0.00
16-Jan-91	A-11	11.31	53.75	42.44	0.00
12-Apr-91	A-11	9.55	53.75	44.20	0.00
10-Jul-91	A-11	11.18	53.75	42.57	0.00
21-Oct-91	A-11	11.24	53.75	42.51	0.00
02-Feb-92	A-11	10.70	53.75	43.05	0.00
29-Apr-92	A-11	10.57	53.75	43.18	0.00
29-Jul-92	A-11	11.33	53.74	42.41	0.00
28-Oct-92	A-11	11.54	53.74	42.20	0.00
26-Jan-93	A-11	9.90	53.74	43.84	0.00
01-Apr-93	A-11	10.11	53.74	43.63	0.00
06-Aug-93	A-11	14.43	53.74	39.31	0.00
14-Oct-93	A-11	14.72	53.74	39.02	0.00
16-Nov-93	A-11		Not Monitored		
16-Dec-93	A-11		Not Monitored		
20-Mar-89	A-12	8.00	52.05	44.05	0.00
24-May-89	A-12	10.35	52.05	41.70	0.00
18-Aug-89	A-12	10.75	52.05	41.30	0.00

TABLE 2

HISTORICAL WATER-LEVEL DATA

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (FT)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
27-Oct-89	A-12	10.06	52.05	41.99	0.00
15-Jan-90	A-12	8.88	52.05	43.17	0.00
04-Apr-90	A-12	10.30	52.05	41.75	0.00
30-Jul-90	A-12	10.66	52.05	41.39	0.00
29-Oct-90	A-12	10.90	52.05	41.15	0.00
16-Jan-91	A-12	10.60	52.05	41.45	0.00
12-Apr-91	A-12	9.45	52.05	42.60	0.00
10-Jul-91	A-12	10.56	52.05	41.49	0.00
21-Oct-91	A-12	10.62	52.05	41.43	0.00
02-Feb-92	A-12	10.10	52.05	41.95	0.00
29-Apr-92	A-12	10.19	52.05	41.86	0.00
29-Jul-92	A-12	10.81	52.05	41.24	0.00
28-Oct-92	A-12	10.81	52.05	41.24	0.00
26-Jan-93	A-12	9.48	52.05	42.57	0.00
01-Apr-93	A-12	10.67	52.05	41.38	0.00
06-Aug-93	A-12	12.95	52.05	39.10	0.00
14-Oct-93	A-12	13.28	52.05	38.77	0.00
16-Nov-93	A-12		Not Monitored		
16-Dec-93	A-12		Not Monitored		
01-Jul-92	A-13	9.93	55.11	45.18	0.00
29-Jul-92	A-13	11.12	55.11	43.99	0.00
28-Oct-92	A-13	10.84	55.11	44.27	0.00
26-Jan-93	A-13	8.99	55.11	46.12	0.00
01-Apr-93	A-13	9.18	55.11	45.93	0.00
06-Aug-93	A-13	13.70	55.11	41.41	0.00
14-Oct-93	A-13	14.02	55.11	41.09	0.00
16-Nov-93	A-13		Not Monitored		
16-Dec-93	A-13		Not Monitored		
01-Jul-92	AR-1	10.27	54.72	44.45	0.00
29-Jul-92	AR-1	11.32	54.72	43.40	0.00
28-Oct-92	AR-1	N/A	54.72	----	----
26-Jan-93	AR-1	N/A	54.72	----	----
01-Apr-93	AR-1	N/A	54.72	----	----
06-Aug-93	AR-1	17.42	54.72	37.30	Product on Sounder
14-Oct-93	AR-1		Well Inaccessible		
16-Nov-93	AR-1	13.76	54.72	40.96	----
16-Dec-93	AR-1	19.44	54.72	35.28	----
01-Jul-92	AR-2	11.33	54.77	43.44	0.00

TABLE 2

HISTORICAL WATER-LEVEL DATA

MONITORING DATE	WELL NUMBER	DEPTH TO WATER (FT)	WELL ELEVATION (FT)	STATIC WATER ELEVATION (FT)	FLOATING PRODUCT THICKNESS (FT)
29-Jul-92	AR-2	11.90	54.77	42.87	0.00
28-Oct-92	AR-2	N/A	54.77	-----	----
26-Jan-93	AR-2	N/A	54.77	-----	----
01-Apr-93	AR-2	N/A	54.77	-----	----
06-Aug-93	AR-2	17.16	54.77	37.61	----
14-Oct-93	AR-2	18.11	54.77	36.66	----
16-Nov-93	AR-2	17.92	54.77	36.85	----
16-Dec-93	AR-2	18.02	54.77	36.75	----
01-Jul-92	AR-3	10.11	54.19	44.08	0.00
29-Jul-92	AR-3	11.55	54.19	42.64	0.00
28-Oct-92	AR-3	N/A	54.19	-----	----
26-Jan-93	AR-3	N/A	54.19	-----	----
01-Apr-93	AR-3	N/A	54.19	-----	----
06-Aug-93	AR-3	16.12	54.19	38.07	----
14-Oct-93	AR-3		Well Inaccessible		
16-Nov-93	AR-3	16.38	54.19	37.81	----
16-Dec-93	AR-3		Well Inaccessible		

N/A = Not Accessible.

Notes:
1. Static water elevations referenced to Mean Sea Level (MSL).
2. Static water-levels corrected for floating product (conversion factor = 0.80).
3. Wells A-3 and A-10 were not monitored on February 2, 1992 due to site construction activities.
4. Wells A-3 and A-6 were not monitored on April 29, 1992 due to site construction activities.
5. Water level data prior to March, 1989 are not available.
6. Depth-to-water from wells AR-1, AR-2, and AR-3 measured on July 1, 1992 were referenced to the top of the casing. These measurements have been adjusted to the top of well box referenced.
7. Well elevations and depth-to-water are referenced to the top of the well box.
8. Wells re-surveyed July 30, 1992.

TABLE 3

HISTORICAL GROUNDWATER QUALITY DATABASE

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
21-Mar-86	A-2	31000.	---	---	---	---
07-Jan-88	A-2	12000.	920.	1500.	---	4000.
20-Mar-89	A-2	22000.	1200.	1800.	1200.	7700.
24-May-89	A-2	9000.	460.	260.	250.	2400.
18-Aug-89	A-2	14000.	900.	200.	<200.	1300.
27-Oct-89	A-2	16000.	1200.	340.	90.	3100.
15-Jan-90	A-2	9900.	1100.	460.	150.	2900.
04-Apr-90	A-2	16000.	1100.	400.	380.	3900.
30-Jul-90	A-2	16000.	1400.	340.	290.	3600.
30-Jul-90	A-2	16000.	1400.	340.	290.	3600.
29-Oct-90	A-2	14000.	1100.	210.	66.	2700.
16-Jan-91	A-2	15000.	1200.	800.	190.	4600.
12-Apr-91	A-2	16000	640	290	280	2600
21-Oct-91	A-2	26000	1100	560	81	3900
02-Feb-92	A-2	11000	150	13	91	94
29-Apr-92	A-2	5400	120	16	129	19
30-Jul-92	A-2	590	10	<2.0	<2.0	9.0
29-Oct-92	A-2	77	0.56	<0.50	<0.50	0.51
26-Jan-93	A-2	390	0.87	<0.50	<0.50	4.3
01-Apr-93	A-2	16,000	<10	<10	<10	<10
06-Aug-93	A-2		Purged Dry			
14-Oct-93	A-2	350	<0.5	<0.5	<0.5	<0.5
21-Mar-86	A-3	1000.	---	---	---	---
07-Jan-88	A-3	250.	2.3	8.	---	21.
20-Mar-89	A-3	230.	1.6	<1.	3.	3.
24-May-89	A-3	170.	0.9	2.	1.	<3.
18-Aug-89	A-3	180.	0.7	1.	<1.	<3.
27-Oct-89	A-3	120.	<0.5	<0.5	<0.5	<1.
15-Jan-90	A-3	<50.	<0.5	<0.5	<0.5	<1.
04-Apr-90	A-3	88.	1.2	2.0	0.8	4.
30-Jul-90	A-3	120.	8.3	2.9	2.3	12.
29-Oct-90	A-3	780.	10.	27.	18.	85.
16-Jan-91	A-3	69.	2.0	3.5	<0.5	9.6
12-Apr-91	A-3	<30	<0.30	<0.30	<0.30	<0.30
10-Jul-91	A-3	59	<0.30	<0.30	0.50	0.51
21-Oct-91	A-3	56	0.44	0.77	0.41	1.3
01-Feb-92	A-3		Not accessible			
29-Apr-92	A-3		Not accessible			
30-Jul-92	A-3	<50	<0.50	<0.50	<0.50	

TABLE 3

HISTORICAL GROUNDWATER QUALITY DATABASE

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
28-Oct-92	A-3	<50	<0.50	<0.50	<0.50	<0.50
26-Jan-93	A-3	<50	<0.50	<0.50	<0.50	<0.50
01-Apr-93	A-3	<50	<0.50	<0.50	<0.50	<0.50
06-Aug-93	A-3	<50	<0.5	<0.5	<0.5	<0.5
14-Oct-93	A-3	<50	<0.5	<0.5	<0.5	<0.5
21-Mar-86	A-4			Floating product		
07-Jan-88	A-4			Floating product		
20-Mar-89	A-4	360000.	1500.	3700.	6500.	35000.
24-May-89	A-4	1500000.	1000.	2000.	6000.	23000.
18-Aug-89	A-4			Floating product		
27-Oct-89	A-4			Floating product		
15-Jan-90	A-4			Floating product		
04-Apr-90	A-4	40000.	680.	320.	1400.	4900.
30-Jul-90	A-4			Floating product		
29-Oct-90	A-4			Floating product		
16-Jan-91	A-4			Floating product		
12-Apr-91	A-4	1800	<60	90	650	1700
10-Jul-91	A-4	61000	2700	8500	1700	8200
20-Sep-91	A-4	N/A	1200	5300	1500	11000
01-Feb-92	A-4			Floating product		
29-Apr-92	A-4			Floating product		
29-Jul-92	A-4			Floating product		
28-Oct-92	A-4			Floating product		
26-Jan-93	A-4			Floating product		
01-Apr-93	A-4			Floating Product		
06-Aug-93	A-4			Floating Product		
14-Oct-93	A-4	160000	1200	<250	4100	950
21-Mar-86	A-5	86.	---	---	---	---
07-Jan-88	A-5	<50.	0.5	1.	---	4.
20-Mar-89	A-5	60.	0.5	1.	2.	10.
24-May-89	A-5	<50.	0.5	<1.	<1.	<3.
18-Aug-89	A-5	<50.	<0.5	<1.	<1.	<3.
27-Oct-89	A-5	<50.	<0.50	<0.50	<0.50	<1.
15-Jan-90	A-5	<50.	<0.5	<0.5	<0.5	<1.
04-Apr-90	A-5	<50.	<0.5	<0.5	<0.5	<1.
30-Jul-90	A-5	<50.	<0.5	<0.5	<0.5	<0.5
29-Oct-90	A-5	280.	<0.5	<0.5	<0.5	<0.5
16-Jan-91	A-5	<50.	<0.5	<0.5	<0.5	<0.5
12-Apr-91	A-5	<30	<0.30	<0.30	<0.30	0.84

TABLE 3

HISTORICAL GROUNDWATER QUALITY DATABASE

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
10-Jul-91	A-5	<30	<0.30	<0.30	<0.30	<0.30
21-Oct-91	A-5	<30	<0.30	<0.30	<0.30	<0.30
01-Feb-92	A-5	<30	1.7	<0.30	<0.30	<0.30
29-Apr-92	A-5	<30	<0.30	<0.30	<0.30	<0.30
30-Jul-92	A-5	<50	<0.50	<0.50	<0.50	<0.50
28-Oct-92	A-5	<50	<0.50	<0.50	<0.50	<0.50
26-Jan-93	A-5	<50	<0.50	<0.50	<0.50	<0.50
01-Apr-93	A-5	<50	<0.50	<0.50	<0.50	<0.50
06-Aug-93	A-5	<50	<0.5	<0.5	<0.5	<0.5
14-Oct-93	A-5	<50	<0.5	<0.5	<0.5	<0.5
21-Mar-88	A-6	<10.	---	---	---	---
07-Jan-88	A-6	390.	54.	89.	---	110.
20-Mar-89	A-6	220.	33.	21.	9.	39.
24-May-89	A-6	110.	13.	6.	3.	13.
18-Aug-89	A-6	<50.	2.1	1.	<1.	<3.
27-Oct-89	A-6	55.	3.8	1.6	1.7	6.
15-Jan-90	A-6	100.	12.	2.5	5.5	18.
04-Apr-90	A-6	100.	17.	7.1	5.5	18.
30-Jul-90	A-6	<50.	2.6	<0.5	<0.5	1.2
29-Oct-90	A-6	<50.	0.7	<0.5	<0.5	<0.5
16-Jan-91	A-6	<50.	<0.5	<0.5	<0.5	<0.5
12-Apr-91	A-6	430	24	5.1	9.4	32
10-Jul-91	A-6	<30	1.4	0.39	0.47	1.5
21-Oct-91	A-6	<30	<0.30	<0.30	<0.30	<0.30
01-Feb-92	A-6	<30	2.0	0.40	0.58	1.7
29-Apr-92	A-6		Not accessible			
30-Jul-92	A-6	<50	0.64	<0.50	<0.50	<0.50
28-Oct-92	A-6	<50	<0.50	<0.50	<0.50	<0.50
26-Jan-93	A-6	1600	4.8	1.2	14	46
01-Apr-93	A-6	310	4.8	0.74	3.3	8.7
06-Aug-93	A-6	<50	<0.5	<0.5	<0.5	<0.5
14-Oct-93	A-6	<50	<0.5	<0.5	<0.5	<0.5
07-Jan-88	A-7	<50.	<0.5	1.	---	4.
20-Mar-89	A-7	<50.	0.9	<1.	<1.	<3.
24-May-89	A-7	<50.	<0.5	<1.	<1.	<3.
18-Aug-89	A-7	<50.	<0.5	<1.	<1.	<3.
27-Oct-89	A-7	<50.	<0.5	<0.5	<0.5	<1.
15-Jan-90	A-7	<50.	<0.5	<0.5	<0.5	<1.
04-Apr-90	A-7	<50.	<0.5	<0.5	<0.5	<1.

TABLE 3

HISTORICAL GROUNDWATER QUALITY DATABASE

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
30-Jul-90	A-7	<50.	<0.5	<0.5	<0.5	<0.5
29-Oct-90	A-7	<50.	2.7	7.6	1.1	3.0
16-Jan-91	A-7	<50.	<0.5	<0.5	<0.5	<0.5
12-Apr-91	A-7	<30	<0.30	<0.30	<0.30	0.48
10-Jul-91	A-7	<30	<0.30	0.49	<0.30	1.2
21-Oct-91	A-7	<30	<0.30	<0.30	<0.30	<0.30
01-Feb-92	A-7	<30	<0.30	<0.30	<0.30	<0.30
29-Apr-92	A-7	<30	<0.30	<0.30	<0.30	<0.30
28-Jul-92	A-7	<50.	<0.50	<0.50	<0.50	<0.50
28-Oct-92	A-7	<50	<0.50	<0.50	<0.50	<0.50
26-Jan-93	A-7	<50	<0.50	<0.50	<0.50	<0.50
01-Apr-93	A-7	<50	<0.50	<0.50	<0.50	<0.50
06-Aug-93	A-7	<50	<0.5	<0.5	<0.5	<0.5
14-Oct-93	A-7	<50	<0.5	<0.5	<0.5	<0.5
21-Mar-86	A-8		Floating Product			
07-Jan-88	A-8		Floating Product			
20-Mar-89	A-8		Floating Product			
24-May-89	A-8		Floating Product			
18-Aug-89	A-8		Floating Product			
27-Oct-89	A-8		Floating Product			
15-Jan-90	A-8		Floating Product			
04-Apr-90	A-8		Floating Product			
30-Jul-90	A-8		Floating Product			
29-Oct-90	A-8		Floating Product			
16-Jan-91	A-8		Floating Product			
12-Apr-91	A-8		Floating Product			
10-Jul-91	A-8		Floating Product			
21-Oct-91	A-8		Floating Product			
01-Feb-92	A-8		Floating Product			
29-Apr-92	A-8		Floating Product			
29-Jul-92	A-8		Floating Product			
28-Oct-92	A-8		Not Accessible			
26-Jan-93	A-8		Not Accessible			
01-Apr-93	A-8		Not Accessible			
06-Aug-93	A-8		Dry			
14-Oct-93	A-8		Not Accessible			
10-Dec-93	A-8	29000000	16000	12000	19000	99000
07-Jan-88	A-9	300.	45.	14.	---	43.
21-Mar-89	A-9	50.	2.8	1.	1.	3.

TABLE 3

HISTORICAL GROUNDWATER QUALITY DATABASE

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
24-May-89	A-9	120.	26.	12.	4.	79.
18-Aug-89	A-9	14000.	400.	800.	400.	2000.
27-Oct-89	A-9	1700.	150.	36.	30.	110.
15-Jan-90	A-9	860.	140.	58.	38.	140.
04-Apr-90	A-9	620.	36.	13.	9.4	32.
30-Jul-90	A-9	180.	77.	1.6	2.1	4.2
29-Oct-90	A-9	110.	30.	3.7	4.1	8.3
16-Jan-91	A-9	<50.	15.	<0.5	<0.5	0.6
12-Apr-91	A-9	130	52	0.83	5.3	6.0
10-Jul-91	A-9	<30	7.8	<0.30	<0.30	<0.30
20-Sep-91	A-9	N/A	21	<2.0	<2.0	<2.0
21-Oct-91	A-9	240	63	0.65	5.1	1.6
01-Feb-92	A-9	320	77	0.95	11	6.5
29-Apr-92	A-9	170	52	<0.30	5.6	1.4
30-Jul-92	A-9	<50	14	<0.50	1.7	6.0
28-Oct-92	A-9		Not Accessible			
26-Jan-93	A-9		Not Accessible			
01-Apr-93	A-9		Not Accessible			
06-Aug-93	A-9		Not Accessible			
14-Oct-93	A-9		Not Accessible			
10-Dec-93	A-9	<50	<0.5	<0.5	<0.5	<0.5
07-Jan-88	A-10	<50.	0.6	11.	---	4.
20-Mar-89	A-10	<50.	<0.5	<1.	<1.	<3.
24-May-89	A-10	<50.	<0.5	<1.	<1.	<3.
18-Aug-89	A-10	<50.	<0.5	<1.	<1.	<3.
27-Oct-89	A-10	<50.	<0.5	<0.5	<0.5	<1.
15-Jan-90	A-10	<50.	<0.5	<0.5	<0.5	<1.
04-Apr-90	A-10		Not accessible			
30-Jul-90	A-10	<50.	<0.5	<0.5	<0.5	<0.5
29-Oct-90	A-10	<50.	2.3	6.9	1.2	3.0
16-Jan-91	A-10	<50.	<0.5	<0.5	<0.5	<0.5
12-Apr-91	A-10	<30	0.67	0.55	<0.30	0.90
10-Jul-91	A-10	<30	<0.30	<0.30	<0.30	<0.30
21-Oct-91	A-10	<30	<0.30	<0.30	<0.30	<0.30
02-Feb-92	A-10		Not accessible			
29-Apr-92	A-10	<30	<0.30	<0.30	<0.30	<0.30
29-Jul-92	A-10	<50	25	<0.50	<0.50	1.8
28-Oct-92	A-10	<50	<0.50	<0.50	<0.50	<0.50
26-Jan-93	A-10	<50	<0.50	<0.50	<0.50	<0.50

TABLE 3

HISTORICAL GROUNDWATER QUALITY DATABASE

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
01-Apr-93	A-10	<50	<0.50	<0.50	<0.50	<0.50
06-Aug-93	A-10	<50	<0.5	<0.5	<0.5	<0.5
14-Oct-93	A-10	<50	<0.5	<0.5	<0.5	<0.5
07-Jan-88	A-11	<50.	1.1	2.	---	5.
20-Mar-89	A-11	<50.	<0.5	<1.	<1.	<3.
24-May-89	A-11	<50.	<0.5	<1.	<1.	<3.
18-Aug-89	A-11	<50.	<0.5	<1.	<1.	<3.
27-Oct-89	A-11	<50.	<0.5	<0.5	<0.5	<1.
15-Jan-90	A-11	<50.	<0.5	<0.5	<0.5	<1.
04-Apr-90	A-11	<50.	<0.5	<0.5	<0.5	<1.
30-Jul-90	A-11	<50.	<0.5	0.6	<0.5	0.5
29-Oct-90	A-11	<50.	0.6	2.4	0.6	1.5
16-Jan-91	A-11	<50.	<0.5	<0.5	<0.5	<0.5
12-Apr-91	A-11	<30	<0.30	0.37	<0.30	<0.30
10-Jul-91	A-11	<30	0.61	0.46	<0.30	1.0
21-Oct-91	A-11	<30	<0.30	<0.30	<0.30	<0.30
01-Feb-92	A-11	<30	<0.30	<0.30	<0.30	<0.30
29-Apr-92	A-11	<30	<0.30	<0.30	<0.30	<0.30
30-Jul-92	A-11	<50.	<0.50	<0.50	<0.50	<0.50
28-Oct-92	A-11	<50	<0.50	<0.50	<0.50	<0.50
26-Jan-93	A-11	<50	<0.50	<0.50	<0.50	<0.50
01-Apr-93	A-11	<50	<0.50	<0.50	<0.50	<0.50
06-Aug-93	A-11	<50	<0.5	<0.5	<0.5	<0.5
14-Oct-93	A-11	<50	<0.5	<0.5	<0.5	<0.5
07-Jan-88	A-12	<50.	<0.5	2.	---	<4.
20-Mar-89	A-12	<50.	<0.5	<1.	<1.	<3.
24-May-89	A-12	<50.	<0.5	<1.	<1.	<3.
18-Aug-89	A-12	<50.	<0.5	<1.	<1.	<3.
27-Oct-89	A-12	<50.	<0.5	<0.5	<0.5	<1.
15-Jan-90	A-12	<50.	<0.5	<0.5	<0.5	<1.
04-Apr-90	A-12	<50.	<0.5	<0.5	<0.5	<1.
30-Jul-90	A-12	<50.	<0.5	<0.5	<0.5	<0.5
29-Oct-90	A-12	<50.	<0.5	<0.5	<0.5	<0.5
16-Jan-91	A-12	<50.	<0.5	<0.5	<0.5	<0.5
12-Apr-91	A-12	<30	<0.30	<0.30	<0.30	<0.30
10-Jul-91	A-12	<30	<0.30	<0.30	<0.30	<0.30
21-Oct-91	A-12	<30	<0.30	<0.30	<0.30	<0.30
01-Feb-92	A-12	<30	<0.30	<0.30	<0.30	<0.30
29-Apr-92	A-12	<30	<0.30	<0.30	<0.30	<0.30

TABLE 3

HISTORICAL GROUNDWATER QUALITY DATABASE

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
30-Jul-92	A-12	<50.	<0.50	<0.50	<0.50	<0.50
28-Oct-92	A-12	<50	<0.50	<0.50	<0.50	<0.50
26-Jan-93	A-12	<50	<0.50	<0.50	<0.50	<0.50
01-Apr-93	A-12	<50	<0.50	<0.50	<0.50	<0.50
06-Aug-93	A-12	<50	<0.5	<0.5	<0.5	<0.5
14-Oct-93	A-12	<50	<0.5	<0.5	<0.5	<0.5
01-Jul-92	A-13	<50	<0.50	<0.50	<0.50	<0.50
30-Jul-92	A-13	<50	<0.50	<0.50	<0.50	<0.50
28-Oct-92	A-13	<50	<0.50	<0.50	<0.50	<0.50
26-Jan-93	A-13	<50	<0.50	<0.50	<0.50	<0.50
01-Apr-93	A-13	<50	<0.50	<0.50	<0.50	<0.50
06-Aug-93	A-13	<50	<0.5	<0.5	<0.5	<0.5
14-Oct-93	A-13	<50	<0.5	<0.5	<0.5	<0.5
01-Jul-92	AR-1	2300	260	150	38	470
29-Jul-92	AR-1	1600	340	180	52	320
28-Oct-92	AR-1		Not Accessible			
26-Jan-93	AR-1		Not Accessible			
01-Apr-93	AR-1		Not Accessible			
06-Aug-93	AR-1		Not Accessible			
14-Oct-93	AR-1		Not Accessible			
10-Dec-93	AR-1	3,400	<25	<25	<25	250
01-Jul-92	AR-2	<50	<0.50	<0.50	<0.50	<0.50
29-Jul-92	AR-2	350	130	8.5	<10	<10
28-Oct-92	AR-2		Not Accessible			
26-Jan-93	AR-2		Not Accessible			
01-Apr-93	AR-2		Not Accessible			
06-Aug-93	AR-2		Not Accessible			
14-Oct-93	AR-2		Not Accessible			
10-Dec-93	AR-2	<50	<0.5	<0.5	<0.5	<0.5
01-Jul-92	AR-3	<50	1.8	0.88	<0.50	2.2
29-Jul-92	AR-3	<50	1.6	<0.50	<0.50	<0.50
28-Oct-92	AR-3		Not Accessible			
26-Jan-93	AR-3		Not Accessible			
01-Apr-93	AR-3		Not Accessible			
06-Aug-93	AR-3		Not Accessible			
14-Oct-93	AR-3		Not Accessible			
10-Dec-93	AR-3	<50	<0.5	<0.50	<0.50	<0.50

PACIFIC
ENVIRONMENTAL
GROUP, INC.

July 25, 1996
Project 330-109.5B

Ms. Sue Jenne
East Bay Municipal Utility District
P.O. Box 24055
Oakland, California 94623-1055

Re: Final Groundwater Monitoring Report - Permit 502-62131
Termination of Account
ARCO Service Station 4931
731 West MacArthur Boulevard
Oakland, California

Dear Ms. Jenne:

On behalf of ARCO Products Company (ARCO) and in response to your letter dated July 2, 1996, Pacific Environmental Group, Inc. (PACIFIC) has prepared this final groundwater monitoring report for the site referenced above. ARCO requested termination of the EBMUD discharge permit on June 14, 1996; a summary of the groundwater extraction (GWE) system operational performance through that date is presented below:

Current Treatment System Status:	*Deactivated*
Reporting Period:	10/1/95 - 6/14/96
Period Average Flow Rate:	N/A
Period Starting Totalizer Reading:	121,370 gallons
Period Ending Totalizer Reading:	121,370 gallons
Period Volume Discharged:	0 gallons
Volume Discharged To Date:	4,643,816 gallons
Field Data Sheets:	N/A
Certified Analytical Reports:	N/A

The GWE system at this site was deactivated on July 5, 1995 due to low influent hydrocarbon concentrations and mass removal rates. A subsequent visit to the site resulted in

Table 2
Quarterly Groundwater Monitoring Data

ARCO Station 4931
731 West MacArthur Boulevard
Oakland, California

Well No.	Date Sampled	Date Analyzed	TPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Xylenes (ppb)	Total Oil and Grease (ppm)	Total Lead (feet)	Well Elevation (feet)	Depth to Water (feet)	Product Thickness (feet)	Static Water Elevation (feet)
A-2	8/9/94	8/17/94	1.1	<0.5	<0.5	<0.5	<0.5	NA	NA	55.48	12.51	0	42.97
A-3	8/9/94	8/17/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	54.66	12.09	0.00	42.57
A-4	8/9/94	8/17/94	20,000	800	<20	200	270	NA	NA	54.73	12.28	0.00	42.45
A-5	8/9/94	8/17/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	54.17	11.86	0.00	42.31
A-6	8/9/94	8/17/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	55.17	10.57	0.00	44.6
A-7	8/9/94	8/17/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	54.71	10.28	0.00	44.43
A-8	8/9/94	8/17/94	Not	Sampled,	Free	Product	Present.			53.77	10.46	0.33	43.31
A-9	8/9/94	8/17/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	53.04	10.81	0.00	42.23
A-10	8/9/94	8/17/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	54.26	12.24	0.00	42.02
A-11	8/9/94	8/17/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	53.74	11.67	0.00	42.07
A-12	8/9/94	8/17/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	52.05	11.07	0.00	40.98
A-13	8/9/94	8/17/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	55.11	11.45	0.00	43.66
AR-1	8/9/94	8/17/94	Not	Sampled,	Free	Product	Present.			54.72	17.59	0.00	37.13
AR-2	8/9/94	8/17/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	54.77	18.25	0.00	36.52
AR-3	8/9/94	8/17/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	54.19	11.92	0.00	42.27
MB		8/17/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	—	—	—	—
MB		8/17/94	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	—	—	—	—

TPH = Total petroleum hydrocarbons
ppb = Parts per billion
ppb = Parts per million
NA = Not analyzed
MB = Method blank

1. All data shown as <x are reported as ND (none detected).
2. Water level elevations referenced to mean sea level (MSL).
3. Static water levels corrected for floating product (conversion factor = 0.80).

Second Quarter 2008 Ground-Water Monitoring Report
Atlantic Richfield Company Station #4931
731 West MacArthur Boulevard
Oakland, California

Prepared for

Mr. Paul Supple
Environmental Business Manager
Atlantic Richfield Company
P.O. Box 1257
San Ramon, California 94583

Prepared by

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

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25 July 2008

Project No. 06-08-624

Table 1
Groundwater Elevation and Analytical Data
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, and MTBE)

ARCO Service Station 4931
731 West MacArthur Boulevard, Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPH Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	MTBE 8021B* (ppb)	MTBE 8260 (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
A-2	03/26/96	55.48	5.37	50.11	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
A-2	05/22/96	55.48	5.25	50.23	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
A-2	08/22/96	55.48	10.45	45.03	<50	1.1	1.8	<0.5	1.3	<2.5	NA	NM	
A-2	12/19/96	55.48	5.53	49.95	<50	<0.5	<0.5	<0.5	<0.5	2.7	NA	NM	
A-2	04/01/97	55.48	8.77	46.71	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NM	
A-2	05/27/97	55.48	9.87	45.61	<50	<0.5	<0.5	<0.5	<0.5	4.6	NA	NM	
A-2	08/12/97	55.48	11.11	44.37	<50	<0.5	<0.5	<0.5	<0.5	5.6	NA	NM	
A-2	11/14/97	55.48	10.63	44.85	<50	0.9	2.8	<0.5	2.4	27	NA	2.6	
A-2	03/18/98	55.48	3.58	51.90	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	NM	
A-2	05/19/98	55.48	4.82	50.66	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	1.30	P
A-2	07/29/98	55.48	8.94	46.54	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	1.2	NP
A-2	10/09/98	55.48	10.82	44.66	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	0.5	NP
A-2	02/19/99	55.48	4.46	51.02	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	3.0	P
A-2	06/02/99	55.48	5.59	49.89	<50	<0.5	0.6	<0.5	<0.5	<3	NA	5.35	NP
A-2	08/26/99	55.48	10.67	44.81	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	0.79	NP
A-2	10/26/99	55.48	4.61	50.87	<50	<0.5	<0.5	<0.5	<1	<3	NA	2.14	P
A-2	02/25/00	55.48	3.10	52.38	<50	<0.5	<0.5	<0.5	<1	<3	NA	4.21	NP
A-3	03/26/96	54.66	7.20	47.46	Not Sampled: Well Sampled Semiannually								
A-3	05/22/96	54.66	7.70	46.96	<50	1.2	1.9	0.7	1.3	NA	NA	NM	
A-3	08/22/96	54.66	10.88	43.78	Not Sampled: Well Sampled Semiannually								
A-3	12/19/96	54.66	7.70	46.96	5,900	<25	<25	<25	<25	NA	5,300	NM	
A-3	04/01/97	54.66	9.78	44.88	Not Sampled: Well Sampled Semiannually								
A-3	05/27/97	54.66	10.55	44.11	2,300	<20	<20	<20	<20	3,800	NA	NM	
A-3	08/12/97	54.66	11.12	43.54	Not Sampled: Well Sampled Semiannually								
A-3	11/14/97	54.66	8.24	46.42	<1,000	<10	<10	<10	<10	1,500	NA	3.8	
A-3	03/18/98	54.66	5.05	49.61	Not Sampled: Well Sampled Semiannually								
A-3	05/19/98	54.66	9.00	45.66	<250	<2.5	<2.5	<2.5	<2.5	220	NA	4.60	P
A-3	07/29/98	54.66	9.86	44.80	Not Sampled: Well Sampled Semiannually								
A-3	10/09/98	54.66	11.36	43.30	<250	<2.5	<2.5	<2.5	<2.5	260	NA	1.0	NP
A-3	02/19/99	54.66	6.19	48.47	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	2.5	NP
A-3	06/02/99	54.66	10.82	43.84	120	<1	<1	<1	<1	160	NA	2.78	NP

Table 1
Groundwater Elevation and Analytical Data
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, and MTBE)

ARCO Service Station 4931
731 West MacArthur Boulevard, Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPH Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	MTBE 8021B* (ppb)	MTBE 8260 (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
A-3	08/26/99	54.66	10.73	43.93	Not Sampled: Well Sampled Semiannually							0.95	
A-3	10/26/99	54.66	6.58	48.08	<50	<0.5	<0.5	<0.5	<1	32	NA	2.06	NP
A-3	02/25/00	54.66	5.41	49.25	Not Sampled: Well Sampled Semiannually								
A-4	03/26/96	54.73	7.95	46.78	8,900	1,200	21	200	220	NA	NA	NM	
A-4	05/22/96	54.73	8.35	46.38	5,300	700	<10	170	130	NA	NA	NM	
A-4	08/22/96	54.73	11.03	43.70	3,000	480	<5.0	75	26	150	NA	NM	
A-4	12/19/96	54.73	8.67	46.06	<2,000	<20	<20	<20	<20	NA	15,000	NM	
A-4	04/01/97	54.73	11.95	42.78	8,900	1,700	22	310	260	6,900	NA	NM	
A-4	05/27/97	54.73	10.80	43.93	7,100	960	<20	150	74	7,900	NA	NM	
A-4	08/12/97	54.73	11.38	43.35	4,300	670	12	51	27	2,800	NA	NM	
A-4	11/14/97	54.73	7.74	46.99	<20,000	300	500	<200	<200	27,000	NA	2.2	
A-4	03/18/98	54.73	6.80	47.93	4,700	600	<20	99	94	1,200	NA	1.0	
A-4	05/19/98	54.73	9.06	45.67	<2000	<20	<20	<20	720	2,000	NA	1.28	P
A-4	07/29/98	54.73	10.05	44.68	8,400	1,300	<20	290	130	1,800	NA	0.7	NP
A-4	10/09/98	54.73	11.20	43.53	3,500	400	<20	54	<20	1,700	NA	1.0	NP
A-4	02/19/99	54.73	6.85	47.88	<1,000	<10	<10	<10	12	650	NA	0.1	NP
A-4	06/02/99	54.73	11.00	43.73	6,100	760	16	260	89	2,300	NA	1.12	NP
A-4	08/26/99	54.73	10.80	43.93	1,100	68	5	8	4	1,400	NA	1.15	NP
A-4	10/26/99	54.73	10.11	44.62	1,500	39	2.3	9.0	5	1,700	NA	10.12	NP
A-4	02/25/00	54.73	5.90	48.83	870	53	1.1	4.6	20	600	NA	1.72	NP
A-5	03/26/96	54.17	7.93	46.24	Not Sampled: Well Sampled Semiannually								
A-5	05/22/96	54.17	8.20	45.97	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
A-5	08/22/96	54.17	10.70	43.47	Not Sampled: Well Sampled Semiannually								
A-5	12/19/96	54.17	8.39	45.78	9,900	1,100	330	230	700	NA	24	NM	
A-5	04/01/97	54.17	10.83	43.34	Not Sampled: Well Sampled Semiannually								
A-5	05/27/97	54.17	10.65	43.52	100	<0.5	<0.5	<0.5	<0.5	120	NA	NM	
A-5	08/12/97	54.17	11.05	43.12	Not Sampled: Well Sampled Semiannually								
A-5	11/14/97	54.17	10.51	43.66	<50	<0.5	<0.5	<0.5	<0.5	41	NA	4.8	
A-5	03/18/98	54.17	8.10	46.07	Not Sampled: Well Sampled Semiannually								
A-5	05/19/98	54.17	9.31	44.86	590	<5	<5	<5	<5	710	NA	2.48	P

Table 1
Groundwater Elevation and Analytical Data
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, and MTBE)

ARCO Service Station 4931
731 West MacArthur Boulevard, Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPH Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	MTBE 8021B* (ppb)	MTBE 8260 (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
A-5	07/29/98	54.17	9.89	44.28	Not Sampled: Well Sampled Semiannually								
A-5	10/09/98	54.17	11.02	43.15	690	<5	<5	<5	<5	710	NA	1.0	NP
A-5	02/19/99	54.17	6.82	47.35	<2,000	<20	<20	<20	<20	2,300	NA	0.6	NP
A-5	06/02/99	54.17	10.82	43.35	1,500	<0.5	2.3	<0.5	<0.5	2,400	NA	2.81	NP
A-5	08/26/99	54.17	10.65	43.52	Not Sampled: Well Sampled Semiannually							0.49	
A-5	10/26/99	54.17	10.35	43.82	380	<0.5	<0.5	<0.5	<1	440	NA	1.55	NP
A-5	02/25/00	54.17	6.89	47.28	Not Sampled: Well Sampled Semiannually								
A-6	03/26/96	55.17	7.15	48.02	52	2.7	<0.5	1.1	2.0	NA	NA	NM	
A-6	05/22/96	55.17	7.35	47.82	<50	2.4	<0.5	0.88	1.7	NA	NA	NM	
A-6	08/22/96	55.17	10.12	45.05	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NM	
A-6	12/19/96	55.17	7.43	47.74	<50	1.7	<0.5	0.78	1.5	<2.5	NA	NM	
A-6	04/01/97	55.17	9.97	45.20	<50	4.7	<0.5	1.9	3.2	<2.5	NA	NM	
A-6	05/27/97	55.17	9.66	45.51	<50	0.69	<0.5	<0.5	<0.5	<2.5	NA	NM	
A-6	08/12/97	55.17	10.43	44.74	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NM	
A-6	11/14/97	55.17	9.76	45.41	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	<1.0	
A-6	03/18/98	55.17	7.00	48.17	<50	6.2	0.5	2.3	2.6	<3	NA	3.0	
A-6	05/19/98	55.17	8.27	46.90	<50	<0.5	<0.5	1.3	4.7	<3	NA	2.16	P
A-6	07/29/98	55.17	8.96	46.21	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	0.8	NP
A-6	10/09/98	55.17	10.23	44.94	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	1.0	NP
A-6	02/19/99	55.17	5.79	49.38	<50	<0.5	<0.5	<0.5	<0.5	5	NA	0.4	NP
A-6	06/02/99	55.17	9.71	45.46	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	2.00	NP
A-6	08/26/99	55.17	9.79	45.38	<50	<0.5	<0.5	<0.5	0.7	<3	NA	0.66	NP
A-6	10/26/99	55.17	9.70	45.47	<50	<0.5	<0.5	<0.5	<1	<3	NA	1.66	NP
A-6	02/25/00	55.17	5.68	49.49	<50	<0.5	<0.5	<0.5	<1	<3	NA	1.22	NP
A-7	03/26/96	54.71	6.90	47.81	Not Sampled: Well Sampled Semiannually								
A-7	05/22/96	54.71	8.27	46.44	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
A-7	08/22/96	54.71	9.80	44.91	Not Sampled: Well Sampled Semiannually								
A-7	12/19/96	54.71	7.19	47.52	Not Sampled: Well Sampled Annually								
A-7	04/01/97	54.71	9.63	45.08	Not Sampled: Well Sampled Annually								
A-7	05/27/97	54.71	9.34	45.37	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NM	

Table 1
Groundwater Elevation and Analytical Data
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ARCO Service Station 4931
731 West MacArthur Boulevard, Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPH Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	MTBE 8021B* (ppb)	MTBE 8260 (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
A-7	08/12/97	54.71	10.10	44.61	Not Sampled: Well Sampled Annually								
A-7	11/14/97	54.71	9.35	45.36	Not Sampled: Well Sampled Annually								
A-7	03/18/98	54.71	6.75	47.96	Not Sampled: Well Sampled Annually								
A-7	05/19/98	54.71	8.85	45.86	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	1.82	P
A-7	07/29/98	54.71	8.84	45.87	Not Sampled: Well Sampled Annually								
A-7	10/09/98	54.71	10.05	44.66	Not Sampled: Well Sampled Annually								
A-7	02/19/99	54.71	5.57	49.14	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	4.7	NP
A-7	06/02/99	54.71	9.56	45.15	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	2.17	NP
A-7	08/26/99	54.71	9.66	45.05	Not Sampled: Well Sampled Annually							0.49	
A-7	10/26/99	54.71	9.54	45.17	Not Sampled: Well Sampled Annually							1.26	
A-7	02/25/00	54.71	5.60	49.11	Not Sampled: Well Sampled Annually								
A-8	03/26/96	53.77	7.10	46.67	48,000	2,600	<100	650	1,100	NA	NA	NM	
A-8	05/22/96	53.77	7.20	46.57	14,000	2,800	160	320	190	NA	NA	NM	
A-8	08/22/96	53.77	11.57	42.20	8,000	1,000	76	150	96	4,300	NA	NM	
A-8	12/19/96	53.77	8.04	45.73	12,000	450	110	210	230	<500	NA	NM	
A-8	04/01/97	53.77	9.98	43.79	Not Sampled: Well Sampled Semiannually								
A-8	05/27/97	53.77	11.45	42.32	11,000	1,600	100	220	210	2,300	NA	NM	
A-8	08/12/97	53.77	11.59	42.18	Not Sampled: Well Sampled Semiannually								
A-8	11/14/97	53.77	9.85	43.92	26,000	2,300	<200	400	400	4,100	NA	2.2	
A-8	03/18/98	53.77	7.80	45.97	Not Sampled: Well Sampled Semiannually								
A-8	05/19/98	53.77	8.78	44.99	88,000	4,200	150	640	600	6,700	NA	1.36	P
A-8	07/29/98	53.77	9.59	44.18	46,000	4,900	160	620	580	13,000	NA	0.5	NP
A-8	10/09/98	53.77	11.23	42.54	130,000	3,700	110	500	770	7,300	NA	1.0	NP
A-8	02/19/99	53.77	6.51	47.26	<1,000	39	<10	<10	<10	840	NA	0.2	NP
A-8	06/02/99	53.77	10.68	43.09	8,500	1,300	32	180	110	6,700	NA	1.31	NP
A-8	08/26/99	53.77	10.43	43.34	6,200	870	17	64	60	3,700	NA	0.69	NP
A-8	10/26/99	53.77	10.23	43.54	15,000	2,800	140	370	360	480	NA	0.62	NP
A-8	02/25/00	53.77	5.93	47.84	2,600	330	6.6	18	26	1,100	NA	1.43	NP
A-9	03/26/96	53.04	7.05	45.99	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
A-9	05/22/96	53.04	7.20	45.84	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	

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ARCO Service Station 4931
731 West MacArthur Boulevard, Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPH Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	MTBE 8021B* (ppb)	MTBE 8260 (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
A-9	08/22/96	53.04	9.68	43.36	<50	<0.5	<0.5	<0.5	<0.5	8.5	NA	NM	
A-9	12/19/96	53.04	7.43	45.61	<50	<0.5	<0.5	<0.5	<0.5	2.6	NA	NM	
A-9	04/01/97	53.04	9.95	43.09	Not Sampled: Well Sampled Semiannually								
A-9	05/27/97	53.04	9.56	43.48	<50	2.3	<0.5	<0.5	<0.5	45	NA	NM	
A-9	08/12/97	53.04	10.15	42.89	Not Sampled: Well Sampled Semiannually								
A-9	11/14/97	53.04	8.64	44.40	<200	<2.0	<2.0	<2.0	<2.0	190	NA	9.6	
A-9	03/18/98	53.04	6.45	46.59	Not Sampled: Well Sampled Semiannually								
A-9	05/19/98	53.04	8.35	44.69	<50	<0.5	<0.5	<0.5	<0.5	7	NA	1.27	P
A-9	07/29/98	53.04	8.74	44.30	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	0.99	NP
A-9	10/09/98	53.04	10.05	42.99	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	1.0	NP
A-9	02/19/99	53.04	6.91	46.13	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	2.0	NP
A-9	06/02/99	53.04	9.72	43.32	<50	<0.5	<0.5	<0.5	<0.5	16	NA	2.32	NP
A-9	08/26/99	53.04	9.48	43.56	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	0.71	NP
A-9	10/26/99	53.04	9.17	43.87	1,500	6.2	0.7	78	11	91	NA	2.15	NP
A-9	02/25/00	53.04	5.84	47.20	<50	<0.5	<0.5	<0.5	<1	<3	NA	1.55	NP
A-10	03/26/96	54.26	8.28	45.98	Not Sampled: Well Removed from Sampling Program								
A-10	05/22/96	54.26	8.60	45.66	Not Sampled: Well Removed from Sampling Program								
A-10	08/22/96	54.26	10.98	43.28	Not Sampled: Well Removed from Sampling Program								
A-10	12/19/96	54.26	8.80	45.46	Not Sampled: Well Removed from Sampling Program								
A-10	04/01/97	54.26	11.15	43.11	Not Sampled: Well Removed from Sampling Program								
A-10	05/27/97	54.26	10.90	43.36	Not Sampled: Well Removed from Sampling Program								
A-10	08/12/97	54.26	11.30	42.96	Not Sampled: Well Removed from Sampling Program								
A-10	11/14/97	54.26	10.80	43.46	Not Sampled: Well Removed from Sampling Program								
A-10	03/18/98		----------		Well Removed from Survey Program ----------								
A-11	03/26/96	53.74	8.10	45.64	Not Sampled: Well Sampled Semiannually								
A-11	05/22/96	53.74	8.25	45.49	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
A-11	08/22/96	53.74	10.58	43.16	Not Sampled: Well Sampled Semiannually								
A-11	12/19/96	53.74	8.37	45.37	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NM	
A-11	04/01/97	53.74	10.95	42.79	Not Sampled: Well Sampled Semiannually								
A-11	05/27/97	53.74	10.60	43.14	<50	<0.5	<0.5	<0.5	<0.5	3.1	NA	NM	

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Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPH Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	MTBE 8021B* (ppb)	MTBE 8260 (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
A-11	08/12/97	53.74	11.07	42.67	Not Sampled: Well Sampled Semiannually								
A-11	11/14/97	53.74	10.58	43.16	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	1.6	
A-11	03/18/98	53.74	8.14	45.60	Not Sampled: Well Sampled Semiannually								
A-11	05/19/98	53.74	9.40	44.34	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	1.13	P
A-11	07/29/98	53.74	10.32	43.42	Not Sampled: Well Sampled Semiannually								
A-11	10/09/98	53.74	10.91	42.83	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	2.0	NP
A-11	02/19/99	53.74	6.77	46.97	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	1.8	NP
A-11	06/02/99	53.74	10.95	42.79	<50	<0.5	<0.5	<0.5	<0.5	6	NA	1.38	NP
A-11	08/26/99	53.74	11.05	42.69	Not Sampled: Well Sampled Semiannually							0.49	
A-11	10/26/99	53.74	10.81	42.93	<50	<0.5	<0.5	<0.5	<1	4	NA	1.27	NP
A-11	02/25/00	53.74	6.70	47.04	Not Sampled: Well Sampled Semiannually								
A-12	03/26/96	52.05	7.83	44.22	Not Sampled: Well Sampled Semiannually								
A-12	05/22/96	52.05	7.80	44.25	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
A-12	08/22/96	52.05	9.97	42.08	Not Sampled: Well Sampled Semiannually								
A-12	12/19/96	52.05	8.18	43.87	85	<0.5	<0.5	<0.5	<0.5	170	NA	NM	
A-12	04/01/97	52.05	10.30	41.75	Not Sampled: Well Sampled Semiannually								
A-12	05/27/97	52.05	10.05	42.00	50	12	<0.5	<0.5	<0.5	96	NA	NM	
A-12	08/12/97	52.05	10.46	41.59	Not Sampled: Well Sampled Semiannually								
A-12	11/14/97	52.05	9.70	42.35	<50	<0.5	<0.5	<0.5	<0.5	75	NA	7.0	
A-12	03/18/98	52.05	8.15	43.90	Not Sampled: Well Sampled Semiannually								
A-12	05/19/98	52.05	9.15	42.90	<50	<0.5	<0.5	<0.5	<0.5	29	NA	1.47	P
A-12	07/29/98	52.05	9.38	42.67	Not Sampled: Well Sampled Semiannually								
A-12	10/09/98	52.05	10.21	41.84	<50	<0.5	<0.5	<0.5	<0.5	7	NA	2.0	NP
A-12	02/19/99	52.05	6.96	45.09	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	5.2	NP
A-12	06/02/99	52.05	10.25	41.80	<50	<0.5	<0.5	<0.5	<0.5	7	NA	1.38	NP
A-12	08/26/99	52.05	9.91	42.14	Not Sampled: Well Sampled Semiannually							0.51	
A-12	10/26/99	52.05	9.73	42.32	<50	<0.5	<0.5	<0.5	<1	12	NA	1.09	NP
A-12	02/25/00	52.05	6.97	45.08	Not Sampled: Well Sampled Semiannually								
A-13	03/26/96	55.11			---------- Well Inaccessible ----------								
A-13	05/22/96	55.11			---------- Well Inaccessible ----------								

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Recreated from electronic data provided by IT Corporation.

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ARCO Service Station 4931
731 West MacArthur Boulevard, Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPH Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	MTBE 8021B* (ppb)	MTBE 8260 (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
A-13	08/22/96	55.11			Well Inaccessible								
A-13	12/19/96	55.11			Well Inaccessible								
A-13	04/01/97	55.11			Well Inaccessible								
A-13	05/27/97	55.11			Well Inaccessible								
A-13	08/12/97	55.11			Well Inaccessible								
A-13	11/14/97	55.11			Well Inaccessible								
A-13	03/18/98	55.11			Well Inaccessible								
A-13	05/19/98	55.11			Well Inaccessible								
A-13	07/29/98	55.11			Well Inaccessible								
A-13	10/09/98	55.11			Well Inaccessible								
A-13	02/19/99	55.11			Well Inaccessible								
A-13	06/02/99	55.11			Well Inaccessible								
A-13	08/26/99	55.11			Well Inaccessible								
A-13	10/26/99	55.11			Well Inaccessible								
A-13	02/25/00	55.11			Well Inaccessible								
AR-1	03/26/96	54.72	8.13	46.59	6,200	110	64	38	520	NA	NA	NM	
AR-1	05/22/96	54.72	8.57	46.15	NS	NS	NS	NS	NS	NS	NS	NM	
AR-1	08/22/96	54.72	10.97	43.75	5,600	100	28	29	310	960	NA	NM	
AR-1	12/19/96	54.72	8.93	45.79	Not Sampled: Well Removed from Sampling Program								
AR-1	04/01/97	54.72	11.78	42.94	Not Sampled: Well Removed from Sampling Program								
AR-1	05/27/97	54.72	10.76	43.96	Not Sampled: Well Removed from Sampling Program								
AR-1	08/12/97	54.72	11.40	43.32	Not Sampled: Well Removed from Sampling Program								
AR-1	11/14/97	54.72	10.80	43.92	Not Sampled: Well Removed from Sampling Program								
AR-1	03/18/98	54.72	NM	NM	Not Sampled: Well Removed from Sampling Program								
AR-1	05/19/98	54.72	NM	NM	Not Sampled: Well Removed from Sampling Program								
AR-1	07/29/98	54.72	10.17	44.55	Not Sampled: Well Removed from Sampling Program								
AR-1	10/09/98	54.72	11.25	43.47	Not Sampled: Well Removed from Sampling Program								
AR-1	02/19/99	54.72	7.02	47.70	Not Sampled: Well Removed from Sampling Program								
AR-1	06/02/99	54.72	11.00	43.72	Not Sampled: Well Removed from Sampling Program								
AR-1	08/26/99	54.72	10.96	43.76	Not Sampled: Well Removed from Sampling Program							0.39	
AR-1	10/26/99	54.72	10.68	44.04	Not Sampled: Well Removed from Sampling Program							1.39	

Table 1
Groundwater Elevation and Analytical Data
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, and MTBE)

ARCO Service Station 4931
731 West MacArthur Boulevard, Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPH Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	MTBE 8021B* (ppb)	MTBE 8260 (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
AR-1	02/25/00	54.72	7.15	47.57	Not Sampled: Well Removed from Sampling Program								
AR-2	03/26/96	54.77	4.93	49.84	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
AR-2	05/22/96	54.77	5.65	49.12	NS	NS	NS	NS	NS	NS	NS	NM	
AR-2	08/22/96	54.77	7.27	47.50	<50	<0.5	<0.5	<0.5	<0.5	200	NA	NM	
AR-2	12/19/96	54.77	7.78	46.99	Not Sampled: Well Removed from Sampling Program								
AR-2	04/01/97	54.77	6.80	47.97	Not Sampled: Well Removed from Sampling Program								
AR-2	05/27/97	54.77	6.32	48.45	Not Sampled: Well Removed from Sampling Program								
AR-2	08/12/97	54.77	7.43	47.34	Not Sampled: Well Removed from Sampling Program								
AR-2	11/14/97	54.77	8.95	45.82	Not Sampled: Well Removed from Sampling Program								
AR-2	03/18/98	54.77	NM	NM	Not Sampled: Well Removed from Sampling Program								
AR-2	05/19/98	54.77	NM	NM	Not Sampled: Well Removed from Sampling Program								
AR-2	07/29/98	54.77	4.47	50.30	Not Sampled: Well Removed from Sampling Program								
AR-2	10/09/98	54.77	6.90	47.87	Not Sampled: Well Removed from Sampling Program								
AR-2	02/19/99	54.77	3.80	50.97	Not Sampled: Well Removed from Sampling Program								
AR-2	06/02/99	54.77	4.61	50.16	Not Sampled: Well Removed from Sampling Program								
AR-2	08/26/99	54.77	5.22	49.55	Not Sampled: Well Removed from Sampling Program							0.44	
AR-2	10/26/99	54.77	3.20	51.57	Not Sampled: Well Removed from Sampling Program							1.79	
AR-2	02/25/00	54.77	2.33	52.44	Not Sampled: Well Removed from Sampling Program								
AR-3	03/26/96	54.19	7.95	46.24	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
AR-3	05/22/96	54.19	8.30	45.89	NS	NS	NS	NS	NS	NS	NS	NM	
AR-3	08/22/96	54.19	10.84	43.35	Not Sampled: Well Removed from Sampling Program								
AR-3	12/19/96	54.19	8.56	45.63	Not Sampled: Well Removed from Sampling Program								
AR-3	04/01/97	54.19	11.24	42.95	Not Sampled: Well Removed from Sampling Program								
AR-3	05/27/97	54.19	10.67	43.52	Not Sampled: Well Removed from Sampling Program								
AR-3	08/12/97	54.19	11.10	43.09	Not Sampled: Well Removed from Sampling Program								
AR-3	11/14/97	54.19	10.60	43.59	Not Sampled: Well Removed from Sampling Program								
AR-3	03/18/98	54.19	NM	NM	Not Sampled: Well Removed from Sampling Program								
AR-3	05/19/98	54.19	NM	NM	Not Sampled: Well Removed from Sampling Program								
AR-3	07/29/98	54.19	9.95	44.24	Not Sampled: Well Removed from Sampling Program								
AR-3	10/09/98	54.19	11.20	42.99	Not Sampled: Well Removed from Sampling Program								

Table 1
Groundwater Elevation and Analytical Data
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, and MTBE)

ARCO Service Station 4931
731 West MacArthur Boulevard, Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPH Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	MTBE 8021B* (ppb)	MTBE 8260 (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
AR-3	02/19/99	54.19	6.98	47.21	Not Sampled: Well Removed from Sampling Program								
AR-3	06/02/99	54.19	10.80	43.39	Not Sampled: Well Removed from Sampling Program								
AR-3	08/26/99	54.19	10.69	43.50	Not Sampled: Well Removed from Sampling Program							0.40	
AR-3	10/26/99	54.19	NM	NM	Not Sampled: Well Removed from Sampling Program								
AR-3	02/25/00	54.19	7.21	46.98	Not Sampled: Well Removed from Sampling Program								

TPH = Total petroleum hydrocarbons by modified EPA method 801
BTEX = Benzene, toluene, ethylbenzene, total xylenes by EPA method 8021B. (EPA method 8020 prior to 10/26/99
MTBE = Methyl tert-butyl ether
* = EPA method 8020 prior to 10/26/99
MSL = Mean sea level
TOB = Top of box
ppb = Parts per billion
ppm = Parts per million
< = Less than laboratory detection limit stated to the right
NA = Not analyzed
NM = Not measured
NS = Not sampled

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www.arcadis-us.com

ENVIRONMENT

Ms. Dilan Roe, P.E.
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502

Subject:
Fourth Quarter 2012 and First Quarter 2013
Semi-Annual Groundwater Monitoring Report
Former Atlantic Richfield Company Station No. 4931
731 West MacArthur Boulevard
Oakland, California 94609

Date:
April 11, 2013

Contact:
Hollis Phillips

Phone:
415.432.6903

Email:
hollis.phillips@arcadis-us.com

Our ref:
GP09BPNA.C110.N0000

Dear Ms. Roe:

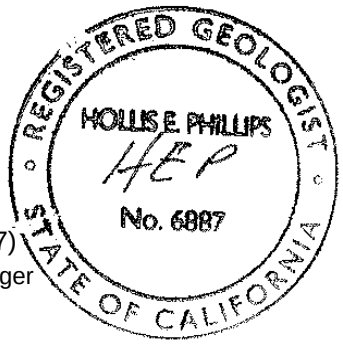
ARCADIS U.S., Inc (ARCADIS) has prepared this report on behalf of BP Remediation Management, a BP affiliated company, for the former BP service station listed below.

BP Facility No.	ACEH Site No.	Location
4931	RO0000076	731 West MacArthur Blvd. Oakland, California

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

Sincerely,

ARCADIS U.S., Inc.



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

Copies:
GeoTracker upload

Table 2
Historical and Current Groundwater Monitoring and Analytical Data
CA-04931
731 W Macarthur Blvd, Oakland, CA 94609

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	EDB (µg/L)	1,2-DCA (µg/L)	DO (mg/l)	Notes
AR-1	12/26/2000		54.72	9.95	--	44.77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	3/20/2001		54.72	8.34	--	46.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	6/12/2001		54.72	10.17	--	44.55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	9/23/2001		54.72	10.72	--	44.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	12/31/2001		54.72	5.91	--	48.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	3/21/2002		54.72	7.00	--	47.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	4/17/2002		54.72	8.33	--	46.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	8/12/2002		54.72	10.18	--	44.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	12/6/2002		54.72	10.21	--	44.51	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	1/30/2003		54.72	8.22	--	46.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	5/28/2003		54.72	9.62	--	45.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	8/6/2003		54.72	10.47	--	44.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	11/14/2003		54.72	10.40	--	44.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	2/2/2004		59.52	7.96	--	51.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	5/4/2004		59.52	10.17	--	49.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	9/2/2004		59.52	10.28	--	49.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	11/10/2004		59.52	9.15	--	50.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	2/2/2005		59.52	7.80	--	51.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	5/9/2005		59.52	7.03	--	52.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	8/11/2005		59.52	9.82	--	49.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	11/18/2005		59.52	9.83	--	49.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	2/15/2006		59.52	7.78	--	51.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	5/30/2006		59.52	8.65	--	50.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	8/11/2006		59.52	9.69	--	49.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	11/1/2006		59.52	10.07	--	49.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	2/7/2007		59.52	9.33	--	50.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	5/9/2007		59.52	8.45	--	51.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	8/7/2007		59.52	10.12	--	49.40	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	11/14/2007		59.52	9.31	--	50.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	2/28/2008		59.52	7.05	--	52.47	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	8/13/2008		59.52	10.20	--	49.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	11/19/2008		59.52	9.73	--	49.79	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	2/10/2009		59.52	8.61	--	50.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	5/7/2009		59.52	8.17	--	51.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	9/3/2009		59.52	10.19	--	49.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	8/24/2012		59.52	9.65	--	49.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-1	2/8/2013		59.52	8.44	--	51.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(NSP)
A-2	6/21/2000		55.48	6.85	--	48.63	<50	<0.5	<0.5	<0.5	<1.0	<3.0	--	--	--	--	--	--	--	--	
A-2	9/20/2000		55.48	10.45	--	45.03	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-2	12/26/2000		55.48	6.27	--	49.21	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-2	3/20/2001		55.48	4.57	--	50.91	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-2	6/12/2001		55.48	9.27	--	46.21	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-2	9/23/2001		55.48	10.75	--	44.73	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-2	12/31/2001		55.48	4.13	--	51.35	<50	<0.5	<0.5	1	3.2	<2.5	--	--	--	--	--	--	--	--	
A-2	3/21/2002		55.48	3.26	--	52.22	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-2	4/17/2002		55.48	3.72	--	51.76	<50	<0.5	<0.5	<0.5	<0.5	3.1	--	--	--	--	--	--	--	--	
A-2	8/12/2002		55.48	9.95	--	45.53	<10	<0.10	<0.10	<0.10	<0.10	<0.50	--	--	--	--	--	--	--	3.1	
A-2	12/6/2002		55.48	10.01	--	45.47	<50	<0.50	<0.50	<0.50	<0.50	6	--	--	--	--	--	--	--	3.1	
A-2	1/30/2003		55.48	5.08	--	50.40	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<40	--	--	2.6	
A-2	5/28/2003		55.48	4.82	--	50.66	<50	<0.50	<0.50	<0.50	<0.50	1.1	<20	<0.50	<0.50	<0.50	<100	--	--	5.7	
A-2	8/6/2003		55.48	9.73	--	45.75	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<100	<0.5	<0.5	2.3	
A-2	11/14/2003		55.48	9.36	--	46.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	2/2/2004		60.65	4.45	--	56.20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	5/4/2004		60.65	6.79	--	53.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	9/2/2004		60.65	10.51	--	50.14	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<100	<0.5	<0.5	3.1	
A-2	11/10/2004		60.65	6.10	--	54.55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	2/2/2005		60.65	4.00	--	56.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	5/9/2005		60.65	4.35	--	56.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	8/11/2005		60.65	9.08	--	51.57	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<100	<0.5	<0.5	3.2	
A-2	11/18/2005		60.65	8.53	--	52.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	2/15/2006		60.65	3.89	--	56.76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	5/30/2006		60.65	4.45	--	56.20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	8/11/2006		60.65	9.03	--	51.62	160	<0.50	<0.50	<0.50	<0.50	3.6	<20	<0.50	<0.50	<0.50	<300	<0.5	<0.5	0.16	

Table 2
Historical and Current Groundwater Monitoring and Analytical Data
CA-04931
731 W Macarthur Blvd, Oakland, CA 94609

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	EDB (µg/L)	1,2-DCA (µg/L)	DO (mg/l)	Notes
A-2	11/1/2006		60.65	9.98	--	50.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	2/7/2007		60.65	7.51	--	53.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	5/9/2007		60.65	4.57	--	56.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	8/7/2007		60.65	9.67	--	50.98	<50	<0.50	<0.50	<0.50	<0.50	3.4	<20	<0.50	<0.50	<0.50	<300	<0.5	<0.5	2.18	
A-2	11/14/2007		60.65	7.84	--	52.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	2/28/2008		60.65	3.30	--	57.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	5/23/2008		60.65	8.80	--	51.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	8/13/2008		60.65	10.20	--	50.45	<50	<0.50	<0.50	<0.50	<0.50	19	<10	<0.50	<0.50	<0.50	<300	<0.5	<0.5	0.87	
A-2	11/19/2008		60.65	9.20	--	51.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	2/10/2009		60.65	7.83	--	52.82	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	5/7/2009		60.65	4.40	--	56.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	9/3/2009		60.65	10.07	--	50.58	<50	<0.50	<0.50	<0.50	<0.50	12	<10	<0.50	<0.50	<0.50	<300	<0.5	<0.5	1.03	
A-2	3/23/2010		60.65	3.67	--	56.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	8/16/2010		60.65	9.40	--	51.25	<50	<0.50	<0.50	<0.50	<1.0	6.1	<4.0	<0.50	<0.50	<0.50	<100	<0.5	<0.5	--	
A-2	3/18/2011		60.65	2.89	--	57.76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	8/18/2011		60.65	7.63	--	53.02	--	--	--	--	--	0.74	--	--	--	--	--	--	--	--	
A-2	2/29/2012		60.65	8.42	--	52.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	8/24/2012		60.65	10.54	--	50.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-2	8/31/2012		60.65	10.70	--	49.95	--	--	--	--	--	9.6	--	--	--	--	--	--	--	--	
A-2	2/8/2013		60.65	4.51	--	56.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(NSP)
AR-2	3/20/2001		54.77	3.13	--	51.64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	6/12/2001		54.77	4.51	--	50.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	9/23/2001		54.77	6.05	--	48.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	12/31/2001		54.77	2.79	--	51.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	3/21/2002		54.77	7.75	--	47.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	4/17/2002		54.77	2.24	--	52.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	8/12/2002		54.77	4.93	--	49.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	12/6/2002		54.77	6.09	--	48.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	1/30/2003		54.77	3.89	--	50.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	5/28/2003		54.77	3.33	--	51.44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	8/6/2003		54.77	5.05	--	49.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	11/14/2003		54.77	6.01	--	48.76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	2/2/2004		59.18	3.88	--	55.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	5/4/2004		59.18	6.01	--	53.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	9/2/2004		59.18	5.65	--	53.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	11/10/2004		59.18	5.48	--	53.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	2/2/2005		59.18	2.62	--	56.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	5/9/2005		59.18	2.84	--	56.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	8/11/2005		59.18	4.33	--	54.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	11/18/2005		59.18	5.34	--	53.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	2/15/2006		59.18	2.49	--	56.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	5/30/2006		59.18	3.02	--	56.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	8/11/2006		59.18	4.32	--	54.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	11/1/2006		59.18	5.25	--	53.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	2/7/2007		59.18	4.64	--	54.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	5/9/2007		59.18	3.15	--	56.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	8/7/2007		59.18	4.55	--	54.63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	11/14/2007		59.18	5.03	--	54.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	2/28/2008		59.18	1.82	--	57.36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	8/13/2008		59.18	5.05	--	54.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	11/19/2008		59.18	5.49	--	53.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	2/10/2009		59.18	5.10	--	54.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	5/7/2009		59.18	2.90	--	56.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	9/3/2009		59.18	5.99	--	53.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	8/24/2012		59.18	4.55	--	54.63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-2	2/8/2013		59.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(INA)
A-3	6/21/2000		54.66	9.48	--	45.18	<50	<0.5	<0.5	<0.5	<1.0	46	--	--	--	--	--	--	--	--	
A-3	9/20/2000		54.66	10.24	--	44.42	<50	<0.5	<0.5	<0.5	<0.5	89.6	--	--	--	--	--	--	--	--	
A-3	12/26/2000		54.66	9.58	--	45.08	<50	<0.5	<0.5	<0.5	<0.5	7.11	--	--	--	--	--	--	--	--	
A-3	3/20/2001		54.66	6.34	--	48.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	6/12/2001		54.66	9.76	--	44.90	<50	<0.5	<0.5	<0.5	<0.5	86	--	--	--	--	--	--	--	--	
A-3	9/23/2001		54.66	10.55	--	44.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 2
Historical and Current Groundwater Monitoring and Analytical Data
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Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	EDB (µg/L)	1,2-DCA (µg/L)	DO (mg/l)	Notes
A-3	12/31/2001		54.66	3.70	--	50.96	<50	<0.5	<0.5	<0.5	1	60	--	--	--	--	--	--	--	--	
A-3	3/21/2002		54.66	5.75	--	48.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	4/17/2002		54.66	7.27	--	47.39	<50	<0.5	<0.5	<0.5	<0.5	45	--	--	--	--	--	--	--	--	
A-3	8/12/2002		54.66	9.71	--	44.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	12/6/2002		54.66	9.55	--	45.11	<500	<5.0	<5.0	<5.0	<5.0	150	--	--	--	--	--	--	--	2.4	
A-3	1/30/2003		54.66	6.05	--	48.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	5/28/2003		54.66	8.06	--	46.60	74	<0.50	<0.50	<0.50	<0.50	43	<20	<0.50	<0.50	24	<100	--	--	1.5	
A-3	8/6/2003		54.66	9.91	--	44.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	11/14/2003		54.66	9.52	--	45.14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	2/2/2004		59.32	5.63	--	53.69	<50	<0.50	<0.50	<0.50	<0.50	13	<20	<0.50	<0.50	4.6	<100	<0.5	<0.5	1.2	
A-3	5/4/2004		59.32	8.14	--	51.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	9/2/2004		59.32	10.10	--	49.22	<250	<2.5	<2.5	<2.5	<2.5	62	<100	<2.5	<2.5	15	<500	<2.5	<2.5	1.3	
A-3	11/10/2004		59.32	7.89	--	51.43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	2/2/2005		59.32	5.00	--	54.32	<50	<0.50	<0.50	<0.50	<0.50	6.8	<20	<0.50	<0.50	2.4	<100	<0.5	<0.5	1.9	
A-3	5/9/2005		59.32	5.96	--	53.36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	8/11/2005		59.32	9.28	--	50.04	<50	<0.50	<0.50	<0.50	<0.50	39	<20	<0.50	<0.50	4.2	<100	<0.5	<0.5	1.8	
A-3	11/18/2005		59.32	8.61	--	50.71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	2/15/2006		59.32	4.36	--	54.96	<50	<0.50	<0.50	<0.50	<0.50	2.2	<20	<0.50	<0.50	0.58	<300	<0.5	<0.5	3.6	
A-3	5/30/2006		59.32	6.28	--	53.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	8/11/2006		59.32	9.27	--	50.05	<50	<0.50	<0.50	<0.50	<0.50	4.1	<20	<0.50	<0.50	<0.50	<300	<0.5	<0.5	2.10	
A-3	11/1/2006		59.32	9.52	--	49.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	2/7/2007		59.32	7.90	--	51.42	<50	<0.50	<0.50	<0.50	<0.50	0.58	<20	<0.50	<0.50	<0.50	<300	<0.5	<0.5	1.74	
A-3	5/9/2007		59.32	6.55	--	52.77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	8/7/2007		59.32	9.57	--	49.75	<50	<0.50	<0.50	<0.50	<0.50	3.9	<20	<0.50	<0.50	<0.50	<300	<0.5	<0.5	0.95	
A-3	11/14/2007		59.32	8.00	--	51.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	2/28/2008		59.32	3.75	--	55.57	<50	<0.50	<0.50	<0.50	<0.50	0.58	<10	<0.50	<0.50	<0.50	<300	<0.5	<0.5	6.16	
A-3	5/23/2008		59.32	9.10	--	50.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	8/13/2008		59.32	9.80	--	49.52	<50	<0.50	<0.50	<0.50	<0.50	0.55	<10	<0.50	<0.50	<0.50	<300	<0.5	<0.5	0.69	
A-3	11/19/2008		59.32	8.31	--	51.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	2/10/2009		59.32	7.30	--	52.02	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	<0.5	<0.5	0.90	
A-3	5/7/2009		59.32	6.10	--	53.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	9/3/2009		59.32	9.50	--	49.82	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	<0.5	<0.5	1.01	
A-3	3/23/2010		59.32	4.45	--	54.87	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<4.0	<0.50	<0.50	<0.50	<100	<0.5	<0.5	--	
A-3	8/16/2010		59.32	9.45	--	49.87	<50	<0.50	<0.50	<0.50	<1.0	0.72	<4.0	<0.50	<0.50	<0.50	<100	<0.5	<0.5	--	
A-3	3/18/2011		59.32	4.00	--	55.32	--	--	--	--	--	<0.50	--	--	--	--	--	--	--	--	
A-3	8/18/2011		59.32	8.62	--	50.70	--	--	--	--	--	<0.50	--	--	--	--	--	--	--	--	
A-3	2/29/2012		59.32	7.22	--	52.10	--	--	--	--	--	<0.50	--	--	--	--	--	--	--	--	
A-3	8/24/2012		59.32	9.31	--	50.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-3	8/31/2012		59.32	9.41	--	49.91	--	--	--	--	--	<0.50	--	--	--	--	--	--	--	--	
A-3	2/8/2013		59.32	6.33	--	52.99	--	--	--	--	--	<0.50	--	--	--	--	--	--	--	--	
AR-3	12/26/2000		54.19	9.70	--	44.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	9/23/2001		54.19	10.43	--	43.76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	12/31/2001		54.19	5.18	--	49.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	3/21/2002		54.19	6.78	--	47.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	4/17/2002		54.19	8.06	--	46.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	8/12/2002		54.19	9.94	--	44.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	12/6/2002		54.19	9.99	--	44.20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	1/30/2003		54.19	7.96	--	46.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	5/28/2003		54.19	8.94	--	45.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	8/6/2003		54.19	9.94	--	44.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	11/14/2003		54.19	10.03	--	44.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	2/2/2004		59.10	6.90	--	52.20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	5/4/2004		59.10	9.12	--	49.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	9/2/2004		59.10	10.15	--	48.95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	11/10/2004		59.10	8.79	--	50.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	2/2/2005		59.10	7.30	--	51.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	5/9/2005		59.10	7.71	--	51.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	8/11/2005		59.10	9.54	--	49.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	11/18/2005		59.10	9.43	--	49.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	2/15/2006		59.10	7.50	--	51.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	5/30/2006		59.10	8.82	--	50.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	8/11/2006		59.10	9.38	--	49.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	11/1/2006		59.10	9.75	--	49.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 2
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Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	EDB (µg/L)	1,2-DCA (µg/L)	DO (mg/l)	Notes
AR-3	2/7/2007		59.10	9.00	--	50.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	5/9/2007		59.10	8.12	--	50.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	8/7/2007		59.10	9.75	--	49.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	11/14/2007		59.10	8.91	--	50.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	2/28/2008		59.10	6.73	--	52.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	8/13/2008		59.10	9.85	--	49.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	11/19/2008		59.10	9.35	--	49.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	2/10/2009		59.10	8.29	--	50.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	5/7/2009		59.10	7.83	--	51.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	9/3/2009		59.10	9.80	--	49.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	8/24/2012		59.10	9.10	--	50.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
AR-3	2/8/2013		59.10	7.62	--	51.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(NSP)
A-4	6/21/2000		54.73	9.49	--	45.24	2,100	110	2.1	11	5.9	2,000	--	--	--	--	--	--	--	--	
A-4	9/20/2000		54.73	10.33	--	44.40	1,540	127	<5.0	9.07	7.42	1,940	--	--	--	--	--	--	--	--	
A-4	12/26/2000		54.73	9.34	--	45.39	1,550	42.7	<5.0	11	10.9	1,210	--	--	--	--	--	--	--	--	
A-4	3/20/2001		54.73	7.56	--	47.17	913	40.9	<5.0	15.5	14.6	<25	--	--	--	--	--	--	--	--	
A-4	6/12/2001		54.73	9.83	--	44.90	2,000	230	<20	21	<20	4,700	--	--	--	--	--	--	--	--	
A-4	9/23/2001		54.73	10.54	--	44.19	1,600	35	<10	<10	<10	3,000	--	--	--	--	--	--	--	--	
A-4	12/31/2001		54.73	5.42	--	49.31	<500	<5.0	<5.0	<5.0	<5.0	880	--	--	--	--	--	--	--	--	
A-4	3/21/2002		54.73	6.18	--	48.55	<5,000	<50	<50	<50	<50	1,400	--	--	--	--	--	--	--	--	
A-4	4/17/2002		54.73	7.34	--	47.39	1,300	79	31	17	55	2,200	--	--	--	--	--	--	--	--	
A-4	8/12/2002		54.73	9.56	--	45.17	2,400	120	<5.0	<5.0	<5.0	2,100	--	--	--	--	--	--	--	2	
A-4	12/6/2002		54.73	10.02	--	44.71	2,200	110	10	42	56	2,000	--	--	--	--	--	--	--	--	
A-4	1/30/2003		54.73	7.55	--	47.18	6,000	180	<50	85	<50	2,100	<2,000	<50	<50	530	<4,000	--	--	1.8	
A-4	5/28/2003		54.73	8.94	--	45.79	6,000	120	<50	<50	<50	2,500	<2,000	<50	<50	590	<10,000	--	--	1.5	
A-4	8/6/2003		54.73	10.03	--	44.70	5,800	100	<25	<25	33	2,500	<1,000	<25	<25	560	<5,000	<25	<25	1.5	
A-4	11/14/2003		54.73	10.37	--	44.36	1,000	17	<5.0	<5.0	<5.0	310	320	<5.0	<5.0	76	<1,000	--	--	1.6	
A-4	2/2/2004		59.59	6.70	--	52.89	3,600	46	<25	<25	<25	1,500	<1,000	<25	<25	350	<5,000	<25	<25	1.0	
A-4	5/4/2004		59.59	9.12	--	50.47	<5,000	<50	<50	<50	<50	2,300	<2,000	<50	<50	510	<10,000	<50	<50	6.4	
A-4	9/2/2004		59.59	9.95	--	49.64	3,000	<25	<25	<25	<25	1,200	1,200	<25	<25	280	<5,000	<25	<25	9.1	
A-4	11/10/2004		59.59	8.68	--	50.91	1,800	16	<10	<10	<10	1,100	910	<10	<10	270	<2,000	<10	<10	2.0	
A-4	2/2/2005		59.59	6.92	--	52.67	3,300	120	<10	66	11	1,700	2,100	<10	<10	430	<2,000	<10	<10	1.5	
A-4	5/9/2005		59.59	7.21	--	52.38	<5,000	140	<50	62	<50	1,800	2,000	<50	<50	460	<10,000	<50	<50	1.64	
A-4	8/11/2005		59.59	9.71	--	49.88	1,700	51	<10	<10	<10	1,200	2,400	<10	<10	310	<2,000	<10	<10	--	
A-4	11/18/2005		59.59	9.45	--	50.14	1,300	23	<2.5	7.2	11	310	1,400	<2.5	<2.5	98	<500	<2.5	<2.5	1.4	
A-4	2/15/2006		59.59	7.12	--	52.47	2,200	46	<2.5	29	7.0	910	2,700	<2.5	<2.5	270	<1,500	<2.5	<2.5	0.9	
A-4	5/30/2006		59.59	7.95	--	51.64	3,300	95	<10	55	<10	1,200	3,000	<10	<10	340	<6,000	<10	<10	1.76	
A-4	8/11/2006		59.59	9.50	--	50.09	350	93	<10	<10	<10	1,200	3,200	<10	<10	350	<6,000	<10	<10	1.4	
A-4	11/1/2006		59.59	9.93	--	49.66	1,300	<10	<10	<10	<10	360	1,700	<10	<10	95	<6,000	--	<10	4.56	
A-4	2/7/2007		59.59	8.82	--	50.77	4,900	85	<10	40	<10	1,500	3,000	<10	<10	460	<6,000	<10	<10	0.72	
A-4	5/9/2007		59.59	7.56	--	52.03	1,700	19	<10	<10	<10	340	2,200	<10	<10	91	<6,000	<10	<10	3.00	
A-4	8/7/2007		59.59	9.80	--	49.79	2,700	69	<5.0	<5.0	<5.0	510	1,800	<5.0	<5.0	140	<3,000	<5	<5	1.04	
A-4	11/14/2007		59.59	8.65	--	50.94	500	4.9	<0.50	<0.50	<0.50	280	600	<0.50	<0.50	90	<300	<0.5	<0.5	1.27	
A-4	2/28/2008		59.59	6.15	--	53.44	850	17	<0.50	4.4	1.4	350	1,600	<0.50	<0.50	73	<300	<0.5	<0.5	1.76	
A-4	5/23/2008		59.59	9.40	--	50.19	1,900	75	<20	<20	<20	1,000	2,500	<20	<20	270	<12,000	<20	<20	1.28	
A-4	8/13/2008		59.59	9.92	--	49.67	3,100	47	<10	<10	<10	530	3,200	<10	<10	190	<6,000	<10	<10	0.89	
A-4	11/19/2008		59.59	9.19	--	50.40	1,800	70	<10	21	<10	430	2,000	<10	<10	140	<6,000	<10	<10	0.83	
A-4	2/10/2009		59.59	7.68	--	51.91	1,900	33	<10	14	<10	400	2,300	<10	<10	120	<6,000	<10	<10	0.87	
A-4	5/7/2009		59.59	7.31	--	52.28	<50	<0.50	<0.50	<0.50	<0.50	9.9	11	<0.50	<0.50	2.0	<300	<0.5	<0.5	2.40	
A-4	9/3/2009		59.59	10.02	--	49.57	3,800	49	<10	<10	<10	360	3,200	<10	<10	120	<6,000	<10	<10	0.79	
A-4	3/23/2010		59.59	6.62	--	52.97	1,000	17	<0.50	5.0	1.3	150	1,600	<0.50	<0.50	45	<100	<0.5	<0.5	--	
A-4	8/16/2010		59.59	9.85	--	49.74	1,600	18	0.50	0.56	<1.0	160	3,400	<0.50	<0.50	47	<100	<0.5	<0.5	--	
A-4	3/18/2011		59.59	5.34	--	54.25	490	9.9	<0.50	1.9	<1.0	66	1,400	<0.50	<0.50	18	<250	<0.5	<0.5	--	
A-4	8/18/2011		59.59	9.08	--	50.51	650	1.9	<0.50	<0.50	<1.0	53	1,400	<0.50	<0.50	15	<250	<0.5	<0.5	--	
A-4	2/29/2012		59.59	6.70	--	52.89	1,300	12	<0.50	4.2	1.1	140	2,200	<0.50	<0.50	38	<250	<0.5	<0.5	--	
A-4	8/24/2012		59.59	9.95	--	49.64	720	<0.50	<0.50	<0.50	<1.0	5.7	370	<0.50	<0.50	<0.50	<250	<0.5	<0.5	--	
A-4	2/8/2013		59.59	7.05	--	52.54	890	5.0	<0.50	1.6	<1.0	--	1,600	<0.50	<0.50	19	<250	<0.5	<0.5	--	
A-5	6/21/2000		54.17	9.29	--	44.88	980	<0.5	<0.5	<0.5	<1.0	2,000	--	--	--	--	--	--	--	--	
A-5	9/20/2000		54.17	10.23	--	43.94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	12/26/2000		54.17	9.65	--	44.52	525	<0.5	<0.5	<0.5	<0.5	1,200	--	--	--	--	--	--	--	--	
A-5	3/20/2001		54.17	8.05	--	46.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	6/12/2001		54.17	9.81	--	44.36	830	<5.0	<5.0	<5.0	<5.0	3,200	--	--	--	--	--	--	--	--	

Table 2
Historical and Current Groundwater Monitoring and Analytical Data
CA-04931
731 W Macarthur Blvd, Oakland, CA 94609

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	EDB (µg/L)	1,2-DCA (µg/L)	DO (mg/l)	Notes
A-5	9/23/2001		54.17	10.42	--	43.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	12/31/2001		54.17	6.03	--	48.14	320	<0.5	<0.5	<0.5	<0.5	60	--	--	--	--	--	--	--	--	
A-5	3/21/2002		54.17	6.71	--	47.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	4/17/2002		54.17	8.01	--	46.16	1,600	<10	<10	<10	<10	3,200	--	--	--	--	--	--	--	--	
A-5	8/12/2002		54.17	9.87	--	44.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	12/6/2002		54.17	9.66	--	44.51	310	<0.50	<0.50	<0.50	<0.50	330	--	--	--	--	--	--	--	1.9	
A-5	1/30/2003		54.17	7.67	--	46.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	5/28/2003		54.17	8.56	--	45.61	<5,000	<50	<50	<50	<50	1,500	<2,000	<50	<50	620	<10,000	--	--	1.6	
A-5	8/6/2003		54.17	9.58	--	44.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	11/14/2003		54.17	9.81	--	44.36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	2/2/2004		58.78	7.43	--	51.35	390	<2.5	9.2	<2.5	2.6	140	170	<2.5	<2.5	54	<500	<2.5	<2.5	1.0	
A-5	5/4/2004		58.78	9.98	--	48.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	9/2/2004		58.78	9.65	--	49.13	<250	<2.5	<2.5	<2.5	<2.5	66	150	<2.5	<2.5	29	<500	<2.5	<2.5	1.1	
A-5	11/10/2004		58.78	8.48	--	50.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	2/2/2005		58.78	7.10	--	51.68	68	<0.50	<0.50	<0.50	<0.50	17	840	<0.50	<0.50	7.6	<100	<0.5	<0.5	1.0	
A-5	5/9/2005		58.78	7.20	--	51.58	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	8/11/2005		58.78	9.21	--	49.57	<50	<0.50	<0.50	<0.50	<0.50	6.8	530	<0.50	<0.50	7.1	<100	<0.5	<0.5	1.3	
A-5	11/18/2005		58.78	9.10	--	49.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	2/15/2006		58.78	7.16	--	51.62	<50	<0.50	<0.50	<0.50	<0.50	5.1	460	<0.50	<0.50	4.2	<300	<0.5	<0.5	1.2	
A-5	5/30/2006		58.78	7.87	--	50.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	8/11/2006		58.78	8.90	--	49.88	920	<0.50	<0.50	<0.50	<0.50	12	1,100	<0.50	<0.50	5.0	<300	<0.5	<0.5	1.4	
A-5	11/1/2006		58.78	9.30	--	49.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	2/7/2007		58.78	8.50	--	50.28	60	<0.50	<0.50	<0.50	<0.50	1.5	600	<0.50	<0.50	<0.50	<300	<0.5	<0.5	0.73	
A-5	5/9/2007		58.78	7.60	--	51.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	8/7/2007		58.78	9.30	--	49.48	<50	<0.50	<0.50	<0.50	<0.50	0.81	79	<0.50	<0.50	<0.50	<300	<0.5	<0.5	0.41	
A-5	11/14/2007		58.78	8.48	--	50.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	2/28/2008		58.78	6.21	--	52.57	<50	<0.50	<0.50	<0.50	<0.50	0.97	230	<0.50	<0.50	<0.50	<300	<0.5	<0.5	2.24	
A-5	5/23/2008		58.78	8.97	--	49.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	8/13/2008		58.78	9.42	--	49.36	<50	<0.50	<0.50	<0.50	<0.50	0.69	33	<0.50	<0.50	<0.50	<300	<0.5	<0.5	0.62	
A-5	11/19/2008		58.78	8.91	--	49.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	2/10/2009		58.78	7.80	--	50.98	<50	<0.50	<0.50	<0.50	<0.50	1.6	18	<0.50	<0.50	0.59	<300	<0.5	<0.5	0.85	
A-5	5/7/2009		58.78	7.37	--	51.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	9/3/2009		58.78	9.33	--	49.45	<50	<0.50	<0.50	<0.50	<0.50	20	<10	<0.50	<0.50	9.1	<300	<0.5	<0.5	0.91	
A-5	3/23/2010		58.78	6.84	--	51.94	<50	<0.50	<0.50	<0.50	<1.0	<0.50	33	<0.50	<0.50	<0.50	<100	<0.5	<0.5	--	
A-5	8/16/2010		58.78	8.85	--	49.93	<50	<0.50	<0.50	<0.50	<1.0	7.9	35	<0.50	<0.50	3.1	<100	<0.5	<0.5	--	
A-5	3/18/2011		58.78	5.45	--	53.33	<50	--	--	--	--	<0.50	--	--	--	--	--	--	--	--	
A-5	8/18/2011		58.78	8.37	--	50.41	<50	--	--	--	--	0.81	--	--	--	--	--	--	--	--	
A-5	2/29/2012		58.78	8.12	--	50.66	<50	--	--	--	--	<0.50	--	--	--	--	--	--	--	--	
A-5	8/24/2012		58.78	9.15	--	49.63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-5	2/8/2013		58.78	7.65	--	51.13	<2,500	--	--	--	--	240	--	--	--	--	--	--	--	--	
A-6	6/21/2000		55.17	8.67	--	46.50	<50	<0.5	<0.5	<0.5	<1.0	<3.0	--	--	--	--	--	--	--	--	
A-6	9/20/2000		55.17	9.34	--	45.83	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-6	12/26/2000		55.17	8.65	--	46.52	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-6	3/20/2001		55.17	6.84	--	48.33	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-6	6/12/2001		55.17	8.93	--	46.24	<50	<0.5	<0.5	<0.5	<0.5	7	--	--	--	--	--	--	--	--	
A-6	9/23/2001		55.17	9.74	--	45.43	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-6	12/31/2001		55.17	4.81	--	50.36	<50	<0.5	<0.5	<0.5	<0.5	3.2	--	--	--	--	--	--	--	--	
A-6	3/21/2002		55.17	5.44	--	49.73	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-6	4/17/2002		55.17	6.95	--	48.22	<50	<0.5	<0.5	<0.5	<0.5	3.1	--	--	--	--	--	--	--	--	
A-6	8/12/2002		55.17	8.90	--	46.27	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	4.3	
A-7	6/21/2000		54.71	8.58	--	46.13	<50	<0.5	<0.5	<0.5	<1.0	<3.0	--	--	--	--	--	--	--	--	
A-7	9/20/2000		54.71	9.19	--	45.52	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	12/26/2000		54.71	8.50	--	46.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	3/20/2001		54.71	6.75	--	47.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	6/12/2001		54.71	8.80	--	45.91	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-7	9/23/2001		54.71	9.59	--	45.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	12/31/2001		54.71	4.78	--	49.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	3/21/2002		54.71	5.35	--	49.36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	4/17/2002		54.71	6.88	--	47.83	<50	<0.5	<0.5	<0.5	<0.5	2.5	--	--	--	--	--	--	--	--	
A-7	8/12/2002		54.71	8.77	--	45.94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	12/6/2002		54.71	9.07	--	45.64	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	1/30/2003		54.71	6.65	--	48.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 2
Historical and Current Groundwater Monitoring and Analytical Data
CA-04931
731 W Macarthur Blvd, Oakland, CA 94609

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	EDB (µg/L)	1,2-DCA (µg/L)	DO (mg/l)	Notes
A-7	5/28/2003		54.71	7.63	--	47.08	<50	<0.50	<0.50	<0.50	<0.50	3.8	<20	<0.50	<0.50	0.94	<100	--	--	2.3	
A-7	8/6/2003		54.71	8.90	--	45.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	11/14/2003		54.71	9.08	--	45.63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	2/2/2004		59.75	5.96	--	53.79	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	5/4/2004		59.75	8.21	--	51.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	9/2/2004		59.75	9.02	--	50.73	<50	<0.50	<0.50	<0.50	<0.50	8.9	<20	<0.50	<0.50	3.0	<100	<0.5	<0.5	3.0	
A-7	11/10/2004		59.75	7.50	--	52.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	2/2/2005		59.75	6.10	--	53.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	5/9/2005		59.75	6.48	--	53.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	8/11/2005		59.75	8.45	--	51.30	<50	<0.50	<0.50	<0.50	<0.50	18	<20	<0.50	<0.50	4.4	<100	<0.5	<0.5	1.6	
A-7	11/18/2005		59.75	8.65	--	51.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	2/15/2006		59.75	6.51	--	53.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	5/30/2006		59.75	7.13	--	52.62	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	8/11/2006		59.75	8.46	--	51.29	<50	<0.50	<0.50	<0.50	<0.50	3.6	<20	<0.50	<0.50	0.91	<300	<0.5	0.54	1.7	
A-7	11/1/2006		59.75	8.99	--	50.76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	2/7/2007		59.75	8.12	--	51.63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	5/9/2007		59.75	7.04	--	52.71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	8/7/2007		59.75	9.10	--	50.65	<50	<0.50	<0.50	<0.50	<0.50	2.7	<20	<0.50	<0.50	<0.50	<300	<0.5	<0.5	1.34	
A-7	11/14/2007		59.75	8.00	--	51.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	2/28/2008		59.75	5.81	--	53.94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	5/23/2008		59.75	8.74	--	51.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	8/13/2008		59.75	9.27	--	50.48	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	<0.5	<0.5	1.05	
A-7	11/19/2008		59.75	8.67	--	51.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	2/10/2009		59.75	7.47	--	52.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	5/7/2009		59.75	6.88	--	52.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	9/3/2009		59.75	9.25	--	50.50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	<0.5	<0.5	0.93	
A-7	3/23/2010		59.75	6.33	--	53.42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	8/16/2010		59.75	9.13	--	50.62	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<4.0	<0.50	<0.50	<0.50	<100	<0.5	<0.5	--	
A-7	3/18/2011		59.75	5.20	--	54.55	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	8/18/2011		59.75	8.54	--	51.21	--	--	--	--	--	<0.50	--	--	--	--	--	--	--	--	
A-7	2/29/2012		59.75	8.00	--	51.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	8/24/2012		59.75	9.06	--	50.69	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-7	8/31/2012		59.75	9.04	--	50.71	--	--	--	--	--	<0.50	--	--	--	--	--	--	--	--	
A-7	2/8/2013		59.75	7.44	--	52.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(NSP)
A-8	6/21/2000		53.77	9.07	--	44.70	810	<0.5	<0.5	<0.5	810	1,500	--	--	--	--	--	--	--	--	
A-8	9/20/2000		53.77	9.72	--	44.05	10,800	2,680	46	439	370	4,410	--	--	--	--	--	--	--	--	
A-8	12/26/2000		53.77	9.20	--	44.57	7,700	1,440	<50	202	106	2,230	--	--	--	--	--	--	--	--	
A-8	3/20/2001		53.77	7.51	--	46.26	<5,000	1,280	<50	53.9	<50	2,880	--	--	--	--	--	--	--	--	
A-8	6/12/2001		53.77	9.53	--	44.24	5,600	1,700	<50	61	54	2,900	--	--	--	--	--	--	--	--	
A-8	9/23/2001		53.77	10.08	--	43.69	10,000	3,500	<50	110	64	6,500	--	--	--	--	--	--	--	--	
A-8	12/31/2001		53.77	4.34	--	49.43	4,300	610	<10	60	24	520	--	--	--	--	--	--	--	--	
A-8	3/21/2002		53.77	6.67	--	47.10	6,600	1,400	<50	130	<50	2,700	--	--	--	--	--	--	--	--	
A-8	4/17/2002		53.77	7.72	--	46.05	3,800	540	<10	<10	12	3,100	--	--	--	--	--	--	--	--	
A-8	8/12/2002		53.77	9.64	--	44.13	9,400	1,800	<20	35	28	4,200	--	--	--	--	--	--	--	1	
A-8	12/6/2002		53.77	9.62	--	44.15	5,300	1,100	11	11	<10	2,200	--	--	--	--	--	--	--	1.4	
A-8	1/30/2003		53.77	7.49	--	46.28	<10,000	1,100	<100	<100	<100	2,200	<4,000	<100	<100	900	<8,000	--	--	1.5	
A-8	5/28/2003		53.77	9.17	--	44.60	7,700	1,700	<50	<50	<50	2,100	<2,000	<50	<50	1,100	<10,000	--	--	1	
A-8	8/6/2003		53.77	9.67	--	44.10	13,000	2,400	<50	<50	<50	3,000	<2,000	<50	<50	1,200	<10,000	<50	<50	0.9	
A-8	11/14/2003		53.77	9.80	--	43.97	3,100	570	<5.0	<5.0	<5.0	850	<200	<5.0	<5.0	320	<1,000	--	--	2.3	
A-8	2/2/2004		58.70	7.10	--	51.60	3,900	300	<25	<25	<25	1,100	<1,000	<25	<25	380	<5,000	<25	<25	1.1	
A-8	5/4/2004		58.70	9.44	--	49.26	<5,000	490	<50	<50	<50	1,600	<2,000	<50	<50	440	<10,000	<50	<50	1.0	
A-8	9/2/2004		58.70	9.67	--	49.03	<2,500	30	<25	<25	<25	680	<1,000	<25	<25	170	<5,000	<25	<25	1.0	
A-8	11/10/2004		58.70	8.15	--	50.55	580	61	<2.5	<2.5	<2.5	290	<100	<2.5	<2.5	66	<500	<2.5	<2.5	1.5	
A-8	2/2/2005		58.70	6.53	--	52.17	5,000	890	<25	<25	<25	1,900	<1,000	<25	<25	510	<5,000	<25	<25	1.0	
A-8	5/9/2005		58.70	6.31	--	52.39	69	0.90	<0.50	<0.50	<0.50	66	<20	<0.50	<0.50	2.9	<100	<0.5	<0.5	4.1	
A-8	8/11/2005		58.70	9.15	--	49.55	1,400	1,300	<12	<12	<12	1,100	<500	<12	<12	310	<2,500	<12	<12	0.7	
A-8	11/18/2005		58.70	8.89	--	49.81	1,200	420	<5.0	<5.0	<5.0	340	<200	<5.0	<5.0	120	<1,000	<5	<5	0.7	
A-8	2/15/2006		58.70	6.34	--	52.36	3,200	970	<10	<10	<10	1,100	880	<10	<10	330	<6,000	<10	<10	0.9	
A-8	5/30/2006		58.70	7.53	--	51.17	510	210	<2.5	<2.5	<2.5	140	<100	<2.5	<2.5	43	<1,500	<2.5	<2.5	2.6	
A-8	8/11/2006		58.70	8.90	--	49.80	1,300	500	<5.0	<5.0	<5.0	290	<200	<5.0	<5.0	92	<3,000	<5	<5	0.7	
A-8	11/1/2006		58.70	9.15	--	49.55	4,800	790	6.6	<5.0	<5.0	910	1,200	<5.0	<5.0	250	<3,000	<5	<5	1.72	
A-8	2/7/2007		58.70	8.48	--	50.22	7,600	2,300	<25	<25	<25	1,200	<1,000	<25	<25	330	<15,000	<25	<25	1.25	
A-8	5/9/2007		58.70	7.25	--	51.45	750	180	<2.5	<2.5	<2.5	55	<100	<2.5	<2.5	16	<1,500	<2.5	<2.5	1.75	

Table 2
Historical and Current Groundwater Monitoring and Analytical Data
CA-04931
731 W Macarthur Blvd, Oakland, CA 94609

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	EDB (µg/L)	1,2-DCA (µg/L)	DO (mg/l)	Notes
A-8	8/7/2007		58.70	9.17	--	49.53	2,100	700	4.0	<2.5	<2.5	430	140	<2.5	<2.5	160	<1,500	<2.5	<2.5	0.77	
A-8	11/14/2007		58.70	7.77	--	50.93	990	300	2.5	0.68	0.96	100	28	<0.50	<0.50	44	<300	<0.5	<0.5	1.01	
A-8	2/28/2008		58.70	5.14	--	53.56	2,100	670	<5.0	<5.0	<5.0	220	230	<5.0	<5.0	72	<3,000	<5	<5	1.67	
A-8	8/13/2008		58.70	9.48	--	49.22	3,100	970	<25	<25	<25	250	<500	<25	<25	86	<15,000	<25	<25	0.84	
A-8	11/19/2008		58.70	8.87	--	49.83	3,800	1,000	<20	<20	<20	230	<400	<20	<20	100	<12,000	<20	<20	0.89	
A-8	2/10/2009		58.70	7.11	--	51.59	3,600	1,300	<25	<25	<25	320	<500	<25	<25	120	<15,000	<25	<25	0.89	
A-8	5/7/2009		58.70	6.47	--	52.23	270	65	<1.0	<1.0	<1.0	12	20	<1.0	<1.0	3.3	<600	<1	<1	0.97	
A-8	9/3/2009		58.70	9.47	--	49.23	3,200	1,400	<25	<25	<25	100	<500	<25	<25	52	<15,000	<25	<25	0.87	
A-8	3/23/2010		58.70	6.12	--	52.58	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<4.0	<0.50	<0.50	<0.50	<100	<0.5	<0.5	--	
A-8	8/16/2010		58.70	9.27	--	49.43	4,300	1,600	12	5.3	6.1	110	<4.0	<0.50	<0.50	41	<100	<0.5	<0.5	--	
A-8	3/18/2011		58.70	5.01	--	53.69	2,000	620	4.7	0.96	1.4	87	220	<0.50	<0.50	43	<250	<0.5	<0.5	--	
A-8	8/18/2011		58.70	8.76	--	49.94	3,300	1,500	13	5.4	<10	120	<40	<5.0	<5.0	57	<2,500	<5	<5	--	
A-8	2/29/2012		58.70	8.19	--	50.51	3,400	1,700	10	3.4	3.9	160	460	<0.50	<0.50	71	<250	<0.5	<0.5	--	
A-8	8/24/2012		58.70	9.44	--	49.26	3,700	1,800	<25	<25	<50	64	220	<25	<25	33	<13,000	<25	<25	--	
A-8	2/8/2013		58.70	7.35	--	51.35	<50	6.0	<0.50	<0.50	<1.0	--	<4.0	<0.50	<0.50	0.92	<250	<0.5	<0.5	--	
A-9	6/21/2000		53.04	8.56	--	44.48	<50	<0.5	<0.5	<0.5	<1.0	5	--	--	--	--	--	--	--	--	
A-9	9/20/2000		53.04	9.05	--	43.99	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-9	12/26/2000		53.04	8.49	--	44.55	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-9	3/20/2001		53.04	6.95	--	46.09	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-9	6/12/2001		53.04	8.67	--	44.37	<50	<0.5	<0.5	<0.5	<0.5	4.8	--	--	--	--	--	--	--	--	
A-9	9/23/2001		53.04	9.21	--	43.83	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-9	12/31/2001		53.04	4.57	--	48.47	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-9	3/21/2002		53.04	5.60	--	47.44	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-9	4/17/2002		53.04	6.89	--	46.15	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-9	8/12/2002		53.04	8.71	--	44.33	<50	<0.50	<0.50	<0.50	<0.50	<2.5	--	--	--	--	--	--	--	4	
A-9	12/6/2002		53.04	8.77	--	44.27	<50	<0.50	<0.50	<0.50	<0.50	<2.0	--	--	--	--	--	--	--	1.1	
A-9	1/30/2003		53.04	6.88	--	46.16	<50	<0.50	<0.50	<0.50	<0.50	1.1	<20	<0.50	<0.50	<0.50	<40	--	--	0.9	
A-9	5/28/2003		53.04	9.75	--	43.29	<50	<0.50	<0.50	<0.50	<0.50	0.74	<20	<0.50	<0.50	<0.50	<100	--	--	1.9	
A-9	8/6/2003		53.04	9.00	--	44.04	<50	<0.50	<0.50	<0.50	<0.50	1.8	<20	<0.50	<0.50	<0.50	<100	<0.5	<0.5	2.2	
A-9	11/14/2003		53.04	8.82	--	44.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	2/2/2004		57.73	7.10	--	50.63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	5/4/2004		57.73	8.12	--	49.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	9/2/2004		57.73	8.78	--	48.95	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<100	<0.5	<0.5	6.6	
A-9	11/10/2004		57.73	7.88	--	49.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	2/2/2005		57.73	6.40	--	51.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	5/9/2005		57.73	6.82	--	50.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	8/11/2005		57.73	8.37	--	49.36	<50	<0.50	<0.50	<0.50	<0.50	1.5	<20	<0.50	<0.50	<0.50	<100	<0.5	<0.5	1.8	
A-9	11/18/2005		57.73	8.24	--	49.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	2/15/2006		57.73	6.38	--	51.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	5/30/2006		57.73	7.17	--	50.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	8/11/2006		57.73	8.20	--	49.53	<50	<0.50	<0.50	<0.50	<0.50	1.6	<20	<0.50	<0.50	<0.50	<300	<0.5	<0.5	1.02	
A-9	11/1/2006		57.73	8.90	--	48.83	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	2/7/2007		57.73	7.83	--	49.90	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	5/9/2007		57.73	6.92	--	50.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	8/7/2007		57.73	8.58	--	49.15	<50	<0.50	<0.50	<0.50	<0.50	0.64	<20	<0.50	<0.50	<0.50	<300	<0.5	<0.5	1.81	
A-9	11/14/2007		57.73	7.77	--	49.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	2/28/2008		57.73	5.61	--	52.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	8/13/2008		57.73	8.65	--	49.08	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	<0.5	<0.5	0.55	
A-9	11/19/2008		57.73	8.49	--	49.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	2/10/2009		57.73	7.07	--	50.66	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	5/7/2009		57.73	6.65	--	51.08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	9/3/2009		57.73	8.56	--	49.17	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	<0.5	<0.5	0.89	
A-9	3/23/2010		57.73	5.98	--	51.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	8/16/2010		57.73	8.32	--	49.41	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<4.0	<0.50	<0.50	<0.50	<100	<0.5	<0.5	--	
A-9	3/18/2011		57.73	4.40	--	53.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	8/18/2011		57.73	7.94	--	49.79	--	--	--	--	--	<0.50	--	--	--	--	--	--	--	--	
A-9	2/29/2012		57.73	7.48	--	50.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-9	8/24/2012		57.73	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(Dry)
A-9	2/8/2013		57.73	6.63	--	51.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(NSP)
A-10	6/21/2000		54.26	10.47	--	43.79	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	9/20/2000		54.26	10.76	--	43.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	11/14/2003		54.26	10.37	--	43.89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 2
Historical and Current Groundwater Monitoring and Analytical Data
CA-04931
731 W Macarthur Blvd, Oakland, CA 94609

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	EDB (µg/L)	1,2-DCA (µg/L)	DO (mg/l)	Notes
A-10	2/2/2004		59.39	7.97	--	51.42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	5/4/2004		59.39	8.69	--	50.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	9/2/2004		59.39	10.55	--	48.84	<500	<5.0	<5.0	<5.0	<5.0	270	<200	<5.0	<5.0	44	<1,000	<5	<5	0.8	
A-10	11/10/2004		59.39	9.16	--	50.23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	2/2/2005		59.39	7.90	--	51.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	5/9/2005		59.39	8.21	--	51.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	8/11/2005		59.39	10.02	--	49.37	69	<0.50	<0.50	<0.50	<0.50	97	<20	<0.50	<0.50	14	<100	<0.5	<0.5	0.9	
A-10	11/18/2005		59.39	9.86	--	49.53	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	2/15/2006		59.39	7.53	--	51.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	5/30/2006		59.39	8.82	--	50.57	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	8/11/2006		59.39	9.88	--	49.51	<50	<0.50	<0.50	<0.50	<0.50	46	<20	<0.50	<0.50	7.3	<300	<0.5	<0.5	1.3	
A-10	11/1/2006		59.39	10.28	--	49.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	2/7/2007		59.39	9.50	--	49.89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	5/9/2007		59.39	8.67	--	50.72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	8/7/2007		59.39	10.25	--	49.14	<50	<0.50	<0.50	<0.50	<0.50	8.9	<20	<0.50	<0.50	<0.50	<300	<0.5	<0.5	0.59	
A-10	11/14/2007		59.39	9.48	--	49.91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	2/28/2008		59.39	7.23	--	52.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	5/23/2008		59.39	9.94	--	49.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	8/13/2008		59.39	10.30	--	49.09	<50	<0.50	<0.50	<0.50	<0.50	28	<10	<0.50	<0.50	6.9	<300	<0.5	<0.5	0.74	
A-10	11/19/2008		59.39	9.90	--	49.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	2/10/2009		59.39	8.74	--	50.65	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	5/7/2009		59.39	8.23	--	51.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	3/23/2010		59.39	7.65	--	51.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	8/16/2010		59.39	10.05	--	49.34	<50	<0.50	<0.50	<0.50	<1.0	3.9	<4.0	<0.50	<0.50	<0.50	<100	<0.5	<0.5	--	
A-10	3/18/2011		59.39	6.52	--	52.87	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	8/18/2011		59.39	9.58	--	49.81	--	--	--	--	--	2.1	--	--	--	--	--	--	--	--	
A-10	2/29/2012		59.39	9.02	--	50.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-10	8/24/2012		59.39	10.03	--	49.36	--	--	--	--	--	1.8	--	--	--	--	--	--	--	--	
A-10	2/8/2013		59.39	8.30	--	51.09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(NSP)
A-11	6/21/2000		53.74	9.54	--	44.20	<50	<0.5	<0.5	<0.5	<1.0	4	--	--	--	--	--	--	--	--	
A-11	9/20/2000		53.74	10.62	--	43.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	12/26/2000		53.74	10.03	--	43.71	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-11	3/20/2001		53.74	8.49	--	45.25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	6/12/2001		53.74	10.21	--	43.53	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-11	9/23/2001		53.74	10.77	--	42.97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	12/31/2001		53.74	6.06	--	47.68	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-11	3/21/2002		53.74	7.14	--	46.60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	4/17/2002		53.74	8.41	--	45.33	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-11	8/12/2002		53.74	10.25	--	43.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	12/6/2002		53.74	10.43	--	43.31	<50	<0.50	<0.50	<0.50	<0.50	<2.0	--	--	--	--	--	--	--	2.4	
A-11	1/30/2003		53.74	8.42	--	45.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	5/28/2003		53.74	9.30	--	44.44	<50	<0.50	<0.50	<0.50	<0.50	0.53	<20	<0.50	<0.50	<0.50	<100	--	--	1.8	
A-11	8/6/2003		53.74	10.28	--	43.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	11/14/2003		53.74	10.40	--	43.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	2/2/2004		59.16	7.95	--	51.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	5/4/2004		59.16	8.72	--	50.44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	9/2/2004		59.16	10.44	--	48.72	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<100	<0.5	<0.5	2.6	
A-11	11/10/2004		59.16	9.20	--	49.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	2/2/2005		59.16	7.95	--	51.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	5/9/2005		59.16	8.07	--	51.09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	8/11/2005		59.16	9.87	--	49.29	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<100	<0.5	<0.5	3.8	
A-11	11/18/2005		59.16	8.88	--	50.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	2/15/2006		59.16	7.90	--	51.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	5/30/2006		59.16	8.78	--	50.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	8/11/2006		59.16	10.33	--	48.83	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<300	<0.5	<0.5	3.8	
A-11	11/1/2006		59.16	10.10	--	49.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	2/7/2007		59.16	9.35	--	49.81	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	5/9/2007		59.16	8.48	--	50.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	8/7/2007		59.16	10.10	--	49.06	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<300	<0.5	<0.5	2.67	
A-11	11/14/2007		59.16	9.31	--	49.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	2/28/2008		59.16	7.12	--	52.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	5/23/2008		59.16	9.77	--	49.39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	8/13/2008		59.16	10.08	--	49.08	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	<0.5	<0.5	0.89	

Table 2
Historical and Current Groundwater Monitoring and Analytical Data
CA-04931
731 W Macarthur Blvd, Oakland, CA 94609

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	EDB (µg/L)	1,2-DCA (µg/L)	DO (mg/l)	Notes
A-11	11/19/2008		59.16	9.75	--	49.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	2/10/2009		59.16	8.67	--	50.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	5/7/2009		59.16	8.20	--	50.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	9/3/2009		59.16	10.15	--	49.01	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	<0.5	<0.5	0.98	
A-11	3/23/2010		59.16	7.70	--	51.46	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-11	8/16/2010		59.16	9.90	--	49.26	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<4.0	<0.50	<0.50	<0.50	<100	<0.5	<0.5	--	
A-11	8/24/2012		59.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(INA)
A-11	2/8/2013		59.16	8.47	--	50.69	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<4.0	<0.50	<0.50	<0.50	<250	<0.5	<0.5	--	
A-12	6/21/2000		52.05	9.28	--	42.77	<50	<0.5	<0.5	<0.5	<1.0	18	--	--	--	--	--	--	--	--	
A-12	9/20/2000		52.05	9.55	--	42.50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	12/26/2000		52.05	9.05	--	43.00	<50	<0.5	<0.5	<0.5	<0.5	17.3	--	--	--	--	--	--	--	--	
A-12	3/20/2001		52.05	7.92	--	44.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	6/12/2001		52.05	9.26	--	42.79	<50	<0.5	<0.5	<0.5	<0.5	25	--	--	--	--	--	--	--	--	
A-12	9/23/2001		52.05	9.68	--	42.37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	12/31/2001		52.05	5.74	--	46.31	<50	<0.5	<0.5	<0.5	<0.5	9.5	--	--	--	--	--	--	--	--	
A-12	3/21/2002		52.05	6.64	--	45.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	4/17/2002		52.05	7.68	--	44.37	<50	<0.5	<0.5	<0.5	<0.5	29	--	--	--	--	--	--	--	--	
A-12	8/12/2002		52.05	9.30	--	42.75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	12/6/2002		52.05	9.38	--	42.67	<50	<0.50	<0.50	<0.50	<0.50	13	--	--	--	--	--	--	--	2.3	
A-12	1/30/2003		52.05	7.87	--	44.18	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	5/28/2003		52.05	8.51	--	43.54	50	<0.50	<0.50	<0.50	<0.50	10	<20	<0.50	<0.50	2.5	<100	--	--	1.4	
A-12	8/6/2003		52.05	9.28	--	42.77	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	11/14/2003		52.05	9.37	--	42.68	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	2/2/2004		57.06	7.90	--	49.16	<50	<0.50	<0.50	<0.50	<0.50	0.91	<20	<0.50	<0.50	<0.50	<100	<0.5	<0.5	1.0	
A-12	5/4/2004		57.06	8.74	--	48.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	9/2/2004		57.06	9.41	--	47.65	<50	<0.50	<0.50	<0.50	<0.50	6.2	<20	<0.50	<0.50	1.7	<100	<0.5	<0.5	1.1	
A-12	11/10/2004		57.06	8.32	--	48.74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	2/2/2005		57.06	7.45	--	49.61	<50	<0.50	<0.50	<0.50	<0.50	8.3	<20	<0.50	<0.50	2.2	<100	<0.5	<0.5	1.4	
A-12	5/9/2005		57.06	7.57	--	49.49	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	8/11/2005		57.06	9.05	--	48.01	<50	<0.50	<0.50	<0.50	<0.50	5.4	<20	<0.50	<0.50	1.1	<100	<0.5	<0.5	0.9	
A-12	11/18/2005		57.06	8.90	--	48.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	2/15/2006		57.06	7.47	--	49.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	5/30/2006		57.06	8.21	--	48.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	8/11/2006		57.06	8.85	--	48.21	<50	<0.50	<0.50	<0.50	<0.50	7.4	<20	<0.50	<0.50	2.5	<300	<0.5	<0.5	1.8	
A-12	11/1/2006		57.06	9.17	--	47.89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	2/7/2007		57.06	8.58	--	48.48	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	5/9/2007		57.06	7.93	--	49.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	8/7/2007		57.06	9.20	--	47.86	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<300	<0.5	<0.5	1.49	
A-12	11/14/2007		57.06	8.52	--	48.54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	2/28/2008		57.06	7.04	--	50.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	5/23/2008		57.06	9.00	--	48.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	8/13/2008		57.06	9.38	--	47.68	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<0.50	<0.50	<0.50	<300	<0.5	<0.5	1.03	
A-12	11/19/2008		57.06	9.01	--	48.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	2/10/2009		57.06	8.10	--	48.96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	5/7/2009		57.06	7.80	--	49.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	9/3/2009		57.06	9.40	--	47.66	<50	<0.50	<0.50	<0.50	<0.50	3.6	<10	<0.50	<0.50	1.0	<300	<0.5	<0.5	0.98	
A-12	3/23/2010		57.06	7.68	--	49.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-12	8/16/2010		57.06	9.30	--	47.76	<50	<0.50	<0.50	<0.50	<1.0	3.6	<4.0	<0.50	<0.50	0.85	<100	<0.5	<0.5	--	
A-12	8/24/2012		57.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(INA)
A-12	2/8/2013		57.06	8.38	--	48.68	<50	<0.50	<0.50	<0.50	<1.0	3.3	<4.0	<0.50	<0.50	1.2	<250	<0.5	<0.5	--	
A-13	3/21/2002		55.11	6.70	--	48.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	4/17/2002		55.11	7.95	--	47.16	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--	--	--	--	--	--	--	--	
A-13	8/12/2002		55.11	10.11	--	45.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	12/6/2002		55.11	10.26	--	44.85	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Table 2
Historical and Current Groundwater Monitoring and Analytical Data
CA-04931
731 W Macarthur Blvd, Oakland, CA 94609

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	EDB (µg/L)	1,2-DCA (µg/L)	DO (mg/l)	Notes
A-13	1/30/2003		55.11	7.81	--	47.30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	5/28/2003		55.11	9.06	--	46.05	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<100	--	--	1.9	
A-13	8/6/2003		55.11	10.22	--	44.89	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	11/14/2003		55.11	10.27	--	44.84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	2/2/2004		60.26	7.92	--	52.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	5/4/2004		60.26	10.06	--	50.20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	9/2/2004		60.26	10.34	--	49.92	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<20	<0.50	<0.50	<0.50	<100	<0.5	<0.5	2.0	
A-13	11/10/2004		60.26	8.95	--	51.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	2/2/2005		60.26	7.28	--	52.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	5/9/2005		60.26	7.85	--	52.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	8/11/2005		60.26	9.70	--	50.56	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	11/18/2005		60.26	9.27	--	50.99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	2/15/2006		60.26	7.24	--	53.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	5/30/2006		60.26	8.38	--	51.88	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	8/11/2006		60.26	9.55	--	50.71	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	11/1/2006		60.26	9.98	--	50.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	2/7/2007		60.26	9.07	--	51.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	5/9/2007		60.26	8.15	--	52.11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	8/7/2007		60.26	10.05	--	50.21	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	11/14/2007		60.26	9.20	--	51.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	2/28/2008		60.26	6.82	--	53.44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	5/23/2008		60.26	9.67	--	50.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	8/13/2008		60.26	10.17	--	50.09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	11/19/2008		60.26	9.63	--	50.63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	2/10/2009		60.26	8.48	--	51.78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	5/7/2009		60.26	7.97	--	52.29	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	9/3/2009		60.26	10.14	--	50.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	3/23/2010		60.26	7.29	--	52.97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	8/16/2010		60.26	9.92	--	50.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	3/18/2011		60.26	6.33	--	53.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
A-13	8/24/2012		60.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(Well has been paved over)
A-13	2/8/2013		60.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	(INA)

Table 2
Historical and Current Groundwater Monitoring and Analytical Data
CA-04931
731 W Macarthur Blvd, Oakland, CA 94609

Well ID	Date	Type	TOC (ft msl)	DTW (ft)	Measured LNAPL Thickness (ft)	GW Elev (ft msl)	GRO (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	Ethanol (µg/L)	EDB (µg/L)	1,2-DCA (µg/L)	DO (mg/l)	Notes

Notes:

-- = Not analyzed/applicable/measured/available

< = Not detected at or above laboratory reporting limit

DO = Dissolved oxygen

DTW = Depth to water in ft bgs

ft bgs = feet below ground surface

GRO = Gasoline range organics

GWE = Groundwater elevation measured in ft

mg/L = Milligrams per liter

MTBE = Methyl tert butyl ether

EDB = Ethylene dibromide/1,2-Dibromomethane

1,2-DCA = 1,2-Dichloroethane

NP = Not purged prior to sampling

P = Purged prior to sampling

TOC = Top of casing measured in ft

TPH-g = Total petroleum hydrocarbons as gasoline

µg/L = Micrograms per liter

BTEX = Benzene, toluene, ethylbenzene and xylenes

a = Hydrocarbon pattern is present in the requested fuel quantitation range but does not resemble the pattern of the requested fuel for GRO/TPH-g.

b = The concentration indicated for this analyte (MTBE) was an estimated value above the calibration range of the instrument.

c = This sample was analyzed beyond the EPA recommended holding time. The results may still be useful for their intended purpose.

d = ORC sock in well.

e = Well inaccessible; well paved over.

f = Sheen in well.

g = Well surveyed to NAVD 88 datum on January 28, 2004.

h = Possible low bias due to CCV falling outside acceptance criteria for GRO.

i = Hydrocarbon result partly due to individual peak(s) in quantitative range for GRO.

j = Well inaccessible.

k = Sample taken from VOA vial with air bubble > 6mm diameter.

l = Incorrect TOC utilized in 2nd and 3rd Quarter 2009 Ground-Water Monitoring Report.

Top and bottom of screen measurements for wells A-2 through A-5 were estimated from the EMCON sampling sheet.

Beginning in the first quarter 2003 (1/30/2003), groundwater samples were analyzed by EPA method 8260B for TPH-g, BTEX, and fuel oxygenates. Prior to 1/30/03, TPH-g was analyzed using EPA Method 8015B modified and MTBE by 8021B unless otherwise noted.

Beginning in the fourth quarter 2003, the laboratory modified the reported analyte list. TPH-g was changed to GRO. The resulting data may be impacted by the potential of non-TPHg analytes within the requested fuel range resulting in a higher concentration being reported.

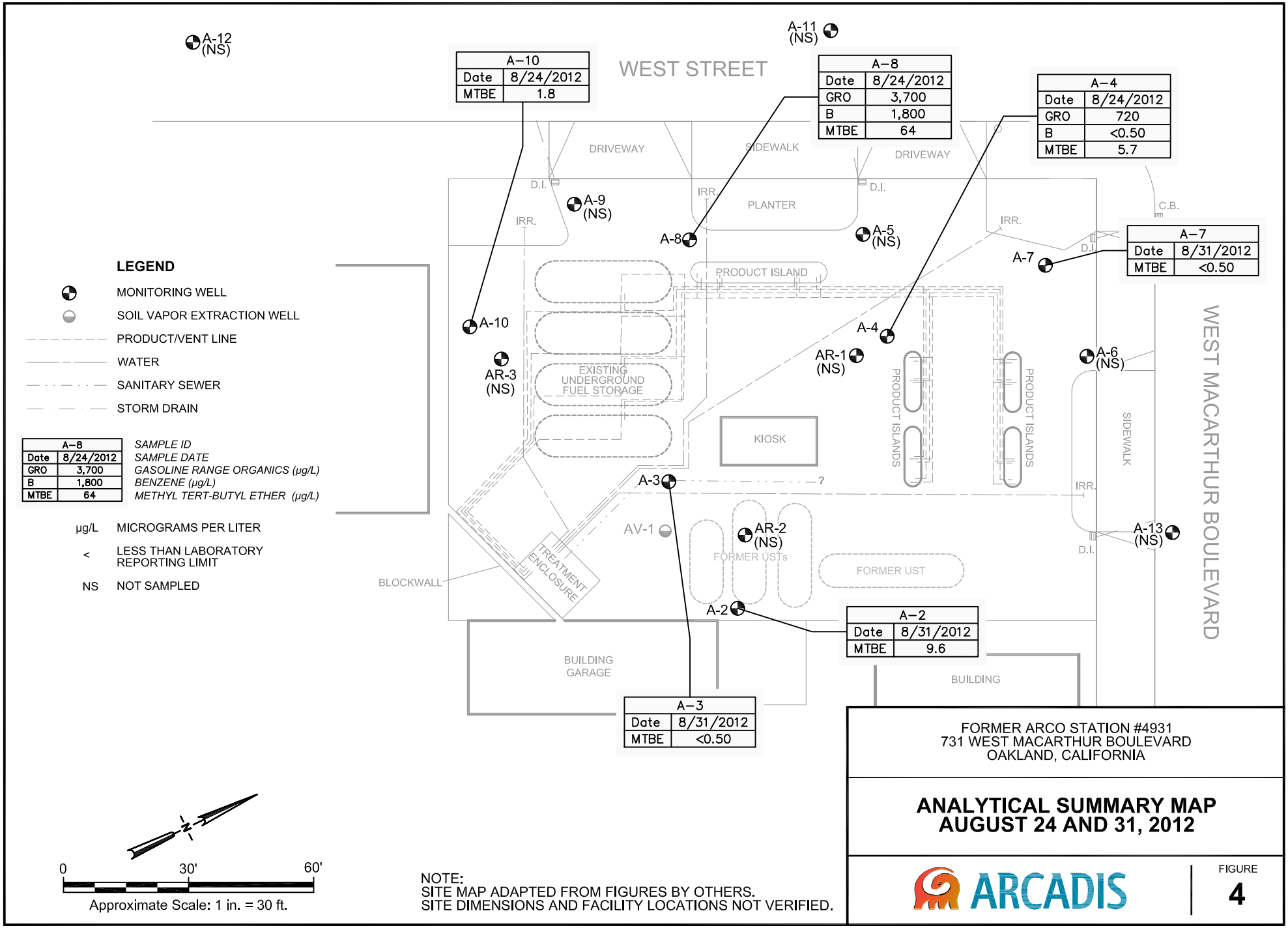
Beginning in the second quarter 2004, the carbon range for GRO was changed from C6-C10 to C4-C12.

Values for DO and pH were obtained through field measurements.

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

Note: The data within this table collected prior to April 2006 was provided to Broadbent & Associates, Inc. by Atlantic Richfield Company and their previous consultants. Broadbent & Associates, Inc. has not verified the accuracy of this information.

CITY: PETALUMA, CA DIV/GROUP: ENV DB: J. HARRIS
C:\Users\jharris\Desktop\ENVCAD\RETURN-TO\EMERYVILLE, CA\GP09BPNA\C110\N0000\3Q12\DWG\GP09BPNAC110-C01.dwg LAYOUT: 4 SAVED: 10/3/2012 2:56 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: SETUP1 PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 10/8/2012 3:22 PM BY: HARRIS, JESSICA



LEGEND

- MONITORING WELL
- SOIL VAPOR EXTRACTION WELL
- PRODUCT/VENT LINE
- WATER
- SANITARY SEWER
- STORM DRAIN

A–8	
Date	8/24/2012
GRO	3,700
B	1,800
MTBE	64

SAMPLE ID
SAMPLE DATE
GASOLINE RANGE ORGANICS (µg/L)
BENZENE (µg/L)
METHYL TERT-BUTYL ETHER (µg/L)

µg/L MICROGRAMS PER LITER

< LESS THAN LABORATORY REPORTING LIMIT

NS NOT SAMPLED

0 30' 60'

Approximate Scale: 1 in. = 30 ft.

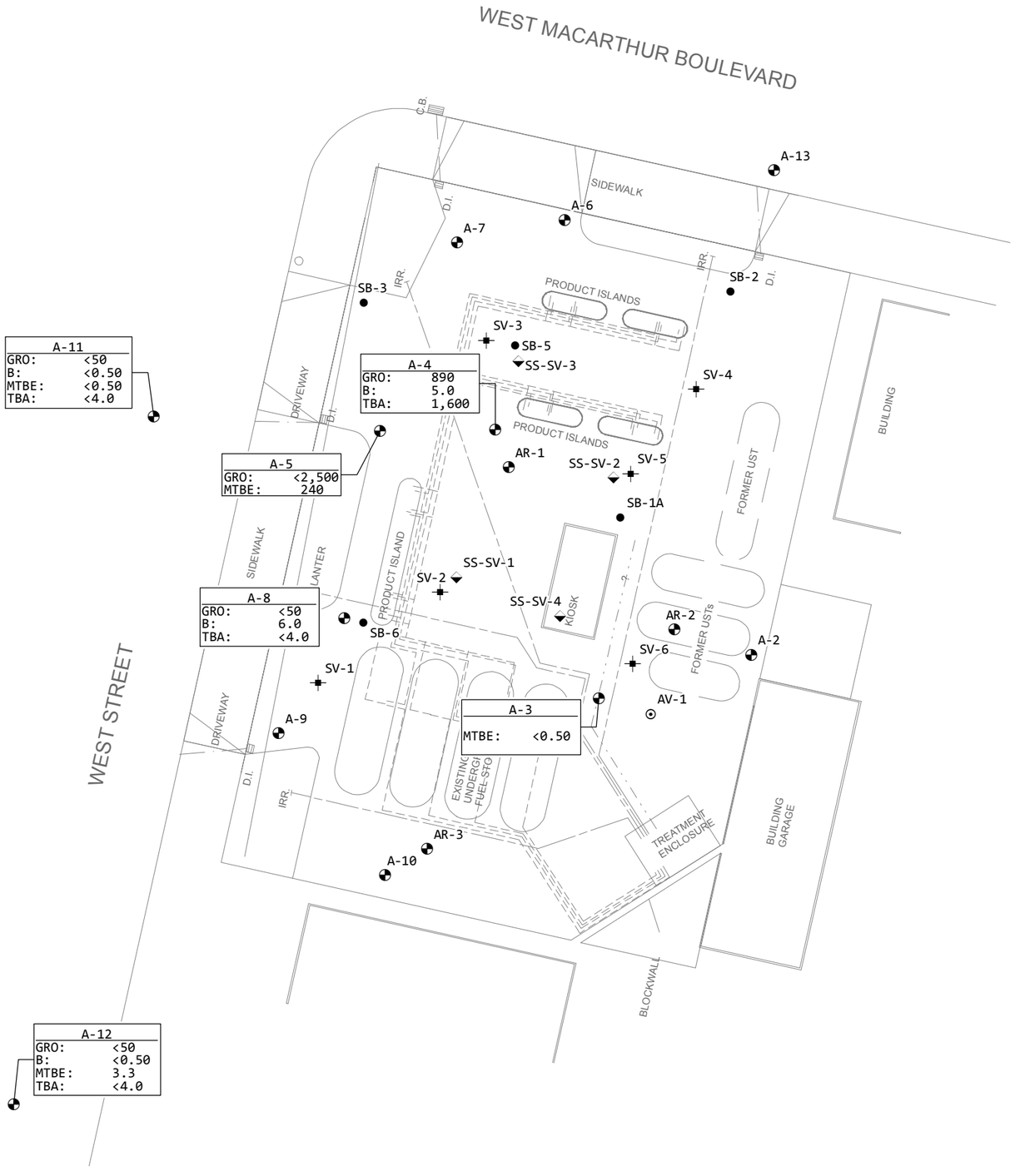
NOTE:
SITE MAP ADAPTED FROM FIGURES BY OTHERS.
SITE DIMENSIONS AND FACILITY LOCATIONS NOT VERIFIED.

FORMER ARCO STATION #4931
731 WEST MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

ANALYTICAL SUMMARY MAP
AUGUST 24 AND 31, 2012

ARCADIS

FIGURE
4



LEGEND:

- GROUNDWATER MONITORING WELL
- SOIL BORING
- SOIL VAPOR EXTRACTION WELL
- SOIL VAPOR SAMPLE LOCATION
- SUB-SLAB SOIL VAPOR SAMPLING LOCATION

XX-1	
GRO:	<XX
B:	<X.X
MTBE:	<X.X
TBA:	<XX

SAMPLE LOCATION ID

CONCENTRATION IN MICROGRAMS PER LITER (µg/L)

ANALYTE

GRO	GASOLINE RANGE ORGANICS
B	BENZENE
MTBE	METHYL TERTIARY-BUTYL ETHER
TBA	TERTIARY-BUTYL ALCOHOL
<	NOT DETECTED AT OR ABOVE STATED LABORATORY REPORTING LIMIT

0 30 60

SCALE IN FEET

FORMER BP STATION No. 04931
731 WEST MACARTHUR BOULEVARD,
OAKLAND, CALIFORNIA

GROUNDWATER ANALYTICAL MAP
FEBRUARY 8, 2013

ARCADIS

FIGURE
4

CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: sbell LD: PIC: PM: TM:
PROJECT: PATH: V:\CA\CA04931\GIS\MXD\CA-04931-Fig4_GWE_Analytical.mxd DATE: 3/6/2013 4:39:06 PM

ARCADIS

Appendix F

First Quarter 2013 – Soil Vapor Sampling Report

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

ENVIRONMENT

Ms. Dilan Roe, P.E.
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502

Subject:
Soil Vapor Monitoring Report - First Quarter 2013
Former Atlantic Richfield Company Station No. 4931
731 West MacArthur Boulevard
Oakland, California 94609

Date:
June 5, 2013

Contact:
Hollis Phillips

Phone:
415.432.6903

Email:
hollis.phillips@arcadis-us.com

Our ref:
GP09BPNA.C110.N0000

Dear Ms. Roe:

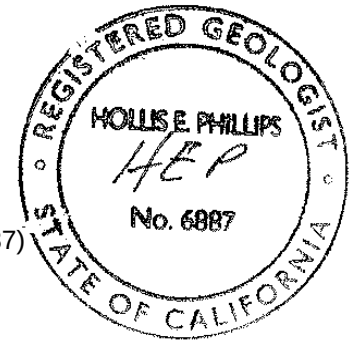
ARCADIS U.S., Inc (ARCADIS) has prepared this report on behalf of BP Remediation Management, a BP affiliated company, for the former BP service station listed below.

BP Facility No.	ACEH Site No.	Location
4931	RO0000076	731 West MacArthur Blvd. Oakland, California

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

Sincerely,

ARCADIS U.S., Inc.



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

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GeoTracker upload

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ENVIRONMENT

Ms. Dilan Roe, P.E.
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502

Subject:
Soil Vapor Monitoring Report - First Quarter 2013
Former Atlantic Richfield Company Station No. 4931
731 West MacArthur Boulevard
Oakland, California 94609

Date:
June 5, 2013

Contact:
Hollis Phillips

Phone:
415.432.6903

Email:
hollis.phillips@arcadis-us.com

Our ref:
GP09BPNA.C110.N0000

Dear Ms. Roe:

ARCADIS U.S., Inc. (ARCADIS) has prepared this report to summarize the soil vapor monitoring performed at the Former Atlantic Richfield Company Station No. 4931 located at 731 West MacArthur Boulevard in Oakland, California (the Site; Figure 1) on January 4, January 9, and February 15, 2013. A site map showing soil vapor probe locations is included as Figure 2. The objective of this sampling event was to confirm results obtained during previous events and to assess the potential attenuation of petroleum hydrocarbons in the vadose zone.

1.0 Background

Soil vapor monitoring was previously conducted at the Site in June 2011 as directed by the Alameda County Environmental Health (ACEH) in their letter dated May 12, 2011 (ACEH 2011). Results of this event were presented in the report *Work Plan for Additional Soil Vapor Characterization*, dated November 4, 2011, prepared by ARCADIS (2011). Based on the soil vapor results from the June 2011 event, ARCADIS recommended that an additional round of soil vapor sampling be conducted at the Site to evaluate if soil vapor is attenuating at a rate fast enough between five feet below ground surface (bgs) and near grade to bring sub-slab vapor concentrations to levels that are not a threat to human health or the environment. A work plan addendum (ARCADIS 2012) was submitted to ACEH to describe deviations from the soil vapor assessment activities described in the November 2011 work plan. ACEH verbally concurred with the recommendations in work plan

(ARCADIS 2011) and work plan addendum (ARCADIS 2012) in the meeting between ACEH and ARCADIS on September 28, 2012.

2.0 Soil Vapor Sampling and Analyses

2.1 Soil Vapor Probe Locations and Probe Construction

Six permanent soil vapor probes (SV-1 through SV-6) were installed at the Site on May 31 and June 1, 2011 (Figure 2). Soil vapor probes were installed to 5 feet bgs. The vapor probe locations were selected based on elevated soil and groundwater concentration results observed during a site investigation conducted in October 2010 (ARCADIS 2010). Each soil vapor probe consists of a stainless-steel soil vapor screen implant 6 inches long and 0.5 inch in diameter, with a slot size of 0.01 inch and connected with Teflon-lined polyethylene tubing to enable sampling at the ground surface. The screen implants are centered in a 1-foot long interval of sand pack allowing approximately 3 inches of sand above and below the screen. Following the sand pack the soil vapor probes are completed with a granular bentonite and then grouted to several inches below grade with a hydrated bentonite seal/neat cement mix and finished with a traffic-rated well vault.

The sub-slab vapor probes (SS-SV-1, SS-SV-2, and SS-SV-3) were completed adjacent to existing soil vapor probes SV-2, SV-5, and SV-3, respectively, as these existing locations had elevated concentrations of constituents-of-concern (COCs) during the June 2011 sampling event. This area was also selected because the surface is finished with concrete and has historically had elevated soil concentrations. Each sub-slab vapor probe was installed immediately beneath the overlaying concrete to approximately 6 inches below the concrete/soil interface.

The sub-slab probes consists of a stainless-steel soil vapor screen implant 6 inches long and 0.5 inch in diameter, with a slot size of 0.01 inch and connected with Teflon-lined polyethylene tubing to enable sampling at the ground surface. The screen implants are centered within a sand pack which was brought to the bottom of the concrete. Approximately 1-inch of dry granular bentonite was placed above the filter pack and was followed by an interval of hydrated bentonite that filled the borehole from the top of the dry granular bentonite to approximately 3-inches below grade. Each sub-slab vapor probe was finished with a traffic rated well vault and additional concrete was placed in and around the well vaults to secure it to the surface and ensure the sub-slab probe is effectively sealed. The well vaults were not set below the concrete-soil interface.

2.2 Sampling Procedures

Soil vapor sampling was initially conducted at the Site on January 4, 2013 at each soil vapor and sub-slab vapor probe location with the following exceptions:

- SV-6 was sampled on January 9, 2013 as a result of running out of helium during the January 4, 2013 event prior to sampling this probe.

- Sampling at SS-SV-2, SV-4, and SV-5 was not conducted on January 4, 2013 due to observed water intrusion at each location. These probes were scheduled to be sampled during the January 9, 2013 event, however, major police activity in the immediate vicinity of the Site presented a significant health and safety risk to field personnel. ARCADIS terminated the January 9 sampling event and left the Site prior to sampling SS-SV-2, SV-4, and SV-5. ARCADIS returned to the Site on February 15, 2013 to collect samples from these probes.

Soil vapor sampling was performed using laboratory-supplied 1-liter SUMMA canisters. The laboratory-supplied SUMMA canisters were batch certified by the laboratory prior to field receipt. During soil gas sampling, a leak test was performed to determine the integrity of the sampling system. The well head and entire sampling train (valves, tubing, fittings, gauges and SUMMA canister) were placed in a sampling shroud. Helium was used as a tracer compound for the leak test. The tracer compound was permitted into the shroud and monitored for concentration stability using a helium detector (model: Radiodetection MGD-2002). Helium concentrations were maintained at approximately 10 to 20% for the duration of purging and sampling at each location.

Purging consisted of removing approximately three volumes of stagnant soil gas using a SUMMA canister dedicated to purging activities. The purge volume was calculated based on the dimensions of the aboveground gauges, tubing, sampling equipment and below-ground tubing.

Following purging, the soil vapor sample was collected using an evacuated 1-liter SUMMA canister. The valve on the sampling train was opened, allowing soil gas to flow into the SUMMA canisters until the vacuum gauge read approximately -5 inches of mercury. Initial and final vacuum gauge readings were taken for each sample and recorded on the chain of custody and on the laboratory-supplied sample labels

included on each SUMMA canister. Field notes from the sampling event are included as Appendix A.

2.3 Sample Analysis

The soil vapor and sub-slab vapor samples were delivered under appropriate chain of custody protocols to AirToxics Ltd. (AirToxics) of Folsom, California, a California Department of Public Health certified analytical laboratory, for analysis of the following analytes:

- Total petroleum hydrocarbons as gasoline range organics (TPH-G), benzene, toluene, ethylbenzene, m,p-xylenes, o-xylene (BTEX), and methyl tertiary butyl ether (MTBE), using Modified United States Environmental Protection Agency (USEPA) Method TO-15; and

- Fixed gas: oxygen, helium, nitrogen, carbon dioxide, and methane using Modified American Society for Testing and Materials (ASTM) Method D-1946.

Additionally, Naphthalene was analyzed by USEPA Method TO-15 in the samples collected from SV-1, SS-SV-1, SV-2, SV-3, and SS-SV-3 due to laboratory oversight.

3.0 Soil Vapor Analytical Results

3.1 Screening Levels for Constituents of Concern

Concentrations of analytes detected in soil vapor above the laboratory reporting limit were compared to San Francisco Bay Region - Regional Water Quality Control Board (SF-RWQCB) residential and commercial/industrial land use Environmental Screening Levels (ESLs) to evaluate potential vapor intrusion concerns. ESLs are presented in the technical document titled *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*, dated February 2013 (SF-RWQCB 2013).

3.2 Soil Vapor Analytical Results

As shown in Table 1 and on Figure 3, TPH-G and benzene were detected in soil vapor that was collected during the January-February 2013 sampling event at

concentrations that exceed the residential and commercial/industrial land use shallow soil gas ESLs protective of vapor intrusion concerns. All other individual constituents were either not detected above the laboratory reporting limits or were at concentrations below their respective soil gas ESLs. The analytical report including the chain of custody documentation is included as Appendix B. Results from each vapor probe are summarized below:

- SV-1 is located onsite, adjacent to the west of the existing underground storage tanks (USTs). Benzene was detected in soil vapor from this probe at a concentration of 11 micrograms per cubic meter (µg/m^3), which is significantly below the residential land use ESL of 42 µg/m^3. All other analytes were not detected above the respective laboratory reporting limits.

- SV-2 is located nearby the west dispenser island. TPH-G and benzene were detected in soil vapor from this probe at concentrations of 49,000,000 µg/m^3 and 150,000 µg/m^3 which are above respective residential and commercial land use ESLs. All other individual analytes were not detected above the respective laboratory reporting limits. The laboratory reporting limit for ethylbenzene, <5,000 µg/m^3, exceeded the residential and commercial soil gas ESLs of 490 µg/m^3 and 4,900 µg/m^3, respectively.

- SS-SV-1 is a sub-slab probe location that is located adjacent to the existing soil vapor probe SV-2. TPH-G and benzene were detected in soil vapor from this probe at concentrations of 740 µg/m^3 and 2.0 µg/m^3, respectively, which are both significantly below the residential land use ESLs of 370,000 µg/m^3 and 42 µg/m^3, respectively. All other analytes were not detected above the respective laboratory reporting limits.

- SV-3 is located nearby the north dispenser islands. TPH-G and benzene were detected in soil vapor from this probe at concentrations of 22,000,000 µg/m^3 and 2,200 µg/m^3, respectively, which are above respective residential and commercial land use ESLs. All other individual analytes were not detected above the respective laboratory reporting limits. The laboratory reporting limit for ethylbenzene, <4,900 µg/m^3, exceeded the residential and commercial soil gas ESLs of 490 µg/m^3 and 4,900 µg/m^3, respectively. Results of the duplicate sample (DUP) collected from SV-3 were consistent with the parent sample results.

- SS-SV-3 is a sub-slab probe location that is located adjacent to the existing soil vapor probe SV-3. TPH-G, benzene, and MTBE were detected in soil vapor from this probe at concentrations of 9,000 µg/m^3, 2.3 µg/m^3, and 300 µg/m^3, respectively, which are below the residential land use ESLs of 370,000 µg/m^3, 42 µg/m^3, and 4,700 µg/m^3, respectively. All other analytes were not detected above the respective laboratory reporting limits.

- SV-4 is located nearby the northern dispenser islands and former USTs. Benzene was detected in soil vapor from this probe at a concentration of 2.2 µg/m^3, which is below the residential land use ESLs of 42 µg/m^3. All other individual analytes were not detected above the respective laboratory reporting limits.

- SV-5 is located between the site kiosk and the northern dispenser islands. TPH-G and BTEX were detected in soil vapor from this probe at concentrations of 1,300 µg/m^3, 3.0 µg/m^3, 28 µg/m^3, 9.9 µg/m^3, 42 µg/m^3 (m,p-X), and 17 µg/m^3 (o-X), respectively, which are all below respective residential land use ESLs. MTBE was not detected above the laboratory reporting limit of 5.2 µg/m^3.

- SS-SV-2 is a sub-slab probe location that is located adjacent to the existing soil vapor probe SV-5. TPH-G and benzene were detected in soil vapor from this probe at concentrations of 41,000,000 µg/m^3 and 2,700 µg/m^3, respectively, which are above respective residential and commercial land use ESLs. All other analytes were not detected above the respective laboratory reporting limits. The laboratory reporting limit for ethylbenzene, <2,600 µg/m^3, exceeded the residential ESL of 490 µg/m^3 but was below the commercial land use ESL of 4,900 µg/m^3.

- SV-6 is located adjacent the former USTs. TPH-G and benzene were detected in soil vapor from this probe at concentrations of 26,000,000 µg/m^3 and 3,400 µg/m^3, respectively, which are above respective residential and commercial land use ESLs. All other individual analytes were not detected above the respective laboratory reporting limits. The laboratory reporting limit for ethylbenzene, <2,500 µg/m^3, exceeded the residential ESLs of 490 µg/m^3 but was below the commercial land use ESL of 4,900 µg/m^3.

3.3 Fixed Gases Results

Soil vapor samples were analyzed by ASTM Method D-1946 for the presence of helium to evaluate the possible entrainment of ambient air through the soil column from the surface to the depth of the soil vapor sample probe. As shown in Table 1, helium was not detected above the laboratory reporting limit in any of the vapor samples collected with the exception of SS-SV-1 and SS-SV-2. Helium was detected at 2.5% volume in the sample collected at SS-SV-1 and was detected at 1.5% volume in the sample collected at SS-SV-2. As noted by the Interstate Technology Regulatory Council in the 2007 *Vapor Intrusion Pathway: A Practical Guide*, a small amount of tracer in a sample does not necessarily indicate an unreliable sample. It is also stated that some agencies allow tracer concentrations up to 10% of the starting concentration before a soil gas sample is compromised (ITRC 2007). Therefore, it is expected that no significant leaks were observed during soil vapor sampling.

Oxygen was detected in samples collected from every probe location at concentrations ranging from 1.0% (SV-2) to 20% (SS-SV-3). Nitrogen was detected at every probe location and concentrations ranging from 42% (SS-SV-2) to 94% (SV-1). Carbon dioxide was detected at every probe location and concentrations ranging from 0.036% (SS-SV-3) to 22% (SV-3). Methane was detected in soil vapor from a range of less than <0.00023% (non-detect) at SV-1 to 41% at SS-SV-2.

The presence and concentration of oxygen and carbon dioxide can be indications of biodegradation of soil vapor in the subsurface. Typically, decrease in hydrocarbon concentrations concurrent with decrease in oxygen and an increase in carbon dioxide is indicative of aerobic biodegradation of hydrocarbons. Oxygen and carbon dioxide concentrations at soil vapor probes SV-1, SV-2, SV-3, SV-6, and SS-SV-2 are consistent with expected patterns of biodegradation of soil vapors in the subsurface (with a minimum of approximately three to five percent oxygen). Fixed gases analytical data are summarized in Table 1.

4.0 Soil Vapor Data Evaluation

4.1 Comparison with Screening Levels

Detected constituent concentrations in soil vapor were compared with health-based screening criteria that regulatory agencies consider to be protective of potential human health vapor intrusion exposures. Detected concentrations of TPH-G and benzene analyzed by USEPA TO-15 from soil vapor samples SV-2, SV-3, SV-6, and SS-SV-2 exceed the residential and commercial/industrial ESLs. Concentrations of TPH-G, BTEX, MTBE, and naphthalene were either not detected above respective

laboratory reporting limits or were below ESLs in the samples collected from SV-1, SV-4, SV-5, SS-SV-1, and SS-SV-3. The First Quarter 2013 soil vapor results are generally consistent with previous soil vapor results collected from the Site.

5.0 Conclusion

The source of petroleum hydrocarbons detected in soil vapor described above is likely off-gassing from underlying shallow groundwater, and the magnitude of the concentrations detected indicate significant attenuation of individual petroleum constituents from groundwater to the vadose zone. Since March 2011 depth-to-water measurements at site wells has ranged from 2.89 feet below top of casing (btoc) to 10.70 btoc.

Laboratory analysis of samples collected from the soil vapor probes in January and February 2013 indicates that the three deep (5 feet bgs) soil vapor probes (SV-2, SV-3 and SV-6) and one sub-slab probe (SS-SV-2) contain GRO and benzene concentrations that exceed residential and commercial/industrial SF-RWQCB ESLs. With the exception of SS-SV-2, soil vapor data collected from the sub-slab vapor probes indicated the presence of significant attenuation of concentrations of petroleum hydrocarbons to levels below ESLs from the 5-foot depth to the near surface depth. The soil vapor sample collected from sub-slab soil vapor probes SS-SV-1 and SS-SV-3 did not contain concentrations of GRO or benzene above the residential or commercial ESLs. Additionally TPH-G and benzene concentrations detected in the sub-slab soil vapor probes were between three and five orders of magnitude lower than their corresponding deeper soil vapor pairs. For example, TPH-G and benzene were detected at SV-2 at concentrations of 49,000,000 µg/m^3 and 150,000 µg/m^3, respectively, while adjacent sub-slab vapor point SS-SV-1 contained concentrations of TPH-G and benzene at 740 µg/m^3 and 2.0 µg/m^3, respectively.

Individual constituent concentrations in soil vapor, such as toluene, ethylbenzene, xylenes, MTBE and naphthalene at all sampled locations were either below respective laboratory method detection limits or were not detected above SF-RWQCB ESLs protective of vapor intrusion concerns in all soil vapor and sub-slab vapor samples collected from the Site.

These data indicate that petroleum hydrocarbon vapors are undergoing significant attenuation in the vadose zone even considering the very limited separation between the water table and the depth of the existing soil vapor probes. It is expected that

concentration of hydrocarbons in the vadose zone beneath this Site will continue to attenuate throughout the soil column to the ground surface.

6.0 Recommendation

Overall, the data collected during this investigation are consistent with and expand upon data collected during previous soil vapor sampling conducted at the Site. The analytical results suggest that residual petroleum-hydrocarbon-impacted soil vapor is primarily affected by TPH-G and benzene. Soil vapor sample results indicate that petroleum hydrocarbon vapors likely attenuate to concentrations that do not exceed health-based screening criteria, which regulatory agencies consider to be protective of human health from potential vapor intrusion exposures for residents and commercial workers. Additional soil vapor sampling at the Site does not appear warranted.

ARCADIS recommends leaving the soil vapor- and sub-slab vapor probes in place in the event that future soil vapor data may assist in determining site conditions.

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

Sincerely,

ARCADIS U.S., Inc.

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

Copies:
File

Attachments:
Table 1 Soil Vapor Sample Results

Figure 1 Site Location Map

7.0 References

ARCADIS U.S., Inc. (ARCADIS). 2010. Site Investigation Report, Former Atlantic Richfield Company Station No. 4931, 731 West MacArthur Boulevard, Oakland, California 94609, ACEH Case # RO0000076. November 11.

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ARCADIS. 2012. Addendum to the Work Plan for Additional Soil Vapor Characterization, Former Atlantic Richfield Company Station No. 4931, 731 West MacArthur Boulevard, Oakland, California 94609, ACEH Case # RO0000076. May 15.

Alameda County Environmental Health (ACEH). 2011. Subject: Soil Vapor Sampling at Fuel Leak Case No. RO0000076 and GeoTracker Global ID T0600100110, ARCO #04931, 731 W Macarthur Blvd., Oakland, CA 94609. May 12.

San Francisco Bay Region - Regional Water Quality Control Board (SF-RWQCB). 2013. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, Interim Final - February. Viewed online on April 15, 2013: http://www.waterboards.ca.gov/rwqcb2/water_issues/programs/esl.shtml

Interstate Technology Regulatory Council (ITRC). 2007. Technical and Regulatory Guidance, Vapor Intrusion Pathway: A Practical Guide. January.

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TABLES

Table 1
Soil Vapor Analytical Data
Former ARCO Service Station 4931
731 West MacArthur Blvd
Oakland, California

Location ID	Date Collected	Purge Volume	TO-15								ASTM D-1946				
			TPH-G	Benzene	Toluene	Ethyl benzene	m,p-Xylene	o-Xylene	MTBE	Naphthalene	Oxygen	Nitrogen	Carbon Dioxide	Methane	Helium
SF-RWQCB ESL (Res)[1]			**370,000**	**42**	**160,000**	**490**	**52,000**	**52,000**	**4,700**	**36**	**NA**	**NA**	**NA**	**NA**	**NA**
SF-RWQCB ESL (C/I)[2]			**3,100,000**	**420**	**1,300,000**	**4,900**	**440,000**	**440,000**	**47,000**	**360**	**NA**	**NA**	**NA**	**NA**	**NA**
Units		**(mL)**	**(µg/m³)**	**(µg/m³)**	**(µg/m³)**	**(µg/m³)**	**(µg/m³)**	**(µg/m³)**	**(µg/m³)**	**(µg/m³)**	**%**	**%**	**%**	**%**	**%**
SV-1-6911	6/9/2011		**4,100**	**8.7**	**19**	<5	<5	<5	**26**	<24	--	**83**	**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**	**4.80**	**0.02**	<0.13
SV-1	1/4/2013	105	<1,500	**11 J**	<27	<31	<31	<31	<26	<150	**2.2**	**94**	**4.2**	<0.00023	<0.12
SS-SV-1	1/4/2013	45	**740**	**2.0 J**	<4.5	<5.2	<5.2	<5.2	<4.3	<25	**20**	**77**	**0.25**	**0.00024**	**2.5**
SV-2-6911	6/9/2011		**42,000,000**	**130,000**	<2200	**6,000**	**3,500**	<2500	<2100	<12000	--	**54**	**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**	**12.00**	**30.00**	<0.12
SV-2	1/4/2013	105	**49,000,000**	**150,000**	<4400	<5000	<5000	<5000	<4200	<24000	**1.0**	**48**	**12**	**37**	<0.12
SS-SV-2	2/15/2013		**41,000,000**	**2,700**	<2300	<2600	<2600	<2600	<2200	---	**2.2**	**42**	**13**	**41**	**1.5**
SV-3-6911	6/9/2011		**15,000,000**	**2,700**	<1200	<1300	<1300	<1300	**3,200**	<6500	--	**74**	**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**	**22.00**	**0.82**	<0.13
SV-3	1/4/2013	150	**22,000,000**	**1,700 J**	<4200	<4900	<4900	<4900	<4000	<23000	**1.6**	**72**	**22**	**3.6**	<0.12
DUP	1/4/2013	150	**22,000,000**	**2,200 J**	<4300	<5000	<5000	<5000	<4100	<24000	**1.4**	**72**	**22**	**3.7**	<0.12
SS-SV-3	1/4/2013	1440	**9,000**	**2.3 J**	<4.3	<5.0	<5.0	<5.0	**300**	<24	**20**	**80**	**0.036**	**0.01**	<0.12
SV-4-6911	6/9/2011		<260	<4	<4.7	<5.5	<5.5	<5.5	<4.5	<26	--	**80**	**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**	**1.70**	<0.00026	<0.13
SV-4	2/15/2013		<240	**2.2 J**	<4.5	<5.2	<5.2	<5.2	<4.3	---	**18**	**81**	**0.97**	<0.00024	<0.12
SV-5-6911	6/9/2011		**400,000**	**56**	<38	<44	<44	<44	**2,900**	<210	--	**89**	**1.00**	**1.50**	<1
SV-5B-6911	6/9/2011		**Not Collected during June 2011 sampling event due to observed groundwater intrusion in probe.**												
SV-5	2/15/2013		**1,300**	**3.0 J**	**28**	**9.9**	**42**	**17**	<5.2	---	**18**	**80**	**1.5**	<0.00029	<0.14
SV-6-6911	6/9/2011		**36,000,000**	**4,800**	<2200	<2600	<2600	<2600	<2100	<12000	--	**83**	**7.20**	**6.10**	<0.12
SV-6B-6911	6/9/2011		**25,000,000**	<3800	<4500	<5200	<5200	<5200	<4300	<25000	--	**81**	**6.20**	**4.90**	**0.45**
SV-6	1/9/2013	120	**26,000,000**	**3,400**	<2200	<2500	<2500	<2500	<2100	---	**4.3**	**78**	**12**	**5.0**	<0.12
Dup-01-6911	6/9/2011		**23,000,000**	<3700	<4400	<5000	<5000	<5000	<4200	<24000	--	**81**	**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**	<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
Lab Blank	1/4/2013		<100	**0.80 J**	<1.9	<2.2	<2.2	<2.2	<1.8	<10	<0.10	<0.10	<0.010	<0.00010	<0.050
Lab Blank	2/15/2013		<100	<1.6	<1.9	<2.2	<2.2	<2.2	<1.8	--	<0.10	<0.10	<0.010	<0.00010	<0.050

Table 1
Soil Vapor Analytical Data
Former ARCO Service Station 4931
731 West MacArthur Blvd
Oakland, California

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.
SF-RWQCB ESL = San Francisco Bay Regional Water Quality Control Board Environmental Screening Level
J = Estimated value

Reference:

[1] Residential Exposure - Shallow soil gas screening levels for evaluation of potential vapor intrusion concerns *(Table E-2, SFR-RWQCB, 2013)*

[2] Commercial/Industrial Land Use - Shallow soil gas screening levels for evaluation of potential vapor intrusion concerns *(Table E-2, SFR-RWQCB, 2013)*

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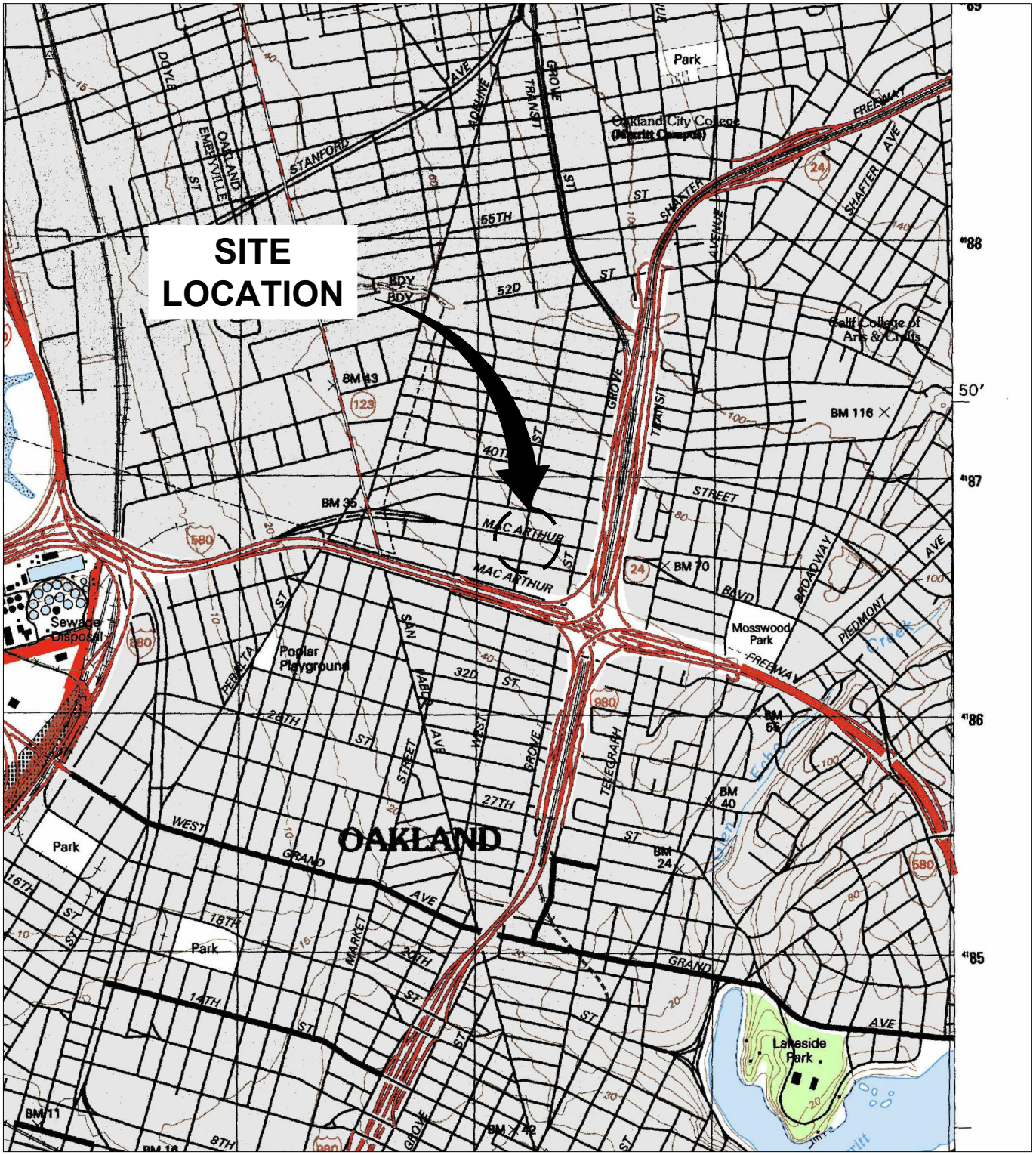
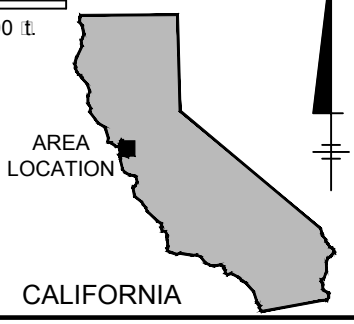
FIGURES



REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., OAKLAND WEST, CALIFORNIA, 1993.

0 2000 4000

Approximate Scale: 1 in. = 2000 ft.



FORMER ARCO STATION 4931
731 WEST MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

SITE LOCATION MAP

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FIGURE
1

CITY: PETALUMA, CA DIV/GROUP: ENV DB: J. HARRIS
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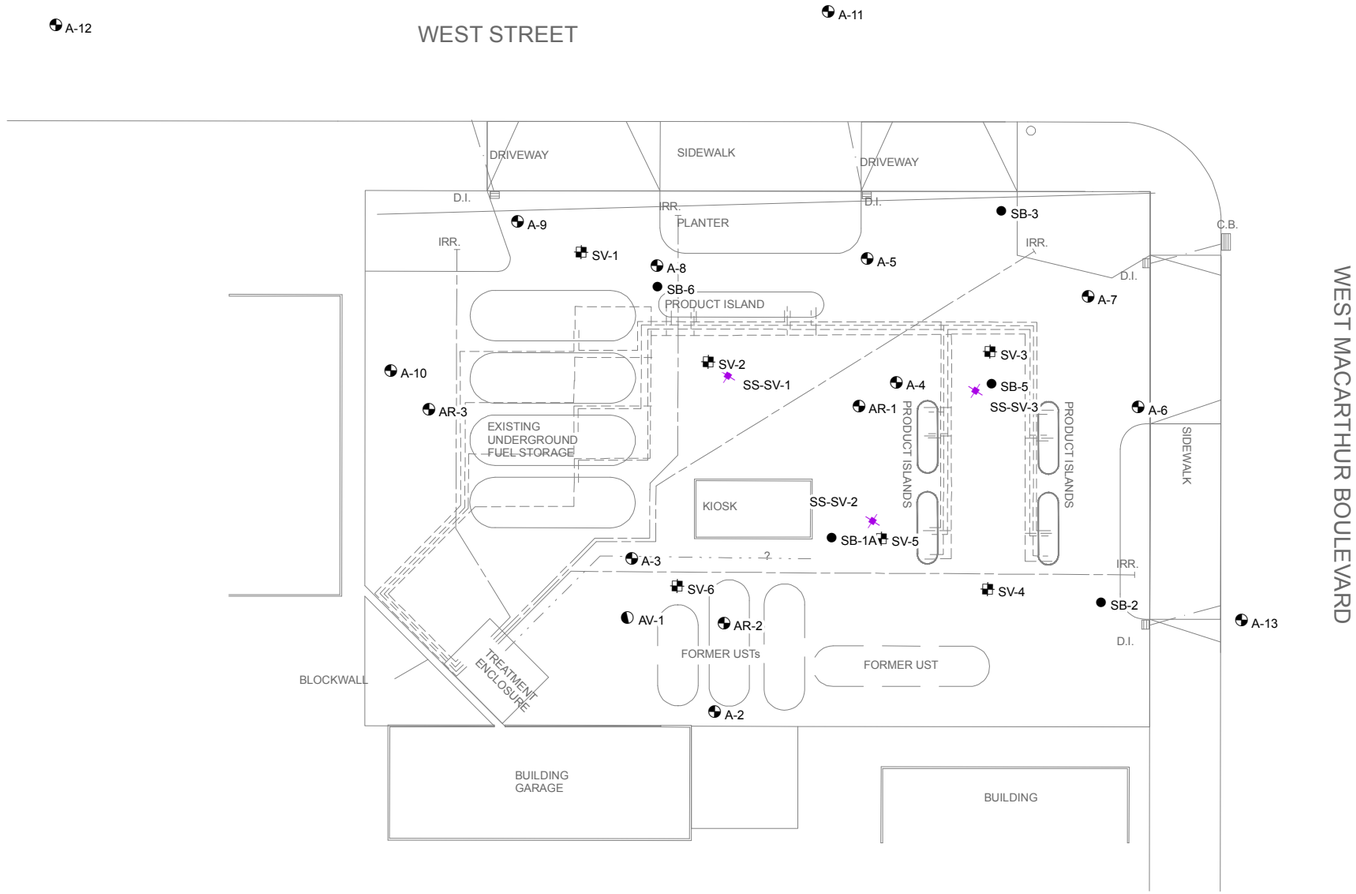
XREFS: IMAGES: PROJECTNAME: ---
Oa la d West. pg



LEGEND:

- SUB-SLAB SOIL VAPOR SAMPLING LOCATION
- SOIL VAPOR SAMPLE LOCATION
- SOIL BORING
- GROUNDWATER MONITORING WELL
- SOIL VAPOR EXTRACTION WELL

0 30 60

SCALE IN FEET

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

FORMER ARCO SERVICE STATION No. 04931
731 WEST MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA

SITE PLAN WITH SOIL VAPOR SAMPLING LOCATIONS

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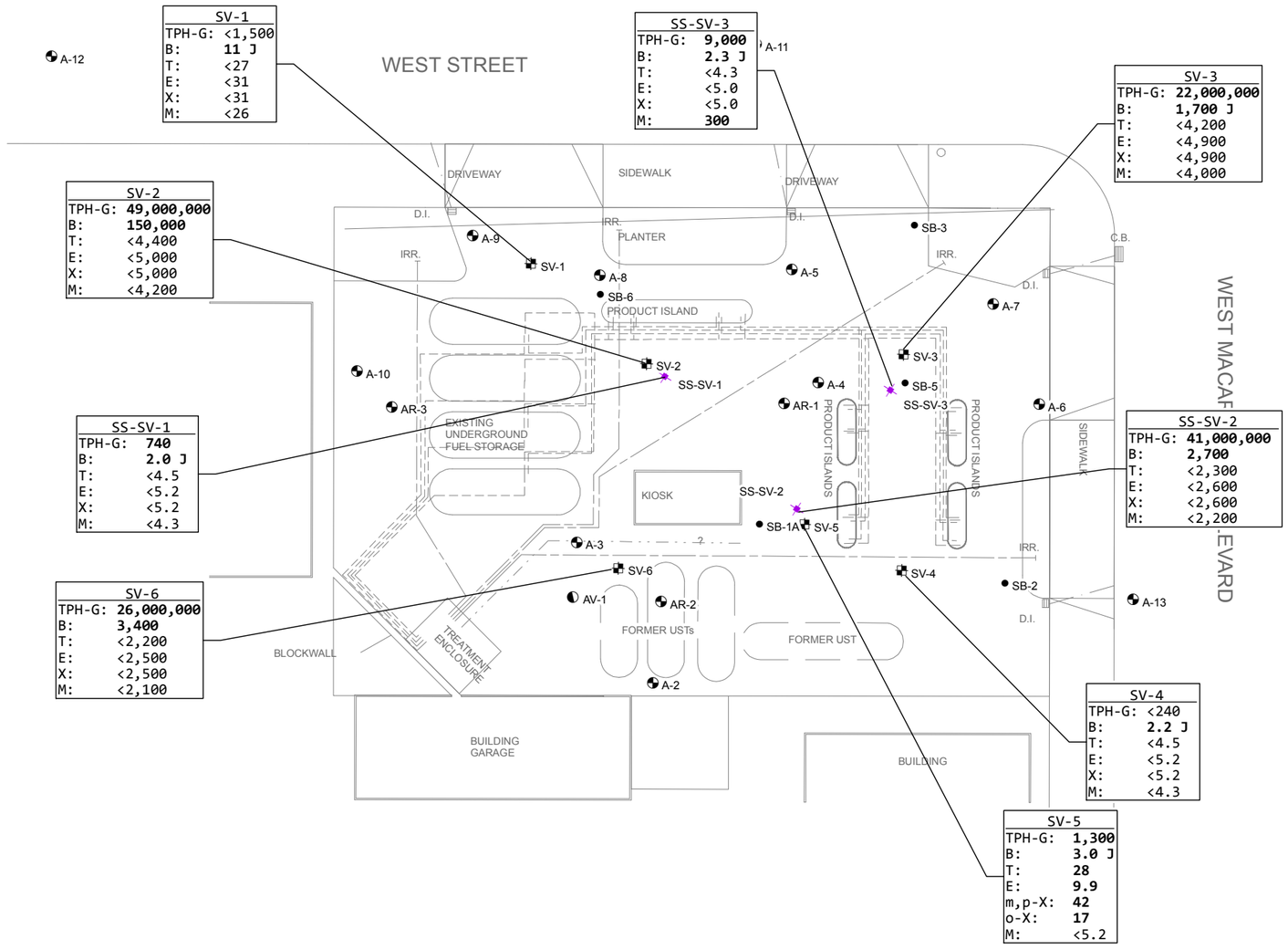
FIGURE
2

CITY: SAN FRANCISCO DIV/GROUP: ENV/IM DB: msmiller LD: PIC: PM: TM:
PROJECT: PATH: H:\GISPROJECTS_ENV\BP_FOXGLOVE\CAD\04931\GISMXD\CA-04931-Fig2_STPL_Sitemap.mxd DATE: 2/7/2013 3:54:49 PM



LEGEND:

- SUB-SLAB SOIL VAPOR SAMPLING LOCATION
- SOIL VAPOR SAMPLE LOCATION
- SOIL BORING
- GROUNDWATER MONITORING WELL
- SOIL VAPOR EXTRACTION WELL

CHEMICAL ANALYTICAL RESULTS:

SS-SV-3	
TPH-G:	9,000
B:	2.3 J
T:	<4.3
E:	<5.0
X:	<5.0
M:	300

SOIL VAPOR PROBE LOCATION ID

CONCENTRATION (µg/m³)

ANALYTE

ANALYTES:

TPH-G	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE RANGE ORGANICS
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
m,p-X	meta- and para- XYLENES
o-X	ortho-XYLENES
M	METHYL TERTIARY BUTYL ETHER
J	ESTIMATED VALUE
[NS]	NOT SAMPLED

0 30 60

SCALE IN FEET

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

NOTES:

1: ALL CONCENTRATIONS IN µg/m³ (MICROGRAMS PER CUBIC METER).

2: <RL = NOT DETECTED AT OR ABOVE REPORTING LIMIT (RL) VALUE.

3: SV-1, SV-2, SV-3, SS-SV-1, AND SS-SV-3 WERE SAMPLED ON JANUARY 4, 2013.
SV-6 WAS SAMPLED ON JANUARY 9, 2013.
SV-4, SV-5, AND SS-SV-2 WERE SAMPLED ON FEBRUARY 15, 2013.

4: **BOLD** VALUES INDICATE CONSTITUENT SOIL VAPOR CONCENTRATIONS DETECTED ABOVE THE LABORATORY RL.

FORMER ARCO SERVICE STATION No. 04931
731 WEST MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA

SOIL VAPOR SAMPLE RESULTS

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FIGURE
3

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Appendix A

Field Data Sheets

Site Visit Report

ARCADIS Project Number:	Dates of Site Visit:
GP09BPNA-C110	1/4/13
ARCADIS Project Name:	**Location of Project:**
BP 4931	Oakland
ARCADIS Personnel Present:	**Other Persons Present:**
AS/PT	

Purpose of Site Visit: Collect SV samples

Date & Time:	Activities:
0800	AS picked up PT
	Berkeley Shed
	E'ville office
	Home Depot
0900	Arrive on site
	H&S tailgate
	Setup at SS-SV-1
1000	Sampled SS-SV-1
1030	Setup at SV-2
1050	Sampled SV-2
	Setup at SS-SV-2
1120	SS-SV-2 compromised, water in well, but 3" water in well box ∴ annular seal should not be compromised
	Setup at SV-5
1230	H_2O also found in SV-5
	Discussed with HEP, potentially due to rains
1320	Setup at SS-SV-3
1400	Sampled SS-SV-3
	Setup at SV-3
1430	Sampled SV-3 (& DUP)
1500	Resampled SS-SV-1 due to insufficient purge volume.
1540	Sampled SB-4, water in well, no sample
1620	Sampled SV-1, low Helium in shroud.
	No Helium to sample SV-6.
1709	Left Site →

Weather: Cool & Sunny.

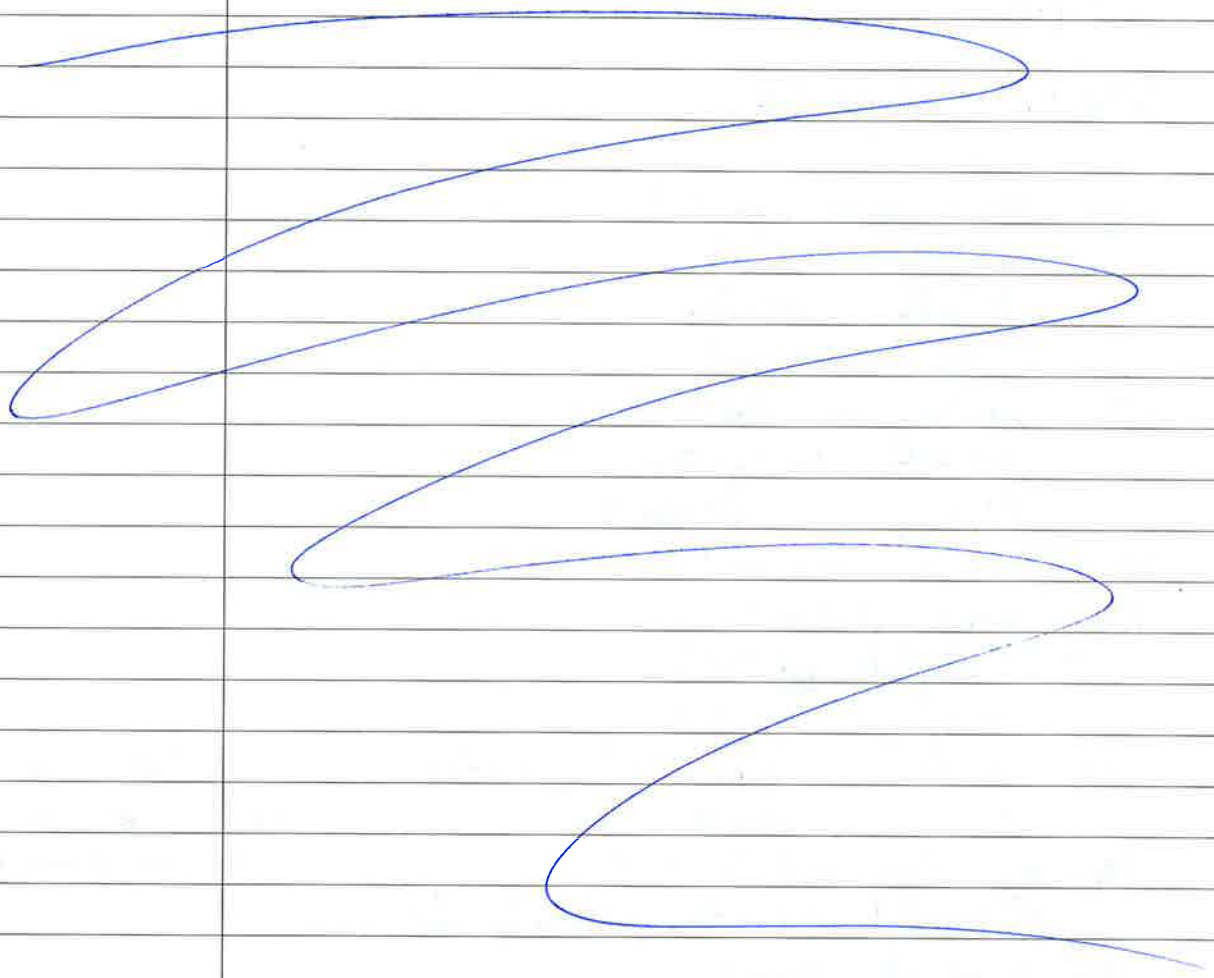
Signature & Date: 1/4/13

Eqpt Billing Log to Accounting

Date: Initials:

Site Visit Report

Date & Time:	Activities:
4/9/13 0915	AS returns to site to sample SV-6.
1000	Sampled SV-6
1015	Leave Site

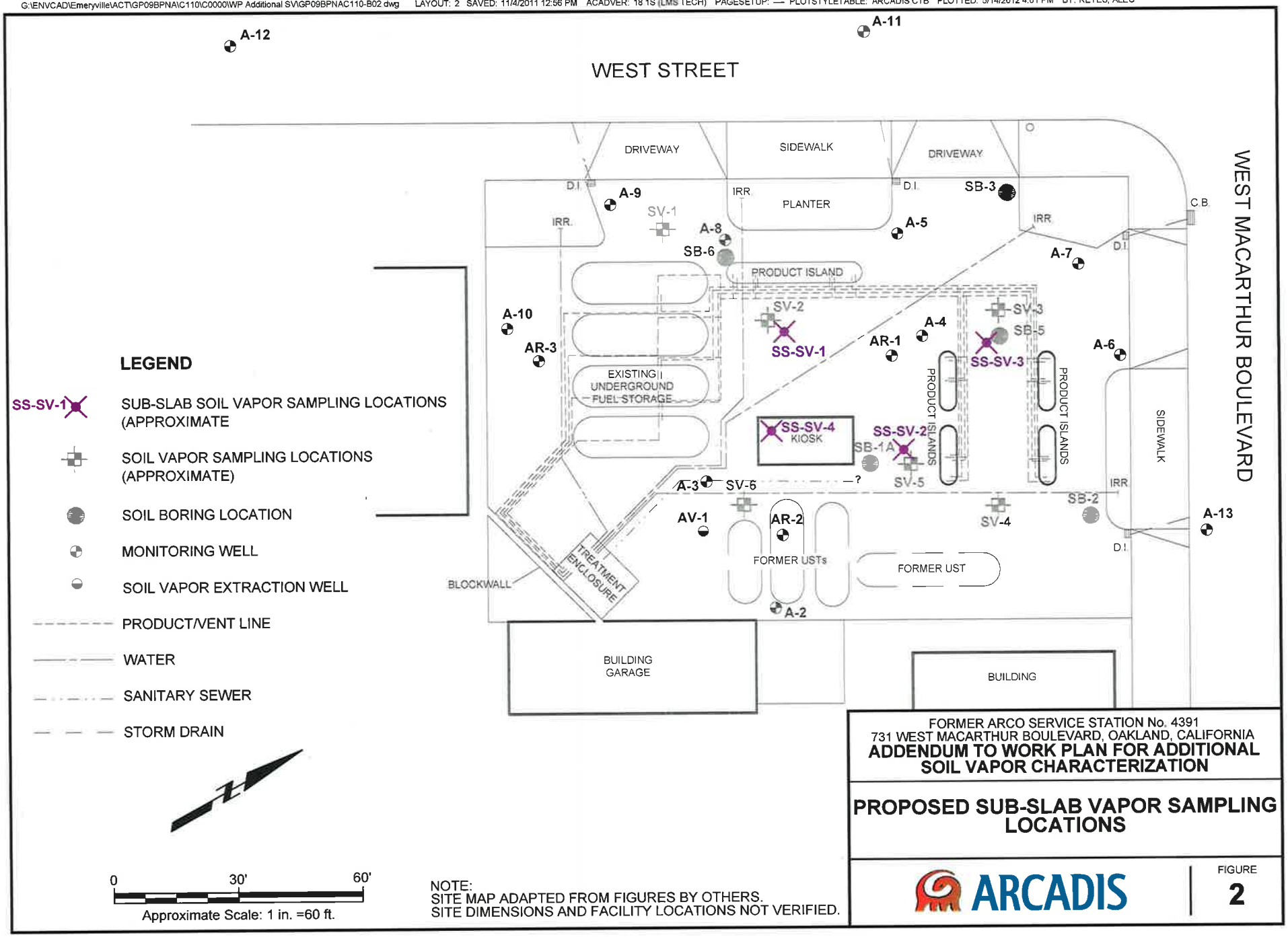


Project: BP 4431
Project #: GP07BPNA.C110

Date: 1/4/13
Sampler: AS/PT

Sample Location	Date	Time	Shroud He Conc. (%)	Field sample He Conc. (%)	Purge Volume (ml)	Leak checked manifold	Summa Cannister				Notes
							manifold #	Cannister #	Initial Vacuum (in Hg)	Final Vacuum (in Hg)	
SS-SV-1	1/4/13	1000	21.4	NA	45	✓	—	2053	30	6	Not enough purge to test field He
SV-2	1/4/13	1050	13.0	NA	105	✓	—	35651	30	5	" "
SS-SV-2	1/4/13	1120				✓	—	37365	30		Insufficient flow to sample. Water in well
SV-5		1230			105	✓	—	37365 (3)	30		" "
SS-SV-3		1400	21.4	NA	1440	✓	—	37365	30	5	
SV-3		1430	18.8	NA	135	✓	—	25278	30	4.5	
SV-3 DUP		1430	18.8	NA	150	✓	—	97100	30	5	
SS-SV-1		1500	16.0	NA	1445	✓	—	36489	30	6	Insufficient ~~flow rate, too permeability soil~~ flow rate, water in well
SV-4		1540	15.0	NA	105	✓	—	36452	30		
SV-1	1/4/13	1630	2.0	NA	105	✓	—	33408 (4)	30	5.5	Low Helium
SV-6	1/9/13	1000	15.1	NA	120	✓	—	2074	27.5	5	

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\WP Additional SV\GP09BPNAC110-B02.dwg LAYOUT: 2 SAVED: 11/4/2011 12:56 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: — PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 5/14/2012 4:01 PM BY: REYES, ALEC



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

FORMER ARCO SERVICE STATION No. 4391
731 WEST MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA

ADDENDUM TO WORK PLAN FOR ADDITIONAL SOIL VAPOR CHARACTERIZATION

PROPOSED SUB-SLAB VAPOR SAMPLING LOCATIONS

ARCADIS

FIGURE
2

ARCADIS

Appendix B

Certified Laboratory Analytical Reports

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1/17/2013
Mr. Arpen Shah
Arcadis U.S., Inc.
100 Montgomery Street
Suite 300
San Francisco CA 94104

Project Name: BP4931
Project #:
Workorder #: 1301149A

Dear Mr. Arpen Shah

The following report includes the data for the above referenced project for sample(s) received on 1/10/2013 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-14A/15 (5&20 ppbv) 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: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kyle Vagadori

Project Manager

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WORK ORDER #: 1301149A

Work Order Summary

CLIENT:	Mr. Arpen Shah Arcadis U.S., Inc. 100 Montgomery Street Suite 300 San Francisco, CA 94104	**BILL TO:**	Accounts Payable Arcadis U.S., Inc. 630 Plaza Drive Suite 600 Highlands Ranch, CO 80129
PHONE:	415-432-6916	**P.O. #**	GP09BPNA.C110
FAX:	415-374-2745	**PROJECT #**	BP4931
DATE RECEIVED:	01/10/2013	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	01/17/2013		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SV-6	Modified TO-14A/15 (5&20]	3.6 "Hg	15 psi
02A	Lab Blank	Modified TO-14A/15 (5&20]	NA	NA
03A	CCV	Modified TO-14A/15 (5&20]	NA	NA
04A	LCS	Modified TO-14A/15 (5&20]	NA	NA
04AA	LCSD	Modified TO-14A/15 (5&20]	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 01/17/13

Technical Director

Certfication numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-5, UT NELAP CA009332012-3, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2011, Expiration date: 10/17/2012.
Eurofins 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 - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15 Soil Gas
Arcadis U.S., Inc.
Workorder# 1301149A

One 1 Liter Summa Canister sample was received on January 10, 2013. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode. The method involves concentrating up to 50 mLs of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

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

There were no receiving discrepancies.

Analytical Notes

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.

Dilution was performed on sample SV-6 due to the presence of high level non-target species.

The recovery of surrogate 1,2-Dichloroethane-d4 in sample SV-6 was outside laboratory control limits due to high level hydrocarbon matrix interference. The surrogate recovery is flagged.

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

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

Client Sample ID: SV-6

Lab ID#: 1301149A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	580	1000	1800	3400
TPH ref. to Gasoline (MW=100)	12000	6500000	47000	26000000

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Client Sample ID: SV-6

Lab ID#: 1301149A-01A

EPA METHOD TO-15 GC/MS

File Name:	**14011627**	**Date of Collection: 1/9/13 10:00:00 AM**	
Dil. Factor:	**115**	**Date of Analysis: 1/16/13 05:11 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	580	1000	1800	3400
Toluene	580	Not Detected	2200	Not Detected
Ethyl Benzene	580	Not Detected	2500	Not Detected
m,p-Xylene	580	Not Detected	2500	Not Detected
o-Xylene	580	Not Detected	2500	Not Detected
Methyl tert-butyl ether	580	Not Detected	2100	Not Detected
TPH ref. to Gasoline (MW=100)	12000	6500000	47000	26000000

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

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	181 Q	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1301149A-02A

EPA METHOD TO-15 GC/MS

File Name:	**14011606**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/16/13 07:07 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
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
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
TPH ref. to Gasoline (MW=100)	100	Not Detected	410	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: CCV

Lab ID#: 1301149A-03A

EPA METHOD TO-15 GC/MS

File Name:	**14011602**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/15/13 08:54 PM**	

Compound	%Recovery
Benzene	82
Toluene	82
Ethyl Benzene	83
m,p-Xylene	85
o-Xylene	85
Methyl tert-butyl ether	81
TPH ref. to Gasoline (MW=100)	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	113	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: LCS

Lab ID#: 1301149A-04A

EPA METHOD TO-15 GC/MS

File Name:	**14011603**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/15/13 09:19 PM**	

Compound	**%Recovery**
Benzene	92
Toluene	88
Ethyl Benzene	90
m,p-Xylene	94
o-Xylene	93
Methyl tert-butyl ether	89
TPH ref. to Gasoline (MW=100)	Not Spiked

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: LCSD

Lab ID#: 1301149A-04AA

EPA METHOD TO-15 GC/MS

File Name:	**14011604**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/15/13 09:45 PM**	

Compound	**%Recovery**
Benzene	91
Toluene	87
Ethyl Benzene	91
m,p-Xylene	94
o-Xylene	94
Methyl tert-butyl ether	92
TPH ref. to Gasoline (MW=100)	Not Spiked

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	113	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	104	70-130

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager Hollis Phillips
Collected by: (Print and Sign) Aspen Shuh
Company AMS Email
Address 100 Montgomery City SF State CA Zip 94104
Phone 415-432-6916 Fax

Project Info:
P.O. # GP09.BPNA.C110
Project #
Project Name BP4931

Turn Around Time:
☒ Normal
☐ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	SV-6	2074	1/9/13	1000	TO-15, ASTM-1946	27.5	5		

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
	1/9/13 1130	Kathi Beck CATC	01/10/13 0845
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes:
TO-15: TPHg, BTEX, MTBE
ASTM-1946: He, CH_4, O_2, CO_2, N_2

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx		NA	good	Yes No (None)	1301149

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1/17/2013
Mr. Arpen Shah
Arcadis U.S., Inc.
100 Montgomery Street
Suite 300
San Francisco CA 94104

Project Name: BP4931
Project #:
Workorder #: 1301149B

Dear Mr. Arpen Shah

The following report includes the data for the above referenced project for sample(s) received on 1/10/2013 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: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kyle Vagadori

Project Manager

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WORK ORDER #: 1301149B

Work Order Summary

CLIENT:	Mr. Arpen Shah Arcadis U.S., Inc. 100 Montgomery Street Suite 300 San Francisco, CA 94104	**BILL TO:**	Accounts Payable Arcadis U.S., Inc. 630 Plaza Drive Suite 600 Highlands Ranch, CO 80129
PHONE:	415-432-6916	**P.O. #**	GP09BPNA.C110
FAX:	415-374-2745	**PROJECT #**	BP4931
DATE RECEIVED:	01/10/2013	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	01/17/2013		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SV-6	Modified ASTM D-1946	3.6 "Hg	15 psi
02A	Lab Blank	Modified ASTM D-1946	NA	NA
02B	Lab Blank	Modified ASTM D-1946	NA	NA
03A	LCS	Modified ASTM D-1946	NA	NA
03AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 01/17/13

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-4, UT NELAP CA009332012-3, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2012, Expiration date: 10/17/2013.
Eurofins 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 - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified ASTM D-1946
Arcadis U.S., Inc.
Workorder# 1301149B

One 1 Liter Summa Canister sample was received on January 10, 2013. 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

There were no receiving discrepancies.

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

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

Client Sample ID: SV-6

Lab ID#: 1301149B-01A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.23	4.3
Nitrogen	0.23	78
Carbon Dioxide	0.023	12
Methane	0.00023	5.0

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Client Sample ID: SV-6

Lab ID#: 1301149B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9011623**	**Date of Collection: 1/9/13 10:00:00 AM**	
Dil. Factor:	**2.30**	**Date of Analysis: 1/16/13 08:39 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.23	4.3
Nitrogen	0.23	78
Carbon Dioxide	0.023	12
Methane	0.00023	5.0
Helium	0.12	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: Lab Blank

Lab ID#: 1301149B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9011605**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/16/13 10:35 AM**	

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

Container Type: NA - Not Applicable

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1301149B-02B

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9011604b**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/16/13 10:11 AM**	

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

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1301149B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9011602**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/16/13 08:47 AM**	

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

Container Type: NA - Not Applicable

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 1301149B-03AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9011624**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/16/13 09:05 PM**	

Compound	%Recovery
Oxygen	99
Nitrogen	100
Carbon Dioxide	100
Methane	100
Helium	101

Container Type: NA - Not Applicable

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager Hollis Phillips
Collected by: (Print and Sign) Aspen Shuh
Company AMS Email
Address 100 Montgomery City SF State CA Zip 94104
Phone 415-432-6916 Fax

Project Info:
P.O. # GP09.BPNA.C110
Project #
Project Name BP4931

Turn Around Time:
☒ Normal
☐ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	SV-6	2074	1/9/13	1000	TO-15, ASTM-1946	27.5	5		

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
	1/9/13 1130	Kathi Beck CATC	01/10/13 0845
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes:
TO-15: TPHg, BTEX, MTBE
ASTM-1946: He, CH_4, O_2, CO_2, N_2

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx		NA	good	Yes No (None)	1301149

Form 1293 rev.11

eurofins | Air Toxics

1/18/2013
Mr. Arpen Shah
Arcadis U.S., Inc.
100 Montgomery Street
Suite 300
San Francisco CA 94104

Project Name: BP4931
Project #:
Workorder #: 1301161A

Dear Mr. Arpen Shah

The following report includes the data for the above referenced project for sample(s) received on 1/10/2013 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: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kyle Vagadori

Project Manager

eurofins | Air Toxics

WORK ORDER #: 1301161A

Work Order Summary

CLIENT:	Mr. Arpen Shah Arcadis U.S., Inc. 100 Montgomery Street Suite 300 San Francisco, CA 94104	**BILL TO:**	Accounts Payable Arcadis U.S., Inc. 630 Plaza Drive Suite 600 Highlands Ranch, CO 80129
PHONE:	415-432-6916	**P.O. #**	GP09BPNA.C110
FAX:	415-374-2745	**PROJECT #**	BP4931
DATE RECEIVED:	01/10/2013	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	01/18/2013		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SV-2	Modified TO-15	4.0 "Hg	15 psi
02A	SS-SV-3	Modified TO-15	3.6 "Hg	15 psi
03A	SV-3	Modified TO-15	3.0 "Hg	15 psi
04A	DUP	Modified TO-15	3.6 "Hg	15 psi
05A	SS-SV-1	Modified TO-15	4.6 "Hg	15 psi
06A	SV-1	Modified TO-15	3.8 "Hg	15 psi
07A	Lab Blank	Modified TO-15	NA	NA
07B	Lab Blank	Modified TO-15	NA	NA
08A	CCV	Modified TO-15	NA	NA
08B	CCV	Modified TO-15	NA	NA
09A	LCS	Modified TO-15	NA	NA
09AA	LCSD	Modified TO-15	NA	NA
09B	LCS	Modified TO-15	NA	NA
09BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Heidi Mayo DATE: 01/18/13

Technical Director

Certfication numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-5, UT NELAP CA009332012-3, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2011, Expiration date: 10/17/2012.
Eurofins 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 - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15
Arcadis U.S., Inc.
Workorder# 1301161A

Six 1 Liter Summa Canister samples were received on January 10, 2013. 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

Sample identification for sample SV-1 was not provided on the sample tag. Therefore the information on the Chain of Custody was used to process and report the sample.

The Chain of Custody (COC) information for sample DUP did not match the entry on the sample tag with regard to sample identification. The information on the COC was used to process and report the sample.

Analytical Notes

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.

As per client project requirements, the laboratory has reported estimated values for Benzene hits that are below the Reporting Limit but greater than the Method Detection Limit. Concentrations that are below the level at which the canister was certified (0.2 ppbv for compounds reported at 0.5 ppbv and 0.8 ppbv for compounds reported at 2.0 ppbv) may be false positives.

Dilution was performed on samples SV-2, SS-SV-3, SV-3, DUP and SV-1 due to the presence of high level non-target species.

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

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

Client Sample ID: SV-2

Lab ID#: 1301161A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1200	48000	3700	150000
TPH ref. to Gasoline (MW=100)	58000	12000000	240000	49000000

Client Sample ID: SS-SV-3

Lab ID#: 1301161A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.2	0.73 J	3.7	2.3 J
Methyl tert-butyl ether	1.2	84	4.1	300
TPH ref. to Gasoline (MW=100)	58	2200	240	9000

Client Sample ID: SV-3

Lab ID#: 1301161A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1100	530 J	3600	1700 J
TPH ref. to Gasoline (MW=100)	56000	5400000	230000	22000000

Client Sample ID: DUP

Lab ID#: 1301161A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1200	690 J	3700	2200 J
TPH ref. to Gasoline (MW=100)	58000	5400000	240000	22000000

Client Sample ID: SS-SV-1

Lab ID#: 1301161A-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.2	0.63 J	3.8	2.0 J
TPH ref. to Gasoline (MW=100)	60	180	240	740

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

Client Sample ID: SV-1

Lab ID#: 1301161A-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	7.2	3.5 J	23	11 J

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Client Sample ID: SV-2

Lab ID#: 1301161A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o011522**	**Date of Collection: 1/4/13 10:50:00 AM**	
Dil. Factor:	**2330**	**Date of Analysis: 1/16/13 01:57 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1200	48000	3700	150000
Ethyl Benzene	1200	Not Detected	5000	Not Detected
Toluene	1200	Not Detected	4400	Not Detected
m,p-Xylene	1200	Not Detected	5000	Not Detected
o-Xylene	1200	Not Detected	5000	Not Detected
Methyl tert-butyl ether	1200	Not Detected	4200	Not Detected
Naphthalene	4700	Not Detected	24000	Not Detected
TPH ref. to Gasoline (MW=100)	58000	12000000	240000	49000000

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	86	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: SS-SV-3

Lab ID#: 1301161A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o011616**	**Date of Collection: 1/4/13 2:00:00 PM**	
Dil. Factor:	**2.30**	**Date of Analysis: 1/16/13 07:51 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.2	0.73 J	3.7	2.3 J
Ethyl Benzene	1.2	Not Detected	5.0	Not Detected
Toluene	1.2	Not Detected	4.3	Not Detected
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	84	4.1	300
Naphthalene	4.6	Not Detected	24	Not Detected
TPH ref. to Gasoline (MW=100)	58	2200	240	9000

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	91	70-130
Toluene-d8	93	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: SV-3

Lab ID#: 1301161A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o011520**	**Date of Collection: 1/4/13 2:30:00 PM**	
Dil. Factor:	**2240**	**Date of Analysis: 1/16/13 12:42 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1100	530 J	3600	1700 J
Ethyl Benzene	1100	Not Detected	4900	Not Detected
Toluene	1100	Not Detected	4200	Not Detected
m,p-Xylene	1100	Not Detected	4900	Not Detected
o-Xylene	1100	Not Detected	4900	Not Detected
Methyl tert-butyl ether	1100	Not Detected	4000	Not Detected
Naphthalene	4500	Not Detected	23000	Not Detected
TPH ref. to Gasoline (MW=100)	56000	5400000	230000	22000000

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	89	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: DUP

Lab ID#: 1301161A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o011521**	**Date of Collection: 1/4/13 3:00:00 PM**	
Dil. Factor:	**2300**	**Date of Analysis: 1/16/13 01:20 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1200	690 J	3700	2200 J
Ethyl Benzene	1200	Not Detected	5000	Not Detected
Toluene	1200	Not Detected	4300	Not Detected
m,p-Xylene	1200	Not Detected	5000	Not Detected
o-Xylene	1200	Not Detected	5000	Not Detected
Methyl tert-butyl ether	1200	Not Detected	4100	Not Detected
Naphthalene	4600	Not Detected	24000	Not Detected
TPH ref. to Gasoline (MW=100)	58000	5400000	240000	22000000

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	88	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: SS-SV-1

Lab ID#: 1301161A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o011517**	**Date of Collection: 1/4/13 3:40:00 PM**	
Dil. Factor:	**2.39**	**Date of Analysis: 1/15/13 10:52 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.2	0.63 J	3.8	2.0 J
Ethyl Benzene	1.2	Not Detected	5.2	Not Detected
Toluene	1.2	Not Detected	4.5	Not Detected
m,p-Xylene	1.2	Not Detected	5.2	Not Detected
o-Xylene	1.2	Not Detected	5.2	Not Detected
Methyl tert-butyl ether	1.2	Not Detected	4.3	Not Detected
Naphthalene	4.8	Not Detected	25	Not Detected
TPH ref. to Gasoline (MW=100)	60	180	240	740

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	95	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: SV-1

Lab ID#: 1301161A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o011519**	**Date of Collection:**	**1/4/13 4:30:00 PM**
Dil. Factor:	**14.4**	**Date of Analysis:**	**1/16/13 12:06 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	7.2	3.5 J	23	11 J
Ethyl Benzene	7.2	Not Detected	31	Not Detected
Toluene	7.2	Not Detected	27	Not Detected
m,p-Xylene	7.2	Not Detected	31	Not Detected
o-Xylene	7.2	Not Detected	31	Not Detected
Methyl tert-butyl ether	7.2	Not Detected	26	Not Detected
Naphthalene	29	Not Detected	150	Not Detected
TPH ref. to Gasoline (MW=100)	360	Not Detected	1500	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	88	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1301161A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o011507a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/15/13 02:18 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.50	0.25 J	1.6	0.80 J
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

J = Estimated value.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	94	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1301161A-07B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o011607a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/16/13 12:57 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	86	70-130
Toluene-d8	88	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: CCV

Lab ID#: 1301161A-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o011502**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/15/13 10:39 AM**	

Compound	%Recovery
Benzene	89
Ethyl Benzene	93
Toluene	92
m,p-Xylene	94
o-Xylene	94
Methyl tert-butyl ether	88
Naphthalene	64
TPH ref. to Gasoline (MW=100)	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	84	70-130
Toluene-d8	93	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: CCV

Lab ID#: 1301161A-08B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o011602**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/16/13 09:36 AM**	

Compound	%Recovery
Benzene	90
Ethyl Benzene	95
Toluene	94
m,p-Xylene	95
o-Xylene	95
Methyl tert-butyl ether	91
Naphthalene	65
TPH ref. to Gasoline (MW=100)	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	85	70-130
Toluene-d8	88	70-130
4-Bromofluorobenzene	107	70-130

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Client Sample ID: LCS

Lab ID#: 1301161A-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o011503**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/15/13 11:51 AM**	

Compound	**%Recovery**
Benzene	86
Ethyl Benzene	93
Toluene	87
m,p-Xylene	95
o-Xylene	94
Methyl tert-butyl ether	87
Naphthalene	88
TPH ref. to Gasoline (MW=100)	Not Spiked

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	87	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: LCSD

Lab ID#: 1301161A-09AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o011504**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/15/13 12:28 PM**	

Compound	**%Recovery**
Benzene	90
Ethyl Benzene	95
Toluene	90
m,p-Xylene	97
o-Xylene	96
Methyl tert-butyl ether	88
Naphthalene	98
TPH ref. to Gasoline (MW=100)	Not Spiked

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	85	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: LCS

Lab ID#: 1301161A-09B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o011603**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/16/13 10:21 AM**	

Compound	**%Recovery**
Benzene	86
Ethyl Benzene	92
Toluene	88
m,p-Xylene	94
o-Xylene	93
Methyl tert-butyl ether	86
Naphthalene	95
TPH ref. to Gasoline (MW=100)	Not Spiked

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	85	70-130
Toluene-d8	90	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: LCSD

Lab ID#: 1301161A-09BB

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o011604**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/16/13 11:00 AM**	

Compound	%Recovery
Benzene	89
Ethyl Benzene	94
Toluene	91
m,p-Xylene	95
o-Xylene	95
Methyl tert-butyl ether	90
Naphthalene	97
TPH ref. to Gasoline (MW=100)	Not Spiked

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	86	70-130
Toluene-d8	91	70-130
4-Bromofluorobenzene	103	70-130

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager: Hollis Phillips
Collected by: (Print and Sign) Arpan Shah
Company: AUS Email:
Address: 100 Montgomery City: San Fran State: CA Zip: 94104
Phone: (415) 432-6916 Fax:

Project Info:
P.O. # GP093PNA.C10
Project #:
Project Name: BP4931

Turn Around Time:
~~Normal~~
☐ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	SV-2	35651	1/4/13	1050	TO-15, ASTM D-1946	30	5		
02A	SS-SV-3	37365		1400		30	5		
03A	SV-3	25278		1430		30	4.5		
04A	DUP	97100		1500		30	5		
05A	SS-SV-1	36489		1540		30	6		
06A	SV-1	33408		1630		30	5.5		

Relinquished by: (signature) Date/Time: 1/4/13 1800
Received by: (signature) Date/Time: 1/10/13 1410

Relinquished by: (signature) Date/Time:
Received by: (signature) Date/Time:

Relinquished by: (signature) Date/Time:
Received by: (signature) Date/Time:

Notes:
TO-15: TPH$_g$, BTEX, MTBE
ASTM 1946: O_2, CO_2, N_2, He, CH_4

Lab Use Only

Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
FedEx		NA	good	Yes No (None)	1301161

Form 1293 rev.11

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1/18/2013
Mr. Arpen Shah
Arcadis U.S., Inc.
100 Montgomery Street
Suite 300
San Francisco CA 94104

Project Name: BP4931
Project #:
Workorder #: 1301161B

Dear Mr. Arpen Shah

The following report includes the data for the above referenced project for sample(s) received on 1/10/2013 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: Kyle Vagadori at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kyle Vagadori

Project Manager

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WORK ORDER #: 1301161B

Work Order Summary

CLIENT:	Mr. Arpen Shah Arcadis U.S., Inc. 100 Montgomery Street Suite 300 San Francisco, CA 94104	**BILL TO:**	Accounts Payable Arcadis U.S., Inc. 630 Plaza Drive Suite 600 Highlands Ranch, CO 80129
PHONE:	415-432-6916	**P.O. #**	GP09BPNA.C110
FAX:	415-374-2745	**PROJECT #**	BP4931
DATE RECEIVED:	01/10/2013	**CONTACT:**	Kyle Vagadori
DATE COMPLETED:	01/18/2013		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SV-2	Modified ASTM D-1946	4.0 "Hg	15 psi
02A	SS-SV-3	Modified ASTM D-1946	3.6 "Hg	15 psi
03A	SV-3	Modified ASTM D-1946	3.0 "Hg	15 psi
04A	DUP	Modified ASTM D-1946	3.6 "Hg	15 psi
05A	SS-SV-1	Modified ASTM D-1946	4.6 "Hg	15 psi
06A	SV-1	Modified ASTM D-1946	3.8 "Hg	15 psi
07A	Lab Blank	Modified ASTM D-1946	NA	NA
07B	Lab Blank	Modified ASTM D-1946	NA	NA
08A	LCS	Modified ASTM D-1946	NA	NA
08AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 01/18/13

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-4, UT NELAP CA009332012-3, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2012, Expiration date: 10/17/2013.
Eurofins 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 - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified ASTM D-1946
Arcadis U.S., Inc.
Workorder# 1301161B

Six 1 Liter Summa Canister samples were received on January 10, 2013. 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

Sample identification for sample SV-1 was not provided on the sample tag. Therefore the information on the Chain of Custody was used to process and report the sample.

The Chain of Custody (COC) information for sample DUP did not match the entry on the sample tag with regard to sample identification. The information on the COC was used to process and report the sample.

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

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

Client Sample ID: SV-2

Lab ID#: 1301161B-01A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.23	1.0
Nitrogen	0.23	48
Carbon Dioxide	0.023	12
Methane	0.00023	37

Client Sample ID: SS-SV-3

Lab ID#: 1301161B-02A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.23	20
Nitrogen	0.23	80
Carbon Dioxide	0.023	0.036
Methane	0.00023	0.010

Client Sample ID: SV-3

Lab ID#: 1301161B-03A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.22	1.6
Nitrogen	0.22	72
Carbon Dioxide	0.022	22
Methane	0.00022	3.6

Client Sample ID: DUP

Lab ID#: 1301161B-04A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.23	1.4
Nitrogen	0.23	72
Carbon Dioxide	0.023	22
Methane	0.00023	3.7

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

Client Sample ID: SS-SV-1

Lab ID#: 1301161B-05A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.24	20
Nitrogen	0.24	77
Carbon Dioxide	0.024	0.25
Methane	0.00024	0.00024
Helium	0.12	2.5

Client Sample ID: SV-1

Lab ID#: 1301161B-06A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.23	2.2
Nitrogen	0.23	94
Carbon Dioxide	0.023	4.2

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Client Sample ID: SV-2

Lab ID#: 1301161B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9011717**	**Date of Collection: 1/4/13 10:50:00 AM**	
Dil. Factor:	**2.33**	**Date of Analysis: 1/17/13 03:58 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.23	1.0
Nitrogen	0.23	48
Carbon Dioxide	0.023	12
Methane	0.00023	37
Helium	0.12	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: SS-SV-3

Lab ID#: 1301161B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9011712**	**Date of Collection: 1/4/13 2:00:00 PM**	
Dil. Factor:	**2.30**	**Date of Analysis: 1/17/13 12:39 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.23	20
Nitrogen	0.23	80
Carbon Dioxide	0.023	0.036
Methane	0.00023	0.010
Helium	0.12	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-3

Lab ID#: 1301161B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9011713**	**Date of Collection: 1/4/13 2:30:00 PM**	
Dil. Factor:	**2.24**	**Date of Analysis: 1/17/13 01:24 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.22	1.6
Nitrogen	0.22	72
Carbon Dioxide	0.022	22
Methane	0.00022	3.6
Helium	0.11	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: DUP

Lab ID#: 1301161B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9011718**	**Date of Collection: 1/4/13 3:00:00 PM**	
Dil. Factor:	**2.30**	**Date of Analysis: 1/17/13 04:26 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.23	1.4
Nitrogen	0.23	72
Carbon Dioxide	0.023	22
Methane	0.00023	3.7
Helium	0.12	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: SS-SV-1

Lab ID#: 1301161B-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9011715**	**Date of Collection: 1/4/13 3:40:00 PM**	
Dil. Factor:	**2.39**	**Date of Analysis: 1/17/13 02:29 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.24	20
Nitrogen	0.24	77
Carbon Dioxide	0.024	0.25
Methane	0.00024	0.00024
Helium	0.12	2.5

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-1

Lab ID#: 1301161B-06A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9011716**	**Date of Collection: 1/4/13 4:30:00 PM**	
Dil. Factor:	**2.31**	**Date of Analysis: 1/17/13 03:03 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.23	2.2
Nitrogen	0.23	94
Carbon Dioxide	0.023	4.2
Methane	0.00023	Not Detected
Helium	0.12	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: Lab Blank

Lab ID#: 1301161B-07A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9011705**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/17/13 08:55 AM**	

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

Container Type: NA - Not Applicable

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Client Sample ID: Lab Blank

Lab ID#: 1301161B-07B

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9011704b**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/17/13 08:31 AM**	

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

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1301161B-08A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9011702**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/17/13 07:36 AM**	

Compound	%Recovery
Oxygen	102
Nitrogen	100
Carbon Dioxide	101
Methane	94
Helium	99

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1301161B-08AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9011729**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 1/17/13 09:19 PM**	

Compound	%Recovery
Oxygen	101
Nitrogen	101
Carbon Dioxide	101
Methane	94
Helium	97

Container Type: NA - Not Applicable

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180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

Project Manager Hollis Phillips
Collected by: (Print and Sign) Alpen Shah [signature]
Company AUS Email
Address 100 Montgomery City San Fran State CA Zip 94104
Phone (415) 432-6916 Fax

Project Info:
P.O. # GP09BPNA.C110
Project #
Project Name BP4931

Turn Around Time: ☒ Normal ☐ Rush ______ specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	SV-2	35651	1/4/13	1050	TO-15, ASTM D-1946	30	5		
02A	SS-SV-3	37365	↓	~~1126~~ 1400	↓	30	5		
03A	SV-3	25278	↓	~~1230~~ 1430	↓	30	4.5		
04A	DUP	97100	↓	~~1400~~ 1500	↓	30	5		
05A	SS-SV-1	36489	↓	~~1430~~ 1540	↓	30	6		
06A	SV-1	33408	↓	~~14~~ 1630	↓	30	5.5		

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
[signature]	1/4/12 1800	Katie Deck / ATL	01/10/13 1410
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes:
TO-15: TPHg, BTEX, MTBE
ASTM 1946: O_2, CO_2, N_2, He, CH_4

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx		NA	good	Yes No (None)	1301161

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2/26/2013
Mr. Arpen Shah
Arcadis U.S., Inc.
100 Montgomery Street
Suite 300
San Francisco CA 94104

Project Name: BP Oakland SV investigation
Project #: GP09BPNA.C110.N0000
Workorder #: 1302327A

Dear Mr. Arpen Shah

The following report includes the data for the above referenced project for sample(s) received on 2/19/2013 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: Maria Barajas at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Maria Barajas

Project Manager

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WORK ORDER #: 1302327A

Work Order Summary

CLIENT:	Mr. Arpen Shah Arcadis U.S., Inc. 100 Montgomery Street Suite 300 San Francisco, CA 94104	**BILL TO:**	Accounts Payable Arcadis U.S., Inc. 630 Plaza Drive Suite 600 Highlands Ranch, CO 80129
PHONE:	415-432-6916	**P.O. #**	R100109-012312
FAX:	415-374-2745	**PROJECT #**	GP09BPNA.C110.N0000 BP Oakland SV investigation
DATE RECEIVED:	02/19/2013	**CONTACT:**	Maria Barajas
DATE COMPLETED:	02/26/2013		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SV-5	Modified TO-15	9.0 "Hg	15 psi
02A	SS-SV-2	Modified TO-15	5.0 "Hg	15 psi
03A	SV-4	Modified TO-15	4.5 "Hg	15 psi
04A	Lab Blank	Modified TO-15	NA	NA
04B	Lab Blank	Modified TO-15	NA	NA
05A	CCV	Modified TO-15	NA	NA
05B	CCV	Modified TO-15	NA	NA
06A	LCS	Modified TO-15	NA	NA
06AA	LCSD	Modified TO-15	NA	NA
06B	LCS	Modified TO-15	NA	NA
06BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Heidi Mayo DATE: 02/26/13

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-4, UT NELAP CA009332012-3, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2012, Expiration date: 10/17/2013.
Eurofins 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 - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15
Arcadis U.S., Inc.
Workorder# 1302327A

Three 1 Liter Summa Canister samples were received on February 19, 2013. 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

There were no receiving discrepancies.

Analytical Notes

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.

As per client project requirements, the laboratory has reported estimated values for Benzene hits that are below the Reporting Limit but greater than the Method Detection Limit.

Dilution was performed on sample SS-SV-2 due to the presence of high level non-target species.

The recovery of surrogate 1,2-Dichloroethane-d4 in sample SS-SV-2 was outside laboratory control limits due to high level hydrocarbon matrix interference. The surrogate recovery is flagged.

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
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

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

Client Sample ID: SV-5

Lab ID#: 1302327A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.4	0.94 J	4.6	3.0 J
Toluene	1.4	7.3	5.4	28
Ethyl Benzene	1.4	2.3	6.3	9.9
m,p-Xylene	1.4	9.6	6.3	42
o-Xylene	1.4	3.9	6.3	17
TPH ref. to Gasoline (MW=100)	72	330	300	1300

Client Sample ID: SS-SV-2

Lab ID#: 1302327A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	600	840	1900	2700
TPH ref. to Gasoline (MW=100)	12000	10000000	49000	41000000

Client Sample ID: SV-4

Lab ID#: 1302327A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.2	0.69 J	3.8	2.2 J

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Client Sample ID: SV-5

Lab ID#: 1302327A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o022127**	**Date of Collection:**	**2/15/13 2:35:00 PM**
Dil. Factor:	**2.89**	**Date of Analysis:**	**2/22/13 01:02 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	1.4	Not Detected	5.2	Not Detected
Benzene	1.4	0.94 J	4.6	3.0 J
Toluene	1.4	7.3	5.4	28
Ethyl Benzene	1.4	2.3	6.3	9.9
m,p-Xylene	1.4	9.6	6.3	42
o-Xylene	1.4	3.9	6.3	17
TPH ref. to Gasoline (MW=100)	72	330	300	1300

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: SS-SV-2

Lab ID#: 1302327A-02A

EPA METHOD TO-15 GC/MS

File Name:	**14022220**	**Date of Collection:**	**2/15/13 1:37:00 PM**
Dil. Factor:	**121**	**Date of Analysis:**	**2/22/13 04:20 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	600	840	1900	2700
Toluene	600	Not Detected	2300	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
Methyl tert-butyl ether	600	Not Detected	2200	Not Detected
TPH ref. to Gasoline (MW=100)	12000	10000000	49000	41000000

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

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	140 Q	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: SV-4

Lab ID#: 1302327A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o022128**	**Date of Collection:**	**2/15/13 4:02:00 PM**
Dil. Factor:	**2.38**	**Date of Analysis:**	**2/22/13 01:39 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	1.2	Not Detected	4.3	Not Detected
Benzene	1.2	0.69 J	3.8	2.2 J
Toluene	1.2	Not Detected	4.5	Not Detected
Ethyl Benzene	1.2	Not Detected	5.2	Not Detected
m,p-Xylene	1.2	Not Detected	5.2	Not Detected
o-Xylene	1.2	Not Detected	5.2	Not Detected
TPH ref. to Gasoline (MW=100)	60	Not Detected	240	Not Detected

J = Estimated value.

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	95	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1302327A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o022107c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/21/13 12:14 PM**	

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

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	88	70-130
1,2-Dichloroethane-d4	92	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1302327A-04B

EPA METHOD TO-15 GC/MS

File Name:	**14022211a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/22/13 12:11 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
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
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
TPH ref. to Gasoline (MW=100)	100	Not Detected	410	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: CCV

Lab ID#: 1302327A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o022102**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/21/13 09:09 AM**	

Compound	%Recovery
Methyl tert-butyl ether	91
Benzene	90
Toluene	96
Ethyl Benzene	92
m,p-Xylene	93
o-Xylene	95
TPH ref. to Gasoline (MW=100)	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	89	70-130
1,2-Dichloroethane-d4	88	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: CCV

Lab ID#: 1302327A-05B

EPA METHOD TO-15 GC/MS

File Name:	**14022207**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/22/13 10:33 AM**	

Compound	%Recovery
Benzene	93
Toluene	95
Ethyl Benzene	98
m,p-Xylene	102
o-Xylene	99
Methyl tert-butyl ether	99
TPH ref. to Gasoline (MW=100)	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: LCS

Lab ID#: 1302327A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o022103**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/21/13 09:47 AM**	

Compound	**%Recovery**
Methyl tert-butyl ether	96
Benzene	92
Toluene	96
Ethyl Benzene	99
m,p-Xylene	103
o-Xylene	101
TPH ref. to Gasoline (MW=100)	Not Spiked

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
Toluene-d8	90	70-130
1,2-Dichloroethane-d4	89	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: LCSD

Lab ID#: 1302327A-06AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**o022104**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/21/13 10:24 AM**	

Compound	**%Recovery**
Methyl tert-butyl ether	94
Benzene	93
Toluene	96
Ethyl Benzene	101
m,p-Xylene	102
o-Xylene	103
TPH ref. to Gasoline (MW=100)	Not Spiked

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
Toluene-d8	89	70-130
1,2-Dichloroethane-d4	91	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: LCS

Lab ID#: 1302327A-06B

EPA METHOD TO-15 GC/MS

File Name:	**14022208**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/22/13 10:59 AM**	

Compound	**%Recovery**
Benzene	78
Toluene	79
Ethyl Benzene	82
m,p-Xylene	84
o-Xylene	83
Methyl tert-butyl ether	82
TPH ref. to Gasoline (MW=100)	Not Spiked

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCSD

Lab ID#: 1302327A-06BB

EPA METHOD TO-15 GC/MS

File Name:	**14022209**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/22/13 11:19 AM**	

Compound	**%Recovery**
Benzene	81
Toluene	81
Ethyl Benzene	82
m,p-Xylene	85
o-Xylene	83
Methyl tert-butyl ether	82
TPH ref. to Gasoline (MW=100)	Not Spiked

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	103	70-130

TO-15/MA APH

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CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922.

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

Project Manager Hollis Phillips
Collected by: (Print and Sign) Paige Taylor Paige Taylor
Company ARCADIS Email Hollis.Phillips@arcadis-us.com
Address _____ City _____ State ____ Zip _____
Phone 510-219-7764 Fax _____

Project Info:
P.O. # _____
Project # GP09BRNA.C110.N0000
Project Name BP Oakland SV investigation

Turn Around Time:
■ Normal
☐ Rush
_____ specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas:
N He

Lab I.D.	Field Sample I.D. (Location)	Flow Controller ID	Can #	Date of Collection	Time of Collection	Analysis Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	SV-5	FC00387	3051	2/15/13	1435	TO-15 BTEX TPHG MTBE ASTM Method -D 1946	28.5	8.8		
02A	SS-SV-2	FC00832	35636	2/15/13	1337	TO-15 + ASTM Method D 1946	27.8	5.0		
03A	SV-4	FC00614	37373	2/15/13	1602	TO-15 + ASTM-D 1946	29.5	5.0		

Relinquished by: (signature) Paige L Taylor Date/Time 2/15/13 1810
Received by: (signature) Teresa O'Reilly Date/Time 2-18-13 1600
Relinquished by: (signature) Teresa O'Reilly Date/Time 2-18-13 1600
Received by: (signature) FEDEX Date/Time 2-18-13 1600
Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time 2/19/13 0958

Notes:
Lab supplied pressure gauge fittings were loose - would go to be tightened.

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx		N/A	Good	Yes No None	1302327

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2/26/2013
Mr. Arpen Shah
Arcadis U.S., Inc.
100 Montgomery Street
Suite 300
San Francisco CA 94104

Project Name: BP Oakland SV investigation
Project #: GP09BPNA.C110.N0000
Workorder #: 1302327B

Dear Mr. Arpen Shah

The following report includes the data for the above referenced project for sample(s) received on 2/19/2013 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: Maria Barajas at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Maria Barajas

Project Manager

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WORK ORDER #: 1302327B

Work Order Summary

CLIENT:	Mr. Arpen Shah Arcadis U.S., Inc. 100 Montgomery Street Suite 300 San Francisco, CA 94104	**BILL TO:**	Accounts Payable Arcadis U.S., Inc. 630 Plaza Drive Suite 600 Highlands Ranch, CO 80129
PHONE:	415-432-6916	**P.O. #**	R100109-012312
FAX:	415-374-2745	**PROJECT #**	GP09BPNA.C110.N0000 BP Oakland SV investigation
DATE RECEIVED:	02/19/2013	**CONTACT:**	Maria Barajas
DATE COMPLETED:	02/26/2013		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SV-5	Modified ASTM D-1946	9.0 "Hg	15 psi
02A	SS-SV-2	Modified ASTM D-1946	5.0 "Hg	15 psi
03A	SV-4	Modified ASTM D-1946	4.5 "Hg	15 psi
04A	Lab Blank	Modified ASTM D-1946	NA	NA
04B	Lab Blank	Modified ASTM D-1946	NA	NA
05A	LCS	Modified ASTM D-1946	NA	NA
05AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: Heidi Mayo DATE: 02/26/13

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-4, UT NELAP CA009332012-3, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2012, Expiration date: 10/17/2013.
Eurofins 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 - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified ASTM D-1946
Arcadis U.S., Inc.
Workorder# 1302327B

Three 1 Liter Summa Canister samples were received on February 19, 2013. 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

There were no receiving discrepancies.

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

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

Client Sample ID: SV-5

Lab ID#: 1302327B-01A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.29	18
Nitrogen	0.29	80
Carbon Dioxide	0.029	1.5

Client Sample ID: SS-SV-2

Lab ID#: 1302327B-02A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.24	2.2
Nitrogen	0.24	42
Carbon Dioxide	0.024	13
Methane	0.00024	41
Helium	0.12	1.5

Client Sample ID: SV-4

Lab ID#: 1302327B-03A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.24	18
Nitrogen	0.24	81
Carbon Dioxide	0.024	0.97

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Client Sample ID: SV-5

Lab ID#: 1302327B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9022319**	**Date of Collection: 2/15/13 2:35:00 PM**	
Dil. Factor:	**2.89**	**Date of Analysis: 2/23/13 03:00 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.29	18
Nitrogen	0.29	80
Carbon Dioxide	0.029	1.5
Methane	0.00029	Not Detected
Helium	0.14	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: SS-SV-2

Lab ID#: 1302327B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9022326**	**Date of Collection: 2/15/13 1:37:00 PM**	
Dil. Factor:	**2.42**	**Date of Analysis: 2/23/13 06:42 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.24	2.2
Nitrogen	0.24	42
Carbon Dioxide	0.024	13
Methane	0.00024	41
Helium	0.12	1.5

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-4

Lab ID#: 1302327B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9022320**	**Date of Collection: 2/15/13 4:02:00 PM**	
Dil. Factor:	**2.38**	**Date of Analysis: 2/23/13 03:46 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.24	18
Nitrogen	0.24	81
Carbon Dioxide	0.024	0.97
Methane	0.00024	Not Detected
Helium	0.12	Not Detected

Container Type: 1 Liter Summa Canister

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Client Sample ID: Lab Blank

Lab ID#: 1302327B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9022305**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/23/13 09:17 AM**	

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

Container Type: NA - Not Applicable

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Client Sample ID: Lab Blank

Lab ID#: 1302327B-04B

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9022303b**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/23/13 08:29 AM**	

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

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1302327B-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9022302**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/23/13 08:07 AM**	

Compound	%Recovery
Oxygen	98
Nitrogen	101
Carbon Dioxide	100
Methane	96
Helium	101

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1302327B-05AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9022331**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 2/23/13 08:43 PM**	

Compound	%Recovery
Oxygen	100
Nitrogen	100
Carbon Dioxide	98
Methane	96
Helium	98

Container Type: NA - Not Applicable

TO-15/MA APH

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CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
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FOLSOM, CA 95630
(916) 985-1000 FAX (916) 985-1020

Project Manager Hollis Phillips
Collected by: (Print and Sign) Paige Taylor Paige Taylor
Company ARCADIS Email Hollis.Phillips@arcadis-us.com
Address _____ City _____ State ____ Zip _____
Phone 510-219-7764 Fax _____

Project Info:
P.O. # _____
Project # GP09BRNA.C110.N0000
Project Name BP Oakland SV investigation

Turn Around Time:
■ Normal
☐ Rush
_____ specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas:
N He

Lab I.D.	Field Sample I.D. (Location)	Flow Controller ID	Can #	Date of Collection	Time of Collection	Analysis Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	SV-5	FC00387	3051	2/15/13	1435	TO-15 BTEX TPHG MTBE ASTM Method -D 1946	28.5	8.8		
02A	SS-SV-2	FC00832	35636	2/15/13	1337	TO-15 + ASTM Method D 1946	27.8	5.0		
03A	SV-4	FC00614	37373	2/15/13	1602	TO-15 + ASTM-D 1946	29.5	5.0		

Relinquished by: (signature) Paige L Taylor Date/Time 2/15/13 1810
Received by: (signature) Teresa O'Reilly Date/Time 2-18-13 1600
Relinquished by: (signature) Teresa O'Reilly Date/Time 2-18-13 1600
Received by: (signature) FEDEX Date/Time 2-18-13 1600
Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time 2/19/13 0958

Notes:
Lab supplied pressure gauge fittings were loose - would go to be tightened.

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx		N/A	Good	Yes No None	1302327

ARCADIS

ACEH LTC Policy Checklist
Low Threat Closure Policy

General Criteria A

LOW THREAT CLOSURE POLICY - GENERAL CRITERIA A

General Criteria a: **Is the Unauthorized Release Located within the Service Area of a Public Water System?**	☒ Y	☐ N

LTCP Statement: "This policy is protective of existing water supply wells. New water supply wells are unlikely to be installed in the shallow groundwater near former UST release sites. However, it is difficult to predict, on a statewide basis, where new wells will be installed, particularly in rural areas that are undergoing new development. This policy is limited to areas with available public water systems to reduce the likelihood that new wells in developing areas will be inadvertently impacted by residual petroleum in groundwater. Case closure outside of areas with a public water system should be evaluated based upon the fundamental principles in this policy and a site specific evaluation of developing water supplies in the area. For purposes of this policy, a public water system is a system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out of the year."

If the unauthorized release is located within the service area of a public water supply system, then

Name of public water system agency?

East Bay Municipal Utility District	☒ Y
Zone 7 Water Agency	☐ Y
City of Hayward Water	☐ Y
Alameda County Water District	☐ Y
Other:	☐ Y

Are there existing water supply wells or other sources of water in the vicinity of the site? ***Use General Criteria e – CSM Well Survey sheet to support answer*** *Note: If yes, the site must still satisfy the groundwater media specific criteria for distance from the contaminant plume boundary to existing wells*	☐ Y	☒ N	☐ NE

If the unauthorized release is located outside the service area of a public water supply system, then Are there additional characteristics to consider that might result in a low-threat designation?	☐ **Y**	☐ **N**	☐ **NE**	☒ **NA**
Has a site-specific evaluation of developing water supplies in the area been conducted?	☐ Y	☐ N	☐ NE	☐ NA
Is impacted groundwater shallower than the sanitary seal requirement for supply wells in the applicable county? Applicable County Sanitary Seal Requirements:	☐ Y	☐ N	☐ NE	☐ NA
Are impacted perched water zones not a viable potential water supply?	☐ Y	☐ N	☐ NE	☐ NA
Does high salinity or low yield negate the impacted groundwater from drinking water beneficial use per State Water Board Resolution 1988-0063, or de-designated areas of the applicable Basin Plans?	☐ Y	☐ N	☐ NE	☐ NA
Will Water Quality Objectives (WQOs) in the groundwater plume be attained through natural attenuation within a reasonable time, prior to the expected need for use of any affected groundwater?	☐ Y	☐ N	☐ NE	☐ NA

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

LOW THREAT CLOSURE POLICY - GENERAL CRITERIA A

General Criteria a: Case Notes

Case File Reference Documents:

Attachments:

Case Notes:

The Site is located in a service area where the local water supply is provided by the East Bay Municipal Utility District (EBMUD).
Source: http://www.ebmud.com/about/service-area-map.

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

ARCADIS

ACEH LTC Policy Checklist
Low Threat Closure Policy

General Criteria B

LOW THREAT CLOSURE POLICY - GENERAL CRITERIA B

General Criteria b: **Does the Unauthorized Release Consist only of Petroleum?**	☒ YES	☐ NO	☐ NE

LTCP Statement: "For purposes of this policy, petroleum is defined as crude oil, or any fraction thereof, which is liquid at standard conditions and temperature and pressure, which means 60 degrees Fahrenheit and 14.7 pounds per square inch absolute including the following substances: motor fuels, jet fuels, distillate fuel oils, residual fuel oils, lubricants, petroleum solvents and used oils, including any additives and blending agents such as oxygenates contained in the formulation of the substances."

Have adequate site investigation activities been conducted to evaluate unauthorized releases of potential chemicals of concern (PCOCs) and chemicals of concern (COCs) from on-site sources due to historical site activities and chemical usage?	☒ Y	☐ N	☐ NE	☐ NA
Have areas of concern been identified based on historical site activities and chemical usage?	☒ Y	☐ N	☐ NE	☐ NA
Have unauthorized releases from underground storage tanks been identified?	☒ Y	☐ N	☐ NE	☐ NA
Have unauthorized releases from above ground storage tanks been identified?	☐ Y	☐ N	☐ NE	☒ NA
Have unauthorized releases from site infrastructure (i.e., sumps, drains, sanitary sewer, etc) been identified?	☐ Y	☐ N	☐ NE	☒ NA
Have unauthorized releases from surface spills at dispenser islands, tank fill ports, etc. been identified?	☐ Y	☐ N	☐ NE	☒ NA
Have unauthorized releases from other on-site sources been identified?	☐ Y	☐ N	☐ NE	☒ NA
Has the site been impacted by off-site sources?	☐ Y	☒ N	☐ NE	☐ NA
Are detected COCs consistent with reported site use?	☒ Y	☐ N	☐ NE	☐ NA
If detected COCs are not consistent with reported site use, then are there other regulatory cases in the vicinity of the site? Identify regulatory case number(s):	☐ Y	☐ N	☐ NE	☒ NA
If there are not other regulatory cases in the vicinity of the site, then has an investigation of other potential sources and contaminant migration pathways been conducted? ***Use General Criteria e – Conceptual Site Model (Off-site sources) sheets to support answer***	☐ Y	☐ N	☐ NE	☒ NA
Has site contamination in all affected media been fully characterized? ***Use page b-2 and General Criteria e – Conceptual Site Model COCs and PCOCs sheets to identify site contaminants***	☒ Y	☐ N	☐ NE	☐ NA
Soil?	☒ Y	☐ N	☐ NE	☐ NA
Soil Gas?	☒ Y	☐ N	☐ NE	☐ NA
Groundwater?	☒ Y	☐ N	☐ NE	☐ NA
Surface Water?	☐ Y	☐ N	☐ NE	☒ NA
Has a data quality review verified the validity of historic analytical data? ***Use General Criteria e – Conceptual Site Model Analytical Data Quality Review sheets to support answers***	☒ Y	☐ N	☐ NE	☐ NA
Have appropriate protocols been followed for obtaining representative samples?	☒ Y	☐ N	☐ NE	☐ NA
Are the analytical methods currently being used consistent with the recommended "best practices" in the CA LUFT Manual?	☒ Y	☐ N	☐ NE	☐ NA
Have appropriate method detection limits been used (i.e., less than the LTCP media specific criteria for groundwater, vapor intrusion to indoor air, and direct contact and outdoor air exposure, and/or current environmental screening levels as appropriate?	☒ Y	☐ N	☐ NE	☐ NA

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

General Criteria b: Case Notes

Case File Reference Documents:

Attachments:

Case Notes:

Environmental remediation and investigation at the Site was originally initiated following a super unleaded product leak reported to have occurred in November 1982 at the Site, however the quantity of product released is unknown. Site contaminates of potential concern (COPCs) in soil and groundwater only consists of petroleum hydrocarbons.

Source:
[Gettler-Ryan 1989]. Gettler-Ryan, Inc., 3 April, 1989. Quarterly Summary Report, First Quarter 1989, ARCO Service Station #4931, Alameda County.

ADDITIONAL INFORMATION IS CONTINUED ON Attachment B-2

Soil: Excavations associated with UST upgrades in November 1991 through April 1992 and product conveyance lines in October 2002 likely removed a significant volume of affected mass from the Site. Soil samples collected from the Site in October 2010 indicated that current concentrations of GRO and benzene show an order of magnitude drop in concentrations of GRO and two orders of magnitude in concentrations for benzene when compared to historical soil sample results from corresponding areas of the Site. None of the reported concentrations in the October 2010 soil samples collected from the Site exceed the commercial environmental screen levels (ESLs) for shallow soil, with the exception of one soil sample collected at 10 feet bgs (SB-6-10; TPHg: 960 mg/kg) and two other soil samples collected at- and below 20 feet bgs (SB-1A-20; TPHg: 770 mg/kg, Ethylbenzene: 9.8 mg/kg and SB-01-25; TPHg: 1,400 mg/kg, Benzene: 5.2 mg/kg, Ethylbenzene: 17 mg/kg, Xylenes: 110 mg/kg).

Source:

ARCADIS U.S., Inc. (ARCADIS). 2010. Site Investigation Report, Former Atlantic Richfield Company Station No. 4931, 731 West MacArthur Boulevard, Oakland, California, ACEH Case # RO0000076. November 11.

Groundwater: Petroleum-hydrocarbon affected groundwater appears to be limited to monitoring wells A-4 and A-8 which have reported the highest groundwater concentrations for the past five years of monitoring. Both of these monitoring wells are located onsite and in the immediate vicinity of fuel dispenser islands and associated product conveyance lines. All the wells that contain (or recently contained) concentrations in groundwater indicate a decreasing trends. Additionally, the dissolved petroleum-hydrocarbon plume does not appear to be migrating. Linear regression analyses of the available site groundwater monitoring data appears to be beneficial to estimate concentration trend direction, attenuation rates, and approximate time to achieve cleanup goals.

Sources:

ARCADIS U.S., Inc. (ARCADIS). 2010. Site Investigation Report, Former Atlantic Richfield Company Station No. 4931, 731 West MacArthur Boulevard, Oakland, California, ACEH Case # RO0000076. November 11.

ARCADIS. 2013. Fourth Quarter 2012 and First Quarter 2013, Semi-Annual Groundwater Monitoring Report, Former Atlantic Richfield Company Station No. 4931, 731 West MacArthur Boulevard, Oakland, California. April 11.

Soil Gas: The magnitude of the concentrations detected in soil vapor samples collected from the Site indicates significant attenuation of individual petroleum constituents from groundwater to the vadose zone. Laboratory analysis of samples collected from the soil vapor probes in January and February 2013 indicates that the three deep (5 feet bgs) soil vapor probes (SV-2, SV-3 and SV-6) and one sub-slab probe (SS-SV-2) contain GRO and benzene concentrations that exceed residential and commercial/industrial

SF-RWQCB ESLs. With the exception of SS-SV-2, soil vapor data collected from the sub-slab vapor probes indicated the presence of significant attenuation of concentrations of petroleum hydrocarbons to levels below ESLs from the 5-foot depth to the near surface depth. The soil vapor sample collected from sub-slab soil vapor probes SS-SV-1 and SS-SV-3 did not contain concentrations of GRO or benzene above the residential or commercial ESLs. Additionally TPH-G and benzene concentrations detected in the sub-slab soil vapor probes were between three and five orders of magnitude lower than their corresponding deeper soil vapor pairs. For example, TPH-G and benzene were detected at SV-2 at concentrations of 49,000,000 $\mu g/m^3$ and 150,000 $\mu g/m^3$, respectively, while adjacent sub-slab vapor point SS-SV-1 contained concentrations of TPH-G and benzene at 740 $\mu g/m^3$ and 2.0 $\mu g/m^3$, respectively. Petroleum-hydrocarbon concentrations detected in SS-SV-2 may be more indicative of shallow groundwater as water has been observed in this probe during the first attempted sampling event in January 2013.

Soil vapor sample results indicate that petroleum hydrocarbon vapors likely attenuate to concentrations that do not exceed health-based screening criteria, which regulatory agencies consider to be protective of human health from potential vapor intrusion exposures for residents and commercial workers13. Additionally, The Site is an active, commercial petroleum fueling facility. Exposures to petroleum vapors associated with historical fuel system releases are comparatively insignificant relative to exposures from small surface spills and fugitive vapor releases that typically occur at active fueling facilities (State Water Board 2012). The State Water Resources Control Board (State Water Board) Low Threat Closure (LTC) Policy states that satisfaction of the Media-Specific Criteria for petroleum vapor migration to indoor air is not required at active commercial petroleum fueling facilities, except in cases where release characteristics can be reasonably believed to pose an unacceptable health risk. Soil vapor sample results are shown in Appendix F of the attached Site Conceptual Model.

Sources:

ARCADIS U.S., Inc. (ARCADIS). 2013. Soil Vapor Monitoring Report - First Quarter 2013, Former Atlantic Richfield Company Station No. 4931, 731 West MacArthur Boulevard, Oakland, California 94609. TBD.

State Water Board. 2012. Water Quality Control Policy for Low-Threat Underground Storage Tank Case Closure. Viewed online on August 15, 2012: http://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2012/rs2012_0016atta.pdf

Surface Water: The nearest downgradient surface water is San Francisco Bay located approximately 1.4 miles west (downgradient) of the Site of the Site. Between the Site and San Francisco Bay are several active leaking UST case sites.

Has a data quality review been conducted on the analytical data: Yes.

To verify that the analytical data collected at the Site is valid and useable, the data collected during routine GW sampling events and during the field events conducted by ARCADIS (since August 2009) has been evaluated using a standard quality assurance and quality control (QA/QC) program. Specific procedures have been followed for sampling, sample handling, sample transport, and analytical methodology. Further,

final laboratory analytical data has been evaluated to verify that the laboratory maintained acceptable QA/QC.

General QA/QC Procedures

Sampling, handling, chain-of-custody, transport, and field documentation procedures have been followed in accordance with the approved appropriate workplans. All samples have been preserved on ice in coolers immediately following sample collection. Chain-of-custody procedures have been followed and the sample coolers have been delivered directly to the laboratory by the laboratory courier representative. Authorized laboratory personnel have received samples collected from the Site and executed the chain-of-custody form. Site samples have arrived chilled at the laboratory, and have been preserved in a refrigerator pending analysis. All analyses have been completed within the specified holding periods except where noted on laboratory analytical reports. The laboratory analytical reports have been included in each associated summary report submitted to ACEH.

Field QA/QC Evaluation

The following field QA/QC procedures have been implemented during the field investigations performed by ARCADIS and during routine GW sampling events performed by ARCADIS's GW sampling subcontractor to maintain sample quality control:

Field equipment such as PIDs, water level meters, etc. has been calibrated daily in accordance with manufacturer specifications. Daily calibration is documented on calibration logs and in the investigation field books;

Field procedures have been documented in daily field logs and by photograph;

Soil, groundwater, and soil vapor sample integrity has been maintained by labeling sample containers immediately following sample collection and recording samples on chain-of-custody forms;

Clean, unused disposable sampling equipment has been used when possible. Decontamination of reusable sampling equipment is typically conducted using a 3-bucket wash system (detergent wash followed by two rinses with distilled water);

Direct-push drill rods, hand auger, shovels, and the post-hole digger have been decontaminated between each borehole using a steam cleaner.

Laboratory QA/QC Evaluation

Evaluation has been completed to assess the validity and usability of the analytical data. The degree of laboratory accuracy and precision was established by evaluating method blanks, laboratory control samples (LCS), matrix spike samples (MS) and surrogate quality control sample results. Further, all comments reported by the laboratory are reviewed following receipt of a laboratory report. The data generated during

this field investigations conducted by ARCADIS or by ARCADIS's groundwater sampling subcontractors have been acceptable analytical quality and are considered valid and useable for project decisions.

The data generated during this field investigations conducted by ARCADIS or by ARCADIS's groundwater sampling subcontractors have been acceptable analytical quality and are considered valid and useable for project decisions.

Chemicals of Concern (COCs - detected) and Potential Chemicals of Concern (PCOCs – i.e., not detected but used in site operations) in Soil, Groundwater, Soil Gas, and/or Surface Water[1]

PETROLEUM HYDROCARBON SOURCE TYPE(S)

COC/PCOC	Soil				Groundwater				Soil Gas ☐, Crawl Space ☐, Indoor Air ☐				Surface Water			
Gasoline[2]	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**
Fuel Oils[3]	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**
Diesel	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Stoddard Solvent	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Jet Fuels	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Kerosene	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Home Heating Fuel	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Bunker Fuel	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Others	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Oils	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**
Waste Oil[4]	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Hydraulic Oil	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Lubricating Oil	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Oil and Grease	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Motor Oil	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Others	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA

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Chemicals of Concern (COCs) and Potential Chemicals of Concern (PCOCs) in Soil, Groundwater, Soil Gas, and/or Surface Water[1]

TOTAL PETROLEUM HYDROCARBON – GASOLINE RELATED CONSTITUENTS[2]

COC/PCOC	Soil				Groundwater				Soil Gas, Crawl Space or Indoor Air				Surface Water			
TPH																
TPH-g	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
GRO	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Others	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Aromatics																
Benzene	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Toluene	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Ethylbenzene	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Xylenes	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Napthalene	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Fuel Oxys[5]																
MTBE[6]	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
ETBE	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
TAME	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
TBA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
DIPE	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Ethanol	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Methanol	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Others	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Leaded Gas																
TML[7]	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
EDC[8]	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
EDB[8]	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA

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Chemicals of Concern (COCs) and Potential Chemicals of Concern (PCOCs) in Soil, Groundwater, Soil Gas, and/or Surface Water[1]

TOTAL PETROLEUM HYDROCARBONS – DIESEL, JET FUEL, ANDOTHER FUEL OIL RELATED CONSTITUENTS[3]

COC/PCOC	Soil				Groundwater				Soil Gas ☐, Crawl Space ☐, Indoor Air ☐				Surface Water			
TPH																
TPH-d	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
DRO	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
TEPH	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Aromatics																
Benzene	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Toluene	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Ethylbenzene	☐ Y													☐ N	☐ NE	☐ NA
Xylenes	☐ Y													☐ N	☐ NE	☐ NA
Napthalene	☐ Y													☐ N	☐ NE	☐ NA
Others																
PAHs[9]	☐ Y													☐ N	☐ NE	☐ NA

see page above for Aromatic info

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Chemicals of Concern (COCs) and Potential Chemicals of Concern (PCOCs) in Soil, Groundwater, Soil Gas, and/or Surface Water[1]

WASTE (USED) OILS[4]

COC/PCOC	Soil				Groundwater				Soil Gas ☐, Crawl Space ☐, Indoor Air ☐				Surface Water			
TPH																
TPH-g	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
GRO	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
TPH-d	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
DRO	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
TPH-mo	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
TEPH	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
MORO	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Others	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Aromatics																
Benzene	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Toluene	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Ethylbenzene	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Xylenes	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Napthalene	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Fuel Oxys																
MTBE	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
TBA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Others	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Wear Metals[10]																
Total Lead	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Cadmium	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Chromium	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Zinc	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Nickel	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Others																
CVOCs[11]	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
PCBs	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
PCPs	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Dioxins & Furans[12]	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA

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Chemicals of Concern (COCs) and Potential Chemicals of Concern (PCOCs) in Soil, Groundwater, Soil Gas, and/or Surface Water[1]

NON PETROLEUM HYDROCARBON SOURCE - RELATED CONTAMINANTS

COC/PCOC	Soil				Groundwater				Soil Gas ☐, Crawl Space ☐, Indoor Air ☐				Surface Water			
	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
VOCs[11]	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
SVOCs[13]	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
OCPs[14]	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Herbicides[15]	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Metals[16]	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Others	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA

REMEDIATION - RELATED BYPRODUCTS

COC/PCOC	Soil				Groundwater				Soil Gas ☐, Crawl Space ☐, Indoor Air ☐				Surface Water			
Remediation Byproducts	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Chromium VI	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Other Metals[16]	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA
Others	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA	☐ Y	☐ N	☐ NE	☐ NA

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Chemicals of Concern (COCs) and Potential Chemicals of Concern (PCOCs) in Soil, Groundwater, Soil Gas, and/or Surface Water

VOLATILE ORGANIC COMPOUNDS

Compound	S	SG	GW	SW				
Benzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Bromobenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Bromochloromethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Bromodichloromethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Bromoform	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Bromomethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
n-Butylbenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
sec-Butylbenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
tert-Butylbenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Carbon tetrachloride	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Chlorobenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Chlorodibromomethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Chloroethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Chloroform	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Chloromethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
2-Chlorotoluene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
4-Chlorotoluene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,2-Dibromo-3-chloropropane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,2-Dibromoethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Dibromomethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,2-Dichlorobenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,3-Dichlorobenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,4-Dichlorobenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Dichlorodifluoromethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,1-Dichloroethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,2-Dichloroethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,1-Dichloroethene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
cis-1,2-Dichloroethene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
trans-1,2-Dichloroethene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,2-Dichloropropane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA

Compound	S	SG	SW	GW				
2,2-Dichloropropane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,3-Dichloropropane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,1-Dichloropropene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Ethylbenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Hexachlorobutadiene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Isopropylbenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
p-Isopropyltoluene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Methylene chloride	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Naphthalene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
n-Propylbenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Styrene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,1,1,2-Tetrachloroethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,1,2,2-Tetrachloroethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Tetrachloroethene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Toluene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,2,4-Trichlorobenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,2,3-Trichlorobenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,1,1-Trichloroethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,1,2-Trichloroethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Trichloroethene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Trichlorofluoromethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,2,3-Trichloropropane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,2,4-Trimethylbenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,3,5-Trimethylbenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Vinyl chloride	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
o-Xylene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
m-Xylene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
p-Xylene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Methyl-t-butyl ether	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Dichlorofluoromethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA

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Chemicals of Concern (COCs) and Potential Chemicals of Concern (PCOCs) in Soil, Groundwater, Soil Gas, and/or Surface Water

SEMI-VOLATILE ORGANIC COMPOUNDS

Compound	S	SG	GW	SW				
1,2-Dichlorobenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,2,4-Trichlorobenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,3-Dichlorobenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
1,4-Dichlorobenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
2-Chloronaphthalene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
2-Chlorophenol	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
2-Methylnaphthalene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
2-Methylphenol	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
2-Nitroaniline	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
2-Nitrophenol	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
2,2'-oxybis (1-Chloropropane)	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
2,4-Dichlorophenol	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
2,4-Dimethylphenol	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
2,4-Dinitrophenol	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
2,4-Dinitrotoluene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
2,4,5-Trichlorophenol	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
2,4,6-Trichlorophenol	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
2,6-Dinitrotoluene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
3-Nitroaniline	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
3,3'-Dichlorobenzidine	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
4-Bromophenyl-phenylether	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
4-Chloro-3-methylphenol	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
4-Chloroaniline	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
4-Chlorophenyl-phenyl ether	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
4-Methylphenol	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
4-Nitroaniline	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
4-Nitrophenol	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
4,6-Dinitro-2-methylphenol	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Acenaphthene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Acenaphthylene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Anthracene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Benzo(a)anthracene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA

Compound	S	SG	SW	GW				
Benzo(a)pyrene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Benzo(b)fluoranthene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Benzo(g,h,i)perylene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Benzo(k)fluoranthene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
bis(2-Chloroethoxy)-methane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
bis(2-Chloroethyl) ether	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
bis(2-Ethylhexyl)phthalate	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Butylbenzylphthalate	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Carbazole	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Chrysene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Di-n-butylphthalate	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Di-n-octylphthalate	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Dibenz(a,h)anthracene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Dibenzofuran	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Diethylphthalate	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Dimethylphthalate	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Fluoranthene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Fluorene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Hexachlorobenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Hexachlorobutadiene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Hexachlorocyclopentadiene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Hexachloroethane	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Indeno(1,2,3-cd)pyrene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Isophorone	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
N-Nitroso-di-n-propylamine	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
N-nitrosodiphenylamine	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Naphthalene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Nitrobenzene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Pentachlorophenol	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Phenanthrene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Phenol	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA
Pyrene	☐	☐	☐	☐	☐ Y	☐ N	☐ NE	☐ NA

Key:
- ■ Y = Detected at site
- ■ N = Tested for but never detected (method reporting limit less than current screening levels – validated by case review)
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- ■ NA = Not Applicable (never present at site – validated by case review)

Chemicals of Concern (COCs) and Potential Chemicals of Concern (PCOCs) in Soil, Groundwater, Soil Gas, and/or Surface Water[1]

Notes:

CVOCS = Chlorinated Volatile Organic Compounds
DIPE = di-isopropyl either
EDC (ethylene dichloride) or 1,2-DCA (1,2-dichloroethane or ethylene dibromide)
EDB = 1,2-dibromomethane
ETBE = ethyl tert butyl ether
MTBE = methyl tert butyl ether (banned in CA since 2004)
OCPs = Organochlorine Pesticides
PAH = Polycyclic Aromatic Hydrocarbons or Polynuclear Aromatic Hydrocarbons
PCPs = Pentachlorphenol (wood preservative)
TAME = tert amyl methyl ether
TBA = t-Butyl Alcohol
TEL = tetra ethyl lead
TML = tetra methyl lead
SVOCs = Semi-volatile Organic Compounds
VOCs = Volatile Organic Compounds

1 = The analytes listed below are recommended in the CA LUFT Manual to ensure that site characterization is complete. Note that more analytes are recommended than are used as "criteria" chemicals in the LTCP for the various media.
2 = **CA LUFT Manual recommended analyses for gasoline releases** include BTEX, napthalene, and fuel oxygenates (MTBE and TBA) and/or lead scavengers if gasoline release was pre-1992.
3 = **CA LUFT Manual recommended analyses for fuel oil releases** include BTEX, and napthalene. Additionally, for heavy fuel oil such as bunker fuel the priority pollutant PAHs should be added to the list of analytes.
4 = **CA LUFT Manual recommended analyses for waste (used) motor oils** include BTEX, the 16 priority pollutant PAHs, chlorinated solvents (which will include EDB and EDC), and fuel oxygenates (MTBE and TBA). For soil only analysis for the five "wear metals" is also recommended.
5 = ACEH recommended analysis of all fuel oxygenates
6 = MTBE to be analyzed at all LUFT sites unless the tank contained only diesel or jet fuel per California Health and Safety Code 25296.15(a). MTBE was added to gasoline in California starting in approximately the late 1980's/early 1990's and was banned in 2004.
7 = Samples to be analyzed for tetra methyl lead
8 = Samples to be initially analyzed for lead scavengers EDC and EDB for all release sites and fuel oxygenates
9 = Use page b-8 to identify priority PAHs
10 = Wear metals need only be analyzed for soil
11 = Use page b-7 to identify specific VOCs
12 = Analyzed for dioxins and furans if PCBs and/or PCPs are detected
13 = Use page b-8 to identify specific SVOCs
14 = Use page b- to identify OCPs
15 = Use page b- to identify herbicides
16 = Use page b- to identify metals (in addition to the 5 wear metals)

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ACEH LTC Policy Checklist
Low Threat Closure Policy

General Criteria C

LOW THREAT CLOSURE POLICY - GENERAL CRITERIA C

General Criteria c: **Has the Unauthorized ("Primary") Release from the UST System been Stopped?**	☒ Y	☐ N	☐ NE	☐ NA

LTCP Statement: "The tank, pipe, or other appurtenant structure that released petroleum into the environment (i.e. the primary source) has been removed, repaired or replaced. It is not the intent of this policy to allow sites with ongoing leaks from the UST system to qualify for low-threat closure."

Fuel Dispensing Facility History (list in chronological order, starting with operational in-place tanks)

	Contents (gas - (leaded, unleaded), diesel, waste oil, etc.)	Type (steel, fiberglass single-walled, double-walled)	Evidence of Release? (Y/N)	Closed in Place, Removed, or Upgraded?	Responsible Party (Organization Name, Type)	Date Installed	Date Removed
Tank (capacity in gallons)							
10,000 (4 USTs)	unleaded gasoline	double-wall fiberglass	no	current USTs onsite	current site operator	April 1992	--
12,000	gasoline	single-walled fiberglass tan	no	removed	unknown; Likely ARCO	unknown	November 1991
8,000	gasoline	single-walled steel tan	no	removed	unknown; Likely ARCO	unknown	November 1991
8,000	gasoline	single-walled steel tank	no	removed	unknown; Likely ARCO	unknown	November 1991
6,000	gasoline	single-walled steel tank	no	removed	unknown; Likely ARCO	unknown	November 1991
Piping							
--	gasoline	not reported	no	removed and replaced	unknown	unknown	October 2002
Dispensers							
Other Structures							
tank observation wells (x2)	--	slotted PVC	yes	removed	unknown	unknown	November 1991

Is the site currently an operating fuel dispensing facility?	☒ Y	☐ N	☐ NE	☐ NA
Have there been multiple tank system locations at the site?	☒ Y	☐ N	☐ NE	☐ NA
Have there been multiple releases at the site?	☐ Y	☒ N	☐ NE	☐ NA
Was there a previous/different regulatory case at this site? Identify previous case number:	☐ Y	☒ N	☐ NE	☐ NA
Is there evidence of releases from other on-site sources besides the UST system(s)?	☐ Y	☒ N	☐ NE	☐ NA
Is there indication of impacts from offsite sources?	☐ Y	☒ N	☐ NE	☐ NA

Use General Criteria e – Conceptual Site Model (Sources) sheets to support answers

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

LOW THREAT CLOSURE POLICY - GENERAL CRITERIA C

General Criteria c:

Has the Unauthorized ("Primary") Release from the UST System been Stopped?

Case File Reference Documents:

Attachments:

Case Notes:

c. The unauthorized ("primary") release from the UST system has been stopped: Yes.
Available records indicate the causative release occurred in November 1982 when a super unleaded product leak was reported. All site USTs and associated conveyance piping were replaced between November 1991 and April 1992. The removed USTs were formerly located in the east portion of the Site and include:
• One 12,000-gallon single-walled fiberglass tank;
• Two 8,000-gallon single-walled steel tanks; and,
• One 6,000-gallon single-walled steel tank.

Following removal activities, four replacement USTs were installed in a new common tank cavity located south of the site kiosk, in the west portion of the Site. This is the existing location of the site USTs currently operating at the Site. Replacement USTs installed in April 1992 include:
• Four 10,000-gallon double-wall fiberglass tanks.

Additionally, the product conveyance piping was removed and replaced in October 2002:
• On 2 October 2002, URS Corporation (URS) observed product line upgrade activities at the Site. The product lines were excavated, removed, inspected, and replaced. URS reported no observable cracks or deterioration of the former product lines. Soil samples were collected and analyzed from the product line trenches as well as from beneath the former dispenser islands. Two locations required minor over-excavation due to observed soil staining and hydrocarbon odors. The new product lines were replaced within the same trenches (URS, 1/21/2003).

Sources:
ROUX Associates. 1992. Underground Storage Tank Removal and Soil Sampling, ARCO Facility No. 4931, 731 West MacArthur Boulevard, Oakland, California. July 20.
URS Corporation. 2003. Product Line Removal and Upgrade Soil Sampling Report, ARCO Service Station No. 4931, 731 West MacArthur Boulevard, Oakland, California 94609. January 21.

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

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General Criteria D

LOW THREAT CLOSURE POLICY - GENERAL CRITERIA D

General Criteria d: **Has Free Product been Removed to the Maximum Extent Practicable?**	☑ Y	☐ N	☐ NE	☐ NA

LTCP Statement: "At petroleum unauthorized release sites where investigations indicate the presence of free product, free product shall be removed to the maximum extent practicable. In meeting the requirements of this section:

(a) Free product shall be removed in a manner that minimizes the spread of the unauthorized release into previously uncontaminated zones by using recovery and disposal techniques appropriate to the hydrogeologic conditions at the site, and that properly treats, discharges or disposes of recovery byproducts in compliance with applicable laws;

(b) Abatement of free product migration shall be used as a minimum objective for the design of any free product removal system; and

(c) Flammable products shall be stored for disposal in a safe and competent manner to prevent fires or explosions."

Has free product (migrating of mobile LNAPL) been detected in site monitoring wells?	☑ Y	☐ N	☐ NE	☐ NA

MW ID	Date FP First Observed	Max FP Apparent Thickness (feet), sheen, or globules	Most Recently Observed FP Apparent Thickness (feet)	Date of Most Recent FP Observation
A-4	March 1986	3.50	0.03	August 1993
A-8	March 1986	1.75	0.33	November 1994
AR-1	August 1993	0.06	0.06	November 1994

Has a description of the standard operating procedures used to measure free product in wells been provided?	☑ Y	☐ N	☐ NE	☐ NA
Has an adequate LNAPL Conceptual Site Model been developed?	☑ Y	☐ N	☐ NE	☐ NA

Was free product observed during tank removal activities or station upgrades?	☐ Y	☑ N	☐ NE	☐ NA
Has an evaluation of the adequacy of the monitoring well network and appropriateness of screen interval to detect free product been conducted?	☑ Y	☐ N	☐ NE	☐ NA
Have there been other indications of the presence of free product (i.e., observations during tank removal, observations during exploratory drilling, bore logs, dissolved phase concentrations of COCs greater than their effective solubility's in groundwater, etc.)	☐ Y	☑ N	☐ NE	☐ NA
Has a preferential pathway study been conducted to determine the probability of free product encountering geologic and anthropogenic preferential pathways and conduits that can act as contaminant migration pathways to or from the site?	☐ Y	☐ N	☐ NE	☑ NA
Has the LNAPL body spatial distribution (horizontal and vertical) been defined?	☐ Y	☐ N	☐ NE	☑ NA
Are there risk and exposure issues attributed to the presence of the LNAPL?	☐ Y	☐ N	☐ NE	☑ NA
Has an evaluation of whether free product removal is practicable, or if not practicable, a description of the conditions that prevent free product removal been conducted?	☐ Y	☐ N	☐ NE	☑ NA

Use General Criteria e - Conceptual Site Model (Free Product) sheets to support answer

Has free product removal been implemented?	☑ Y	☐ N	☐ NE	☐ NA

Location/ MW ID	Method (Absorbent Materials, Bailing, Skimmer, DPE, Excavation, etc.)	Cumulative Gallons/Volume/Mass Removed	Dates Implemented
A-9	GWETS	--	November 1992
AR-1	GWETS	--	November 1992
AR-2	GWETS	--	November 1992
AR-3	GWETS	--	November 1992
--	GWETS	23 pounds	Nov. 1992 to July 1995

Does data indicate rebound of free product subsequent to product removal?	☐ Y	☑ N	☐ NE	☐ NA

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

LOW THREAT CLOSURE POLICY - GENERAL CRITERIA D

General Criteria d:
Has Free Product been Removed to the Maximum Extent Practicable?

Case File Reference Documents:

Attachments:

Case Notes:

d. Free product has been removed to the maximum extent practicable: Yes.
Available groundwater monitoring data indicate that measureable separate phase hydrocarbons (SPH) were last observed at the Site in November 1994, suggesting that the petroleum system repairs/upgrades, soil excavation, remediation, and natural attenuation processes have reduced the source area mass.

A groundwater extraction treatment system (GWETS), which stared up on November 10, 1992, included the capability of SPH and groundwater extraction from four wells (A-9, AR-1, AR-2, and AR-3). The extracted fluid was routed through an oil water centrifugal separator to remove SPH and was then routed through a particulate filter and three in-series 1,500-pound granular activated carbon (GAC) vessels to remove dissolved-phase petroleum hydrocarbons. Collected SPH was contained in 55-gallon drums. The treated water was discharged into the sanitary sewer system. Modifications to the GWETS included adding an extraction pump to monitoring well A-8 in the First Quarter 1994 for the purpose of removing SPH in this well.

The GWETS was shutdown on July 5, 1995 due to mass recovery rates having achieved asymptotic levels. During the Second Quarter 1995, the GWETS removed a total of 0.3 pound of total petroleum hydrocarbons in the gasoline range (TPH-G) and 0.02 pound of benzene. Additionally, downgradient wells A-11 and A-12 had remained non-detect for TPH-G and benzene since groundwater monitoring began in 1988, indicating that the plume had stabilized and downgradient migration was minimal.

From system startup on November 10, 1992 through system shutdown on July 5, 1995 the GWETS extracted and treated approximately 4,643,696 gallons of groundwater. Approximately 2.74 pounds (0.45 gallons) of TPH-G and 0.46 pound (0.06 gallons) of benzene were removed from the Site through groundwater extraction and treatment. As of December 31, 1995, 23 pounds (3.75 gallons) of SPH had been removed from the Site (PEG, 3/15/1996).

Sources:
Pacific Environmental Group, Inc. (PEG). 1996. Final Groundwater Monitoring Report – Permit 502-62131, Termination of Account, ARCO Service Station 4931, 731 West MacArthur Boulevard, Oakland, California. July 25.

GeoStrategies, Inc. 1994. Recovery System Evaluation Report – Fourth Quarter 1993, ARCO Service Station No. 4931, 731 West MacArthur Boulevard, Oakland, California 94609. February 22.

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

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General Criteria E

LOW THREAT CLOSURE POLICY - GENERAL CRITERIA E

General Criteria e: **Has a Conceptual Site Model that Assesses the Nature, Extent, and Mobility of the Release been Developed?**	☒ Y	☐ N	☐ NE

LTCP Statement: "The Conceptual Site Model (CSM) is a fundamental element of a comprehensive site investigation. The CSM establishes the source and attributes of the unauthorized release, describes all affected media (including soil, groundwater, and soil vapor as appropriate), describes local geology, hydrogeology and other physical site characteristics that affect contaminant environmental transport and fate, and identifies all confirmed and potential contaminant receptors (including water supply wells, surface water bodies, structures and their inhabitants). The CSM is relied upon by practitioners as a guide for investigative design and data collection. Petroleum release sites in California occur in a wide variety of hydrogeologic settings. As a result, contaminant fate and transport and mechanisms by which receptors may be impacted by contaminants vary greatly from location to location. Therefore, the CSM is unique to each individual release site. All relevant site characteristics identified by the CSM shall be assessed and supported by data so that the nature, extent and mobility of the release have been established to determine conformance with applicable criteria in this policy. The supporting data and analysis used to develop the CSM are not required to be contained in a single report and may be contained in multiple reports submitted to the regulatory agency over a period of time."

Has a CSM been prepared that is representative of current site conditions? ☒ Y ☐ N

Document Title	Author	Date
Contained herein + in other documents. see case notes for sources	--	--

If the CSM is provided in multiple documents, provide additional document titles, authors and dates in the Case File Reference document section on page e-2

Is the CSM comprehensive enough to show compliance with all the LTCP criteria and that final closure review is appropriate? ☒ Y ☐ N

General Criteria			
a	The unauthorized release is located within the service area of a public water system	☒ Y	☐ N
b	The unauthorized release consists only of petroleum	☒ Y	☐ N
c	The unauthorized ("primary") release from the UST system has been stopped	☒ Y	☐ N
d	Free product has been removed to the maximum extent practicable	☒ Y	☐ N
e	A CSM that assesses the nature, extent, and mobility of the release has been developed	☒ Y	☐ N
f	Secondary source has been removed to the extent practicable	☒ Y	☐ N
g	Soil or groundwater has been tested for MTBE and results reported in accordance with Health and Safely Code section 25296.15	☒ Y	☐ N
h	Nuisance as defined by Water Code section 13050 does not exist at the site	☒ Y	☐ N
Media-Specific Criteria			
Groundwater		☒ Y	☐ N
Vapor Intrusion to Indoor Air		☒ Y	☐ N
Direct Contact and Outdoor Air Exposure		☒ Y	☐ N

If the CSM is not comprehensive enough to show compliance with all the LTCP criteria, then

Has a data gap investigation work plan been prepared that is guided by the CSM?	☐ Y	☐ N
Has a path to closure plan been prepared that is guided by the CSM?	☐ Y	☐ N

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

LOW THREAT CLOSURE POLICY - GENERAL CRITERIA E

General Criteria e: Case Notes

Case File Reference Documents:

Attachments:

Table 1 - Site Conceptual Model

Case Notes:

e. A conceptual site model that assesses the nature, extent, and mobility of the release has been developed: Yes.
Information pertaining to the site conceptual model (SCM) is summarized from the following sources and is presented as Table 1.
SCM information provided in multiple documents:

ARCADIS. 2013. Fourth Quarter 2012 and First Quarter 2013, Semi-Annual Groundwater Monitoring Report, Former Atlantic Richfield Company Station No. 4931, 731 West MacArthur Boulevard, Oakland, California. April 11.

ARCADIS. 2010. Site Investigation Report, Former Atlantic Richfield Company Station No. 4931, 731 West MacArthur Boulevard, Oakland, California, ACEH Case # RO0000076. November 11.

GeoStrategies, Inc. 1991. Remediation Action Plan, ARCO Service Station No. 4931, 731 West MacArthur Boulevard, Oakland, California. May 15.

ROUX Associates (ROUX). 1992. Underground Storage Tank Removal and Soil Sampling, ARCO Facility No. 4931, 731 West MacArthur Boulevard, Oakland, California. July 20.

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

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Low Threat Closure Policy

General Criteria F

LOW THREAT CLOSURE POLICY - GENERAL CRITERIA F

General Criteria f: **Has Secondary Source been Removed to the Extent Practicable?**	☑ Y	☐ N	☐ NE

LTCP Statement: "Secondary source" is defined as petroleum-impacted soil or groundwater located at or immediately beneath the point of release from the primary source. Unless site attributes prevent secondary source removal (e.g. physical or infrastructural constraints exist whose removal or relocation would be technically or economically infeasible), petroleum-release sites are required to undergo secondary source removal to the extent practicable as described herein. "To the extent practicable" means implementing a cost-effective corrective action which removes or destroys-in-place the most readily recoverable fraction of source-area mass. It is expected that most secondary mass removal efforts will be completed in one year or less. Following removal or destruction of the secondary source, additional removal or active remedial actions shall not be required by regulatory agencies unless (1) necessary to abate a demonstrated threat to human health or (2) the groundwater plume does not meet the definition of low threat as described in this policy."

Has corrective action been implemented at the site to remove or destroy-in-place the most readily recoverable fraction of source-area mass?	☑ Y	☐ N	☐ NE	☐ NA
Soil remediation	☑ Y	☐ N	☐ NE	☐ NA

Method	Mass/Volume Removed	Dates of Implementation
Excavation	1,900 cubic yards	November 1991 - April 1992
Excavation	Not Reported	October 2002

If soil remediation is currently being conducted, then is it progressing adequately?	☐ Y	☐ N	☐ NE	☑ NA
If soil remediation is no longer being conducted then, has confirmation sampling results confirmed that additional corrective actions are not necessary?	☑ Y	☐ N	☐ NE	☐ NA
Are additional soil remedial actions necessary to meet the media-specific criteria of the Policy or to abate a demonstrated threat to human health?	☐ Y	☑ N	☐ NE	☐ NA
Groundwater Remediation	☑ Y	☐ N	☐ NE	☐ NA

Method	Mass/Volume Removed	Dates of Implementation
GW Extraction + Treament	4,643,696 gallons	November 1992 to July 1995
SPH Extraction	23 pounds	November 1992 to December 1995

If groundwater remediation is currently being conducted, then is it progressing adequately?	☐ Y	☐ N	☐ NE	☑ NA
If groundwater remediation is no longer being conducted then, has verification monitoring confirmed that additional corrective actions are not necessary?	☑ Y	☐ N	☐ NE	☐ NA
Are additional groundwater remedial actions necessary to meet the media-specific criteria of the Policy or to abate a demonstrated threat to human health?	☐ Y	☑ N	☐ NE	☐ NA

Use sheet f-2 - Maximum Detected Contaminant Concentrations Before and After Corrective Action to support your answers

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

General Criteria f: Maximum Documented Contaminant Concentrations Before and After Correction Action

Contaminant	Soil (ppm)		Water (ppb)	
	Historical Maximum	Current Maximum	Historical Maximum	Current Maximum
TPH-G/GRO (@~5' bgs)	8,300	<0.24	--	--
TPH-G/GRO (@~10' bgs)	430	29	--	--
TPH-G/GRO (@~15' bgs)	29	1.2	--	--
TPH-G/GRO	--	--	29,000,000 (A-8; 12/1993)	<50 (A-8; 2/2013)
Benzene (@~5' bgs)	3.1	<0.0048	--	--
Benzene (@~10' bgs)	24	0.044	--	--
Benzene (@~15' bgs)	0.44	0.18	--	--
Benzene	--	--	16,000 (A-8; 12/1993)	6.0 (A-8; 2/2013)
Toluene (@~5' bgs)	23	<0.0048	--	--
Toluene (@~10' bgs)	21	<0.025	--	--
Toluene (@~15' bgs)	0.041	0.1	--	--
Toluene	--	--	12,000 (A-8; 12/1993)	<0.50 (A-8; 2/2013)
Ethylbenzene (@~5' bgs)	40	<0.0048	--	--
Ethylbenzene (@~10' bgs)	56	0.8	--	--
Ethylbenzene (@~15' bgs)	0.041	0.084	--	--
Ethylbenzene	--	--	19,000 (A-8; 12/1993)	<0.50 (A-8; 2/2013)
Xylenes(@~5' bgs)	300	<0.0097	--	--
Xylenes(@~10' bgs)	290	<0.96	--	--
Xylenes(@~15' bgs)	0.16	0.27	--	--
Xylenes	--	--	99,000 (A-8; 12/1993)	<0.1 (A-8; 2/2013)

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

LOW THREAT CLOSURE POLICY - GENERAL CRITERIA F

General Criteria f: Case Notes

Case File Reference Documents:

Attachments:

Case Notes:

f. Secondary source has been removed to the extent practicable: Yes.
The original unauthorized release was stopped and the causative UST was removed from the Site. Approximately 1,900 cubic yards of soil was excavated during removal of the site USTs between November 1991 and April 1992. Additional source removal occurred during replacement of the product conveyance lines in October 2002 when additional over-excavation was conducted due to observed soil staining and hydrocarbon odors. These removal activities likely removed a significant volume of secondary sources that affected the subsurface beneath the Site.

Moreover, groundwater COPC concentration trends are generally remaining stable and/or decreasing. If a secondary source was present, the majority of groundwater COPC trends would be increasing.

Sources:
ROUX Associates (ROUX). 1992. Underground Storage Tank Removal and Soil Sampling, ARCO Facility No. 4931, 731 West MacArthur Boulevard, Oakland, California. July 20.

URS Corporation. 2003. Product Line Removal and Upgrade Soil Sampling Report, ARCO Service Station No. 4931, 731 West MacArthur Boulevard, Oakland, California 94609. January 21.

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

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ACEH LTC Policy Checklist
Low Threat Closure Policy

General Criteria G

LOW THREAT CLOSURE POLICY - GENERAL CRITERIA G

General Criteria g: Has Soil or Groundwater been Tested for MTBE and Results Reported in Accordance with Health and Safety Code Section 25296.15?	☑ Y	☐ N	☐ NE	☐ NA

LTCP Statement: "Health and Safety Code section 25296.15 prohibits closing a UST case unless the soil, groundwater, or both, as applicable have been tested for MTBE and the results of that testing are known to the Regional Water Board. The exception to this requirement is where a regulatory agency determines that the UST that leaked has only contained diesel or jet fuel. Before closing a UST case pursuant to this policy, the requirements of section 25296.15, if applicable, shall be satisfied."

Exemption - Has sufficient data been presented to determine that the UST that leaked has only contained diesel or jet fuel?	☐ Y	☐ N	☐ NE	☐ NA

If the site does not qualify for the exemption then

Has sufficient data been presented to assess whether MTBE is or was present in soil at or in the vicinity of the site?	☑ Y	☐ N	☐ NE	☐ NA
Has sufficient data been presented to assess whether MTBE is or was present in groundwater at or in the vicinity of the site?	☑ Y	☐ N	☐ NE	☐ NA
Have all results been verified by the appropriate analytical laboratory method?	☑ Y	☐ N	☐ NE	☐ NA

Use General Criteria b pages b-3 and General Criteria e – Conceptual Site Model sheets to support answer

Case File Reference Documents:

Attachments:

Case Notes:

g. Soil or groundwater has been tested for MTBE and results reported in accordance with Health and Safety Code section 25296.15: Yes.

MTBE has been analyzed in groundwater samples collected from site monitoring wells since August 1996. MTBE analysis has generally been completed by USEPA Method 8260B.

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

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ACEH LTC Policy Checklist
Low Threat Closure Policy

General Criteria H

LOW THREAT CLOSURE POLICY - GENERAL CRITERIA H

General Criteria h: **Does a Nuisance as Defined by Water Code Section 13050 Exist at the Site?**	☐ Y	☒ N	☐ NE

LTCP Statement: "Water Code section 13050 defines "nuisance" as anything which meets all of the following requirements:

(1) Is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property.

(2) Affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal.

(3) Occurs during, or as a result of, the treatment or disposal of wastes.

For the purpose of this policy, waste means a petroleum release."

Does a nuisance condition currently exist (or potentially could exist) that meets all of the following criteria?	☐ Y	☒ N	☐ NE	☐ NA
Is injurious to health? *-OR-*	☐ Y	☒ N	☐ NE	☐ NA
Is indecent or offensive to the senses? *-OR-*	☐ Y	☒ N	☐ NE	☐ NA
Is an obstruction to the free use of property so as to interfere with the comfortable enjoyment of life or property?	☐ Y	☒ N	☐ NE	☐ NA
Affects at the same time an entire community, although the extent of the annoyance or damage inflicted upon individuals may be unequal? *-OR-*	☐ Y	☒ N	☐ NE	☐ NA
Affects at the same time an entire neighborhood, although the extent of the annoyance or damage inflicted upon individuals may be unequal? *-OR-*	☐ Y	☒ N	☐ NE	☐ NA
Affects at the same time any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal?	☐ Y	☒ N	☐ NE	☐ NA
Occurs during the treatment of waste? *-OR-*	☐ Y	☒ N	☐ NE	☐ NA
Occurs during the disposal of waste? *-OR-*	☐ Y	☒ N	☐ NE	☐ NA
Occurs as a result of the treatment of waste? *-OR-*	☐ Y	☒ N	☐ NE	☐ NA
Occurs as a result of the disposal of waste?	☐ Y	☒ N	☐ NE	☐ NA

Has an evaluation of whether site contamination is present in locations that have the potential to pose nuisance conditions during common or reasonably expected site activities been conducted?	☒ Y	☐ N	☐ NE	☐ NA
Surface soils?	☒ Y	☐ N	☐ NE	☐ NA
Utility corridors?	☒ Y	☐ N	☐ NE	☐ NA
Groundwater?	☒ Y	☐ N	☐ NE	☐ NA
Surface water?	☒ Y	☐ N	☐ NE	☐ NA
Soil gas?	☒ Y	☐ N	☐ NE	☐ NA
Basements or other subsurface structures?	☒ Y	☐ N	☐ NE	☐ NA

Use the following to support your answer:

- *General Criteria a (site located within a service area of a public water supply system)*
- *General Criteria b (identified chemicals of concern and potential chemicals of concern)*
- *General Criteria d (free product evaluation)*
- *General Criteria e (results of preferential pathway and sensitive receptor survey)*
- *Media Specific Criteria for Groundwater*
- *Media Specific Criteria for Vapor Intrusion to Indoor Air*
- *Media Specific Criteria for Direct Contact and Outdoor Air Exposure*

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

General Criteria h: Case Notes

Case File Reference Documents:

Attachments:

Case Notes:

h. Nuisance as defined by Water Code section 13050 does not exist at the Site: Yes.

No nuisance exists at the Site, as defined by Water Code section 13050. Site conditions and the treatment and disposal of site wastes are not injurious to health, indecent or offensive to the senses, and do not obstruct free use of property or interfere with the comfortable enjoyment of life or property. Site conditions and the treatment and disposal of site wastes do not affect an entire community or neighborhood or any considerable number of persons. Site impacts are restricted to the subsurface, and are present in a limited area that does not adversely affect the community at large.

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

ARCADIS

ACEH LTC Policy Checklist
Low Threat Closure Policy

Media Specific Criteria – Groundwater

LOW THREAT CLOSURE POLICY
MEDIA SPECIFIC CRITERIA: GROUNDWATER

Does the site qualify for the Soil Only Case exemption? -OR-	☐ Y	☒ N	☐ NE
Does the site satisfy the Media-Specific Criteria for Groundwater?	☒ Y	☐ N	☐ NE

LTCP Statement: "This policy describes criteria on which to base a determination that threats to existing and anticipated beneficial uses of groundwater have been mitigated or are de minimis, including cases that have not affected groundwater.

State Water Board Resolution 92-49, *Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304* is a state policy for water quality control and applies to petroleum UST cases. Resolution 92-49 directs that water affected by an unauthorized release attain either background water quality or the best water quality that is reasonable if background water quality cannot be restored. Any alternative level of water quality less stringent than background must be consistent with the maximum benefit to the people of the state, not unreasonably affect current and anticipated beneficial use of affected water, and not result in water quality less than that prescribed in the water quality control plan for the basin within which the site is located. Resolution No. 92-49 does not require that the requisite level of water quality be met at the time of case closure; it specifies compliance with cleanup goals and objectives within a reasonable time frame.

Water quality control plans (Basin Plans) generally establish "background" water quality as a restorative endpoint. This policy recognizes the regulatory authority of the Basin Plans but underscores the flexibility contained in Resolution 92-49.

It is a fundamental tenet of this low-threat closure policy that if the closure criteria described in this policy are satisfied at a petroleum unauthorized release site, attaining background water quality is not feasible, establishing an alternate level of water quality not to exceed that prescribed in the applicable Basin Plan is appropriate, and that water quality objectives will be attained through natural attenuation within a reasonable time, prior to the expected need for use of any affected groundwater.

If groundwater with a designated beneficial use is affected by an unauthorized release, to satisfy the media-specific criteria for groundwater, the contaminant plume that exceeds water quality objectives must be stable or decreasing in areal extent, and meet all of the additional characteristics of one of the five classes of sites listed below. A plume that is "stable or decreasing" is a contaminant mass that has expanded to its maximum extent: the distance from the release where attenuation exceeds migration."

"Sites with Releases that Have Not Affected Groundwater - Sites with soil that does not contain sufficient mobile constituents [leachate, vapors, or light non-aqueous-phase liquids (LNAPL)] to cause groundwater to exceed the groundwater criteria in this policy shall be considered low-threat sites for the groundwater medium. Provided the general criteria and criteria for other media are also met, those sites are eligible for case closure. For older releases, the absence of current groundwater impact is often a good indication that residual concentrations present in the soil are not a source for groundwater pollution."

Has adequate data been collected to demonstrate that soil does not contain sufficient mobile constituents to cause groundwater to exceed the groundwater criteria in this policy?	☐ Y	☒ N	☐ NE
Leachate? ☐ Y ☐ N ☐ NE ☒ NA Soil gas? ☐ Y ☐ N ☐ NE ☒ NA LNAPL? ☐ Y ☐ N ☐ NE ☒ NA			
If the site does not qualify for the soil only exemption, then Does groundwater in the vicinity of the site have beneficial use designations?	☒ Y	☐ N	☐ NE

Use General Criteria e – Conceptual Site Model sheets to support answer

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

LOW THREAT CLOSURE POLICY
MEDIA SPECIFIC CRITERIA: GROUNDWATER

GROUNDWATER PLUME STABILITY

If the site <u>does not</u> qualify for the soil only exemption, and groundwater has designated beneficial uses, then, **Is the contaminant plume stable or decreasing in areal extent?**	☒ Y	☐ N	☐ NE	☐ NA

Technical Justification for Groundwater Media-Specific Criteria: "A plume is considered stable or decreasing if a contaminant mass has expanded to its maximum extent: the distance from the release where attenuation exceeds migration. There are two common ways to demonstrate plume stability. The first common way is to routinely observe non-detect values for groundwater parameters in down-gradient wells. The second common way is to show stable or decreasing concentration levels in down-gradient wells at the distal end of the plume. It should be noted that concentration levels may exhibit fluctuation due to seasonal variations. These variations may be also attributed to man-made factors, including but not limited to: varying sampling techniques, false positive results, or laboratory inconsistencies."

"Requiring that a plume must be stable or decreasing reduces uncertainty as to how long the plume might become in the future.

Has the maximum stabilized plume length been defined?	☒ Y	☐ N	☐ NE	☐ NA
Have non-detect values for groundwater parameters in down-gradient wells at the distal end of the plume been routinely observed?	☒ Y	☐ N	☐ NE	☐ NA

MW ID's	Dates of GW Monitoring Events Demonstrating Non-Detect Values?
MW-11	Non-Detect Concentrations or below ESLs for all analytes since September 2004
MW-12	Non-Detect Concentrations or below ESLs for all analytes since October 1998
MW-5	Non-Detect Concentrations or below ESLs for all analytes since August 2007, with exception of MTBE . MTBE results indicate a downward concentration trend since
--	2009 with the exception of most recent sampling event (February 2013) when MTBE was detected at highest concentration since 2003.

Have stable or decreasing concentration levels in down-gradient wells at the distal end of the plume been routinely observed?	☐ Y	☐ N	☐ NE	☒ NA

MW ID's	Dates of GW Monitoring Events Demonstrating Stability?

Do concentration levels exhibit fluctuations due to seasonal variations?	☒ Y	☐ N	☐ NE	☐ NA
Do concentration levels exhibit fluctuations due to man- made factors?	☐ Y	☒ N	☐ NE	☐ NA

Varying Sampling Techniques?	☐ Y	☒ N	☐ NE	☐ NA
False Positive Results?	☐ Y	☒ N	☐ NE	☐ NA
Laboratory Inconsistencies?	☐ Y	☒ N	☐ NE	☐ NA

Use Criteria e – Conceptual Site Model sheets to support answers

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

LOW THREAT CLOSURE POLICY
MEDIA SPECIFIC CRITERIA: GROUNDWATER

GROUNDWATER CONTAMINANT PLUME CLASSIFICATION CHARACTERISTICS

If the Contaminant Plume is Stable or Decreasing, then Does the contaminant plume that exceeds water quality objectives meet <u>all of the additional characteristics</u> of at least <u>one of the five</u> (5) LTCP classes listed below?	☒ Y	☐ N	☐ NE	☐ NA

	Plume Length[1] (feet)	Free Product Remaining[2] (Yes/No)	Distance of Nearest Water Supply Well from Plume Boundary[3] (feet)	Distance of Nearest Surface Water Body from Plume Boundary[4] (feet)	Stable or Decreasing Plume[5]	Maximum Dissolved Benzene Concentration[6] (µg/L)	Maximum Dissolved MTBE Concentration[6] (µg/L)	Property Owner Willing to Accept Land Use Restriction[7]			
Site											
Does the contaminant plume that exceeds water quality objectives meet <u>all of the characteristics</u> of at least <u>one of the five</u> LTCP classes listed below?									☒ Y	☐ N	☐ NE
1[a]	< 100	No	>250	>250	Yes	NA	NA	NA	☒ Y	☐ N	☐ NE
2[b]	<250	No	>1,000	>1,000	Yes	<3,000	<1,000	NA	☐ Y	☐ N	☐ NE
3[c]	<250	Yes	>1,000	>1,000	> 5 Years	NA	NA	Yes	☐ Y	☐ N	☐ NE
4[d]	<1,000	No	>1,000	>1,000	Yes	<1,000	<1,000	NA	☐ Y	☐ N	☐ NE
5[e]	A site-specific analysis determines that under current and reasonable anticipated near-term future scenarios, the contaminant plume poses a low threat to human health and safety and to the environment and water quality objectives will be achieved within a reasonable period time frame.								☐ Y	☐ N	☐ NE

Notes:

1 = The length of the plume is the maximum extent from the point of release of any petroleum related constituent in groundwater that exceeds the WQOs. The plume boundary is where the constituent(s) furthest from the point of release concentration level equals the WQOs (Technical Justification for Groundwater Specific Criteria). **General Criteria – Conceptual Site Model pages e-___ through e-___ to support plume length determination.**

2 = A "Yes" designation signifies free product remains at the site, has been removed to the maximum extent practicable, but does not extend off-site. A "No" designation means free product does not exist onsite or off-site. **See General Criteria – Conceptual Site Model pages e-___ through e-___** to support free product status.

(See page gw-4 for a continuation of notes)

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

LTCP Groundwater Contaminant Plume Classification Characteristics

Notes (continued):

3 = **See General Criteria – Conceptual Site Model sheets** to support distance to nearest water supply well.

4 = **See General Criteria – Conceptual Site Model sheets** to support distance to nearest surface water body.

5 = The specified concentrations are maximums, and typically occur in source area monitoring wells. **See General Criteria – Conceptual Site Model sheets** to support length of time plume has been stable or decreasing.

6 = The specified concentrations are maximums, and typically occur in source area monitoring wells. **See General Criteria – Conceptual Site Model sheets** to support dissolved benzene and MTBE concentrations.

7 = **See General Criteria – Conceptual Site Model sheets** to support Property Owner's willingness to accept Land Use Restrictions.

a = Class 1: Represents a short, stabilized plume that is indicative of a small or depleted source and/or very high natural attenuation rate. (CA LUFT Manual)

b = Class 2: Represents a moderate, stabilized plume length (plume boundary is <250 feet from point of release) that approximates the average benzene plume length from cited studies. The maximum concentration of benzene (3,000 µg/L) and MTBE (1,000 µg/L) in groundwater are conservative indicators that free product is not present. These concentrations are approximately 10% and 0.02%, respectively, of the typical effective solubility of benzene and MTBE in unweathered gasoline. (CA LUFT Manual)

c = Class 3: Represents a moderate, stabilized plume length (plume boundary is <250 feet from point of release) that approximates the average benzene plume length from cited studies. The on-site free product and/or high dissolved concentrations in the plume remaining after secondary source removal to the maximum extent practicable as per the General Criteria in the Policy require that the plume has been stable or decreasing for a minimum of five years of monitoring to validate plume stability/natural attenuation (i.e., to confirm that the rate of natural attenuation exceeds the rate of LNAPL dissolution and dissolved-phase migration). (CA LUFT Manual)

d = Class 4: Represents a long, stabilized plume length (plume boundary is <1,000 feet from point of release) that approximates the maximum MTBE plume length cited. (CA LUFT Manual)

e = Class 5: For other low-threat site-specific scenarios not captured in Class 1 through 4, use a fate-and-transport model to evaluate the potential migration and attenuation of the chemicals using site-specific calibration data when available. It is important to use models that consider mass balance whenever possible. (CA LUFT Manual)

NA = Not applicable

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

Groundwater: Case Notes

Case File References (Document File Names):

Technical References:

Case Notes:

A. The contaminant plume that exceeds water quality objectives is less than 100 feet in length: YES
Based on the most recent groundwater sampling events (August 2012 and February 2013), the dissolved-phase groundwater plume that exceeds ESLs (Table F-3) drinking water screening levels for GRO, benzene, and MTBE was not greater than 100 feet in length.
B. There is no free product: YES
Measurable thickness of SPH has not been detected in site monitoring wells in over 18 years.
C. The nearest existing water supply well or surface water body is greater than 250 feet from the defined plume boundary: YES
There are no water supply wells or surface water bodies within 250 feet of the Site.
The nearest municipal water supply well is operated by EBMUD and is located at 2600 Grant Avenue in San Leandro, located over 15 miles south of the Site. This well operates to supplement the surface water supply during prolonged drought periods and uses the deep aquifer at approximately 500 feet bgs (AECOM 2013).
The nearest non-municipal water production wells include:
• Irrigation well identified by ARCADIS for the former BP-11127, located at 5425 Martin Luther King, Oakland, CA
-Irrigation well approximately 4,000 feet north (crossgradient) of the Site
• Domestic well identified for the 76 Station #0746, located at 3943 Broadway, Oakland, CA
-Domestic well approximately 3,000 ft northeast (downgradient/crossgradient) of the Site
None of the wells identified in the well survey are located within the path of the local groundwater flow and are therefore not considered potential receptors.
The nearest surface water body appears to be Glen Echo Creek approximately 4,600 feet southeast (upgradient). However, the creek in this area is predominately shown as an underground culvert. A map showing the creek location can be viewed online at: http://museumca.org/creeks/1160-OMTemescal.html#.
The nearest downgradient surface water body is San Francisco Bay and is located approximately 1.4 miles west of the Site.
Sources:
-AECOM. 2013. Chevron Site No. 351642 (Former Unocal Service Station No. 3538) 411 West MacArthur Boulevard, Oakland, California ACEH Case No. RO0000251 Subject: Low-Threat Case Closure Request. March 27.
-ARCADIS. 2010. Re: Case Closure Summary Report Former British Petroleum Station #11127, 5425 Martin Luther King Jr. Way, Oakland, California 94609, ACEH Case # RO0000241. August 6.
-ARCADIS. 2010. Site Investigation Report, Former Atlantic Richfield Company Station No. 4931, 731 West MacArthur Boulevard, Oakland, California, ACEH Case # RO0000076. November 11.
-Delta Consultants. 2009. Re: Sensitive Receptor Survey, Addendum, Delta Project No C100746, RO# 0203, AOC 1085. April 24.

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

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Low Threat Closure Policy

Media Specific Criteria – Petroleum Vapor Intrusion to Indoor Air

LOW THREAT CLOSURE POLICY
MEDIA SPECIFIC CRITERIA: PETROLEUM VAPOR INTRUSION TO INDOOR AIR

Does the site qualify for the active commercial fueling facility exemption? **-OR-**	☒ Y	☐ N	☐ NE
Does the site meet one of the three petroleum vapor intrusion to indoor air specific criteria (a, b, or c)?	☐ Y	☐ N	☐ NE

LTCP Statement: "Exposure to petroleum vapors migrating from soil or groundwater to indoor air may pose unacceptable human health risks. This policy describes conditions, including bioattenuation zones, which if met will assure that exposure to petroleum vapors in indoor air will not pose unacceptable health risks. In many petroleum release cases, potential human exposures to vapors are mitigated by bioattenuation processes as vapors migrate toward the ground surface. For the purposes of this section, the term "bioattenuation zone" means an area of soil with conditions that support biodegradation of petroleum hydrocarbon vapors.

The low-threat vapor-intrusion criteria described below apply to sites where the release originated and impacted or potentially impacted adjacent parcels when:

(1) existing buildings are occupied or may be reasonably expected to be occupied in the future, or

(2) buildings for human occupancy are reasonably expected to be constructed in the future.

Appendices 1 through 4 (attached) illustrate four potential exposure scenarios and describe characteristics and criteria associated with each scenario. Petroleum release sites shall satisfy the media-specific criteria for petroleum vapor intrusion to indoor air and be considered low-threat for the vapor-intrusion-to-indoor-air pathway if:

a. Site-specific conditions at the release site satisfy all of the characteristics and criteria of scenarios 1 through 3 as applicable, or all of the characteristics and criteria of scenario 4 as applicable; or

b. A site-specific risk assessment for the vapor intrusion pathway is conducted and demonstrates that human health is protected to the satisfaction of the regulatory agency; or

c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, the regulatory agency determines that petroleum vapors migrating from soil or groundwater will have no significant risk of adversely affecting human health.

Exception: Exposures to petroleum vapors associated with historical fuel system releases are comparatively insignificant relative to exposures from small surface spills and fugitive vapor releases that typically occur at active fueling facilities. Therefore, satisfaction of the media-specific criteria for petroleum vapor intrusion to indoor air is not required at active commercial petroleum fueling facilities, except in cases where release characteristics can be reasonably believed to pose an unacceptable health risk."

Does the site qualify for an exemption from the Petroleum Vapor Intrusion to Indoor Air criteria?	☒ Y	☐ N	☐ NE	☐ NA
Is the site is an active commercial petroleum fueling facility?	☒ Y	☐ N	☐ NE	☐ NA
Are release characteristics reasonably believed to pose an unacceptable health risk to facility users or nearby facilities?	☐ Y	☒ N	☐ NE	☐ NA
If the site does not qualify for an exemption, then				
a. Do site-specific conditions at the release site satisfy all of the characteristics and criteria of scenarios 1 through 3 as applicable, or all of the characteristics and criteria of scenario 4? **-OR-** ***(Use page vi-2 through vi-10 to support answer)***	☐ Y	☐ N	☐ NE	☐ NA
b. Has a site-specific risk assessment for the vapor intrusion pathway been conducted that demonstrates that human health is protected? **-OR-**	☐ Y	☐ N	☐ NE	☐ NA
c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, has the regulatory agency determined that petroleum vapors migrating from soil or groundwater will have no significant risk of adversely affecting human health?	☐ Y	☐ N	☐ NE	☐ NA

Use General Criteria e - Conceptual Site Model pages to support answer

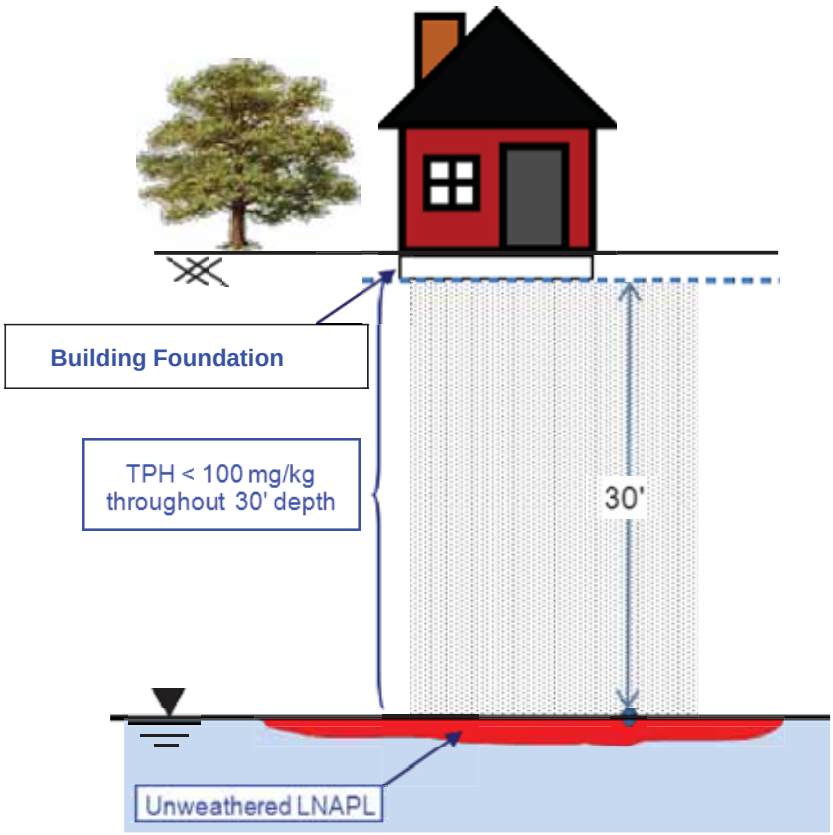
Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

SCENARIO 1 - UNWEATHERED LNAPL IN GROUNDWATER				
Do site specific conditions at the site satisfy all the characteristics of Scenario 1?	☐ Y	☐ N	☐ NE	☐ NA

Scenario 1
Existing Building or Potential Future Construction

LNAPL Characteristics:
Unweathered – petroleum product that has not been subjected to significant volatilization or solubilization, and therefore has not lost a significant portion of its volatile or soluble constituents (e.g., comparable to recently dispensed fuel)

Bioattenuation Zone Required Characteristics:
Minimum 30 foot vertical separation distance between the bottom of building foundations and LNAPL in groundwater, Total TPH concentrations in soil < 100 mg/kg



Is the LNAPL unweathered?	☐ Y	☐ N	☐ NE	☐ NA
Does the site have a continuous bioattenuation zone that provides a separation of at least 30 feet vertically between the LNAPL in groundwater and the foundation of existing buildings?; **-and-**	☐ Y	☐ N	☐ NE	☐ NA
Does the site have a continuous bioattenuation zone that provides a separation of at least 30 feet vertically between the LNAPL in groundwater and the foundation of potential buildings?; **-and-**	☐ Y	☐ N	☐ NE	☐ NA
Are total TPH concentrations in soil less than 100 mg/kg throughout the entire vertical extent of the 30 foot bioattenuation zone?	☐ Y	☐ N	☐ NE	☐ NA

Use Criteria e – Conceptual Site Model sheets to support answers

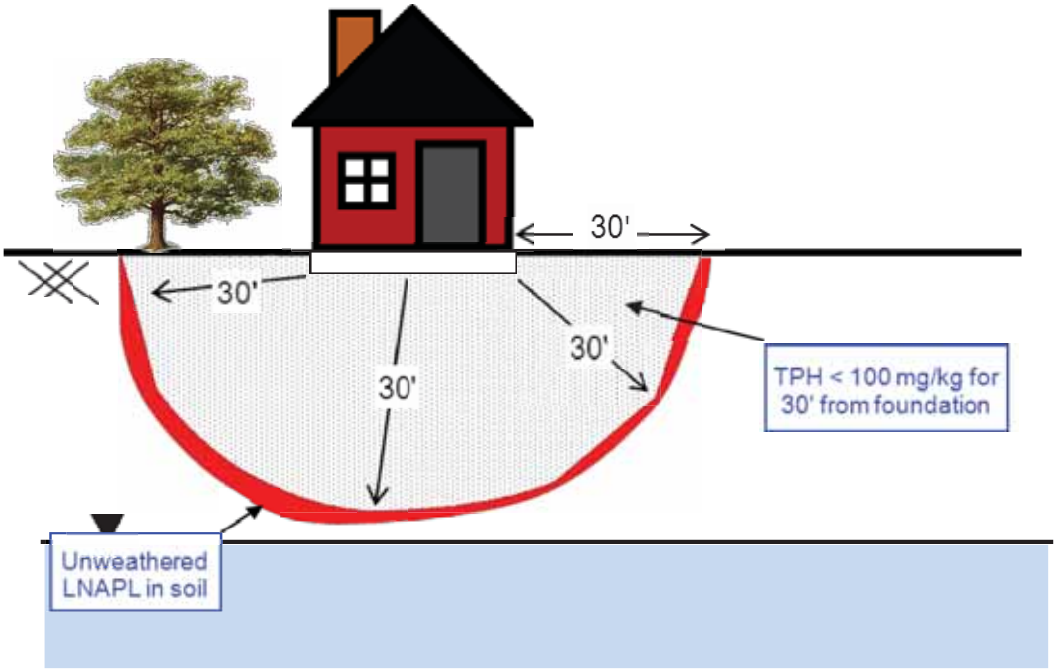
Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

SCENARIO 2 - UNWEATHERED LNAPL IN SOIL				
Do site specific conditions at the site satisfy all the characteristics of Scenario 2?	☐ Y	☐ N	☐ NE	☐ NA

Scenario 2
Existing Building or Potential Future Construction

LNAPL Characteristics:
Unweathered – petroleum product that has not been subjected to significant volatilization or solubilization, and therefore has not lost a significant portion of its volatile or soluble constituents (e.g., comparable to recently dispensed fuel)

Bioattenuation Zone Required Characteristics:
Minimum 30 foot vertical separation distance between the bottom of building foundations and LNAPL in soil,
Total TPH concentrations in Soil < 100 mg/kg



Is the LNAPL unweathered?	☐ Y	☐ N	☐ NE	☐ NA
Does the site have a continuous bioattenuation zone that provides a separation of at least 30 feet both laterally and vertically between the LNAPL in soil and the foundation of existing buildings?; **-and-**	☐ Y	☐ N	☐ NE	☐ NA
Does the site have a continuous bioattenuation zone that provides a separation of at least 30 feet both laterally and vertically between the LNAPL in soil and the foundation of potential buildings?; **-and-**	☐ Y	☐ N	☐ NE	☐ NA
Are total TPH concentrations in soil less than 100 mg/kg throughout the entire lateral and vertical extent of the 30 foot bioattenuation zone?	☐ Y	☐ N	☐ NE	☐ NA

Use Criteria e – Conceptual Site Model sheets to support answers

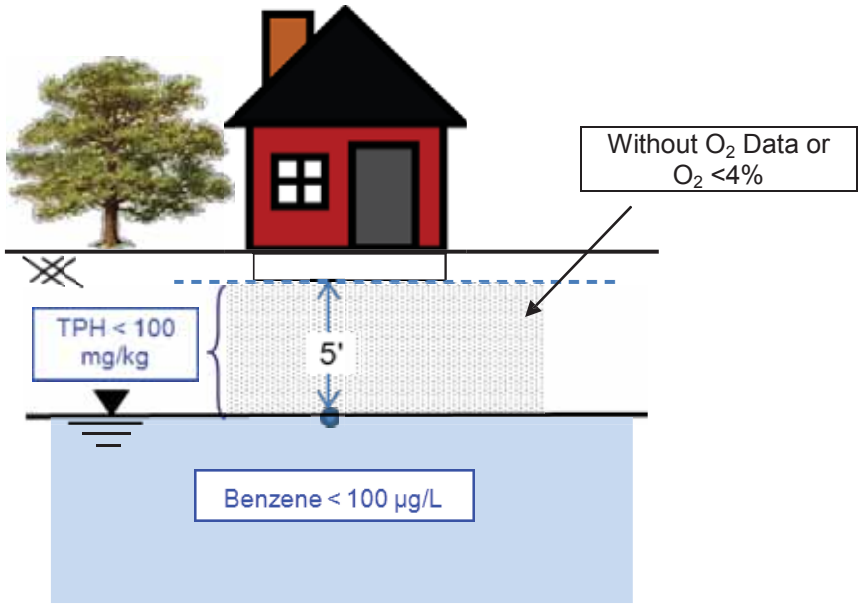
Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

SCENARIO 3 – LOW CONCENTRATION GROUNDWATER SCENARIO (FIGURE A)				
Does the Site Satisfy all of the Characteristics and Requirements of Scenario 3 Figure A?	☐ Y	☐ N	☐ NE	☐ NA

Figure A
Existing Building or Future Construction

Dissolved Phase Benzene Concentrations in Groundwater Requirements:
< 100 µg/L

Bioattenuation Zone Required Characteristics:
Minimum 5 Foot Vertical Separation Distance between Bottom of Building Foundations and Water Table,
No Soil Gas Oxygen Data or Measured Soil Gas Oxygen Concentrations< 4%,
Total TPH Concentrations in Soil < 100 mg/kg



Are maximum dissolved benzene concentrations in groundwater < 100 µg/L? **-and-**	☐ Y	☐ N	☐ NE	☐ NA
Is the bioattenuation zone a continuous zone that provides a separation of at least 5 feet vertically between the dissolved phase benzene and the foundation of existing buildings? **-and-**	☐ Y	☐ N	☐ NE	☐ NA
Is the bioattenuation zone a continuous zone that provides a separation of at least 5 feet vertically between the dissolved phase benzene and the foundation of potential buildings? **-and-**	☐ Y	☐ N	☐ NE	☐ NA
Has sufficient data been collected to determine that Total TPH (TPH-g and TPH-d combined) concentrations in soil are < 100 mg/kg throughout the entire depth of the 5 foot bioattenuation zone?	☐ Y	☐ N	☐ NE	☐ NA

Use Criteria e – Conceptual Site Model sheets to support answers

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

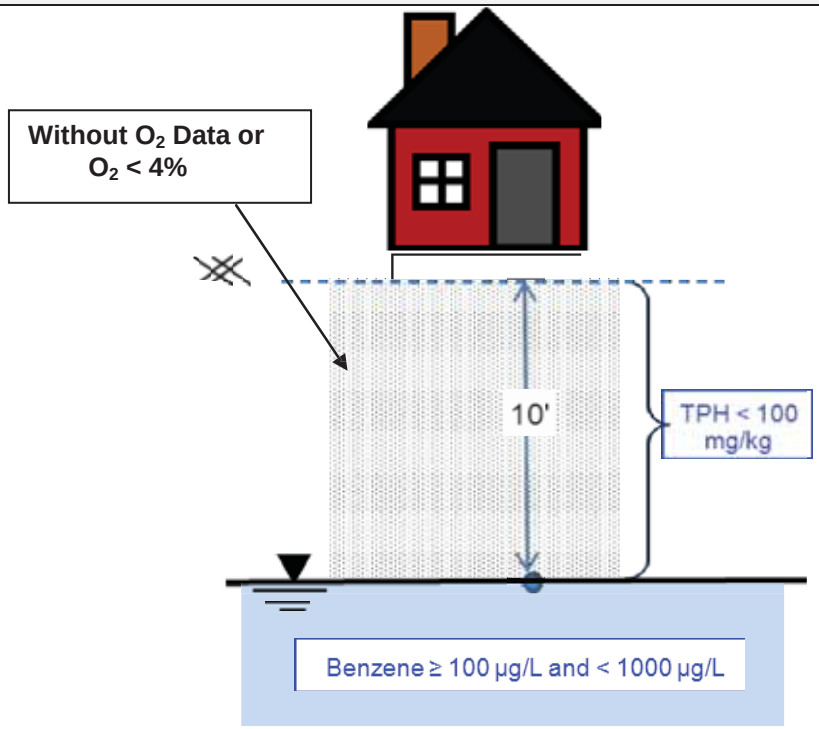
SCENARIO 3 – LOW CONCENTRATION GROUNDWATER SCENARIO (FIGURE B)

Does the Site Satisfy all of the Characteristics and Requirements of Scenario 3 - Figure B?	☐ Y	☐ N	☐ NE	☐ NA

Figure B
Existing Building or Future Construction

Dissolved Phase Benzene Concentrations in Groundwater Requirements:
≥ 100 µg/L but < 1,000 µg/L

Bioattenuation Zone Required Characteristics:
Minimum 5 Foot Vertical Separation Distance between Bottom of Building Foundations and Water Table,
Measured Soil Gas Oxygen Concentrations< 4%,
Total TPH Concentrations in Soil < 100 mg/kg



Are maximum dissolved benzene concentrations in groundwater ≥ 100 µg/L but < 1,000 µg/L?; **-and-**	☐ Y	☐ N	☐ NE	☐ NA
Is the bioattenuation zone a continuous zone that provides a separation of at least 10 feet vertically between the dissolved phase benzene and the foundation of existing **buildings**?; **-and-**	☐ Y	☐ N	☐ NE	☐ NA
Is the bioattenuation zone a continuous zone that provides a separation of at least 10 feet vertically between the dissolved phase benzene and the foundation of **potential buildings**?; **-and-**	☐ Y	☐ N	☐ NE	☐ NA
Has sufficient data been collected to determine that Total TPH (TPH-g and TPH-d combined) concentrations in soil are < 100 mg/kg throughout the entire depth of the 10 foot bioattenuation zone?	☐ Y	☐ N	☐ NE	☐ NA

Use Criteria e – Conceptual Site Model sheets to support answers

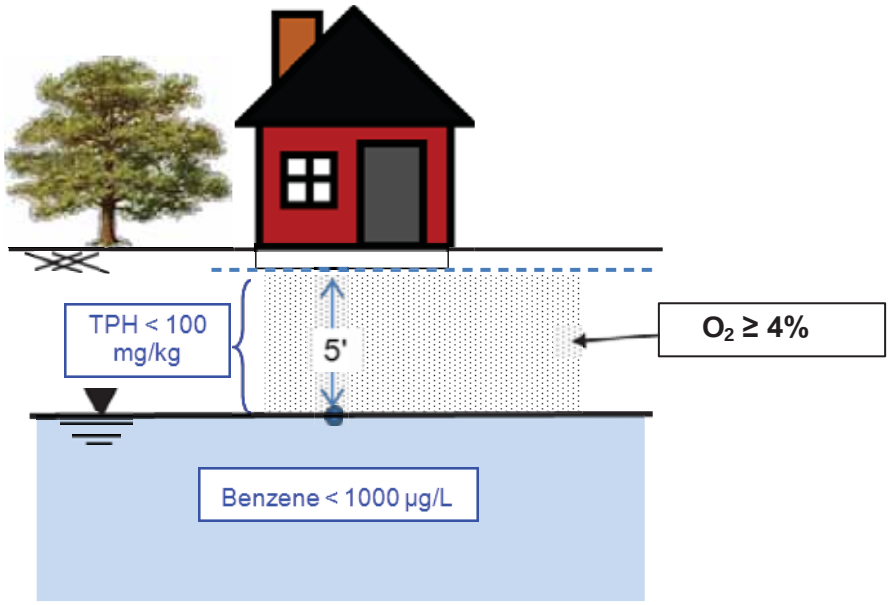
Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

SCENARIO 3 – LOW CONCENTRATION GROUNDWATER SCENARIO (FIGURE C)				
Does the Site Satisfy all of the Characteristics and Requirements of Scenario 3 - Figure C?	☐ Y	☐ N	☐ NE	☐ NA

Figure C
Existing Building or Future Construction

Dissolved Phase Benzene Concentrations in Groundwater Requirements:
< 1,000 µg/L

Bioattenuation Zone Required Characteristics:
Minimum 5 Foot Vertical Separation Distance between Bottom of Building Foundations and Water Table,
Measured Soil Gas Oxygen Concentrations ≥ 4%,
Total TPH Concentrations in Soil < 100 mg/kg



Are maximum dissolved benzene concentrations in groundwater ≥ 100 µg/L but < 1,000 µg/L?; **-and-**	☐ Y	☐ N	☐ NE	☐ NA
Is the bioattenuation zone a continuous zone that provides a separation of at least 10 feet vertically between the dissolved phase benzene and the foundation of existing buildings?; **-and-**	☐ Y	☐ N	☐ NE	☐ NA
Is the bioattenuation zone a continuous zone that provides a separation of at least 10 feet vertically between the dissolved phase benzene and the foundation of potential buildings?; **-and-**	☐ Y	☐ N	☐ NE	☐ NA
Has sufficient data been collected to determine that Total TPH (TPH-g and TPH-d combined) concentrations in soil are < 100 mg/kg throughout the entire depth of the 10 foot bioattenuation zone?	☐ Y	☐ N	☐ NE	☐ NA

Use Criteria e – Conceptual Site Model sheets to support answers

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

SCENARIO 4 – DIRECT MEASUREMENT OF SOIL GAS CONCENTRATIONS (WITH A BIOATTENUATION ZONE)				
Does the Site Satisfy all of the Characteristics and Requirements of Scenario 4 – With Bioattenuation Zone?	☐ Y	☐ N	☐ NE	☐ NA

Soil Gas Sampling – With Bioattenuation Zone
Existing Building or Future Construction

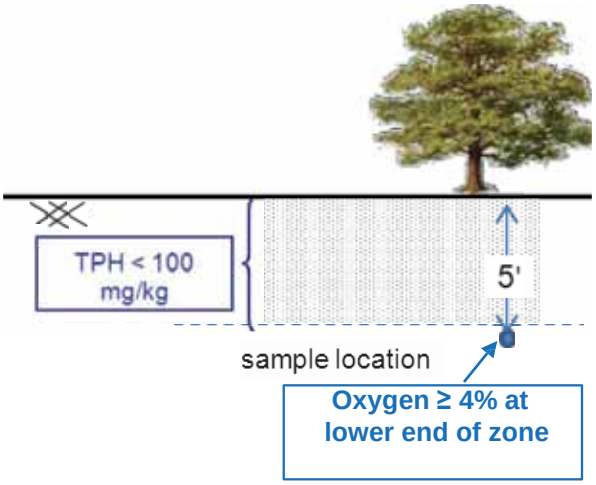
Bioattenuation Zone Required Characteristics:

Minimum 5 foot vertical feet of soil between the soil vapor measurement and the foundation of an existing building or ground surface of future construction;
Total TPH concentrations in soil < 100 mg/kg (measured in at least two depths within the five-foot zone);
Soil gas oxygen concentrations ≥ 4% at the bottom of the five-foot bioattenuation zone

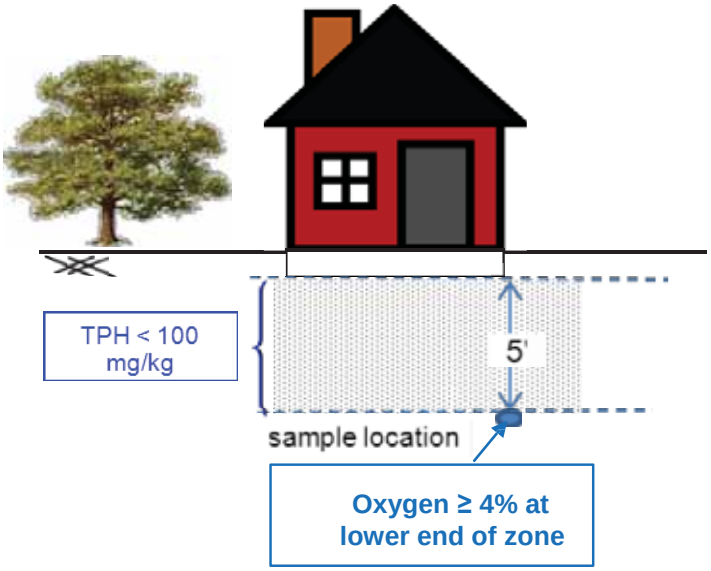
Soil Gas Sample Location Requirements:

Existing Buildings - At least five feet below the bottom of the building foundation
Future Construction - The soil gas sample shall be collected from at least five feet below ground surface

Existing Building



Future Construction



Are the required bioattenuation zone characteristics satisfied?	☐ Y	☐ N	☐ NE	☐ NA
Is there a minimum 5 foot vertical feet of soil between the soil vapor measurement and the foundation of existing buildings?	☐ Y	☐ N	☐ NE	☐ NA
Is there a minimum 5 foot vertical feet of soil between the soil vapor measurement and the ground surface of future construction?	☐ Y	☐ N	☐ NE	☐ NA
Has sufficient data been collected to determine that total TPH concentrations in soil are < 100 mg/kg (measured in at least two depths within the five-foot zone)?	☐ Y	☐ N	☐ NE	☐ NA
Has sufficient data been collected to determine that soil gas oxygen concentrations are ≥ 4% at the bottom of the five-foot bioattenuation zone?	☐ Y	☐ N	☐ NE	☐ NA

Use Criteria e – Conceptual Site Model sheets to support answers

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

SCENARIO 4 – DIRECT MEASUREMENT OF SOIL GAS CONCENTRATIONS (WITH A BIOATTENUATION ZONE)

If the required bioattenuation zone characteristics have been met then,

Have soil gas samples been collected in accordance with required protocols?	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**
For existing buildings, were soil gas samples collected from at least five feet below the bottom of building foundations?	☐ Y	☐ N	☐ NE	☐ NA
For sites where future construction is planned, were soil gas samples collected from at least five feet below ground surface within the footprints of future buildings?	☐ Y	☐ N	☐ NE	☐ NA
Were samples collected in accordance with the guidance provided in the CA LUFT Manual?	☐ Y	☐ N	☐ NE	☐ NA
Has sufficient data been collected to determine that soil gas concentrations for benzene, ethylbenzene, and napthalene are below the specified residential screening levels?	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**
Benzene < 85,000 µg/m^3	☐ Y	☐ N	☐ NE	☐ NA
Ethylbenzene < 1,100,000 µg/m^3	☐ Y	☐ N	☐ NE	☐ NA
Napthalene < 93,000 µg/m^3	☐ Y	☐ N	☐ NE	☐ NA
Has sufficient data been collected to determine that soil gas concentrations for benzene, ethylbenzene, and napthalene are below the specified commercial screening levels?	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**
Benzene < 280,000 µg/m^3	☐ Y	☐ N	☐ NE	☐ NA
Ethylbenzene < 3,600,000 µg/m^3	☐ Y	☐ N	☐ NE	☐ NA
Napthalene < 310,000 µg/m^3	☐ Y	☐ N	☐ NE	☐ NA

Use Criteria e – Conceptual Site Model sheets to support answers

If the required bioattenuation zone characteristics have not been satisfied then use Scenario 4 – No Bioattenuation Zone (pages vi-9 and vi-10)

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

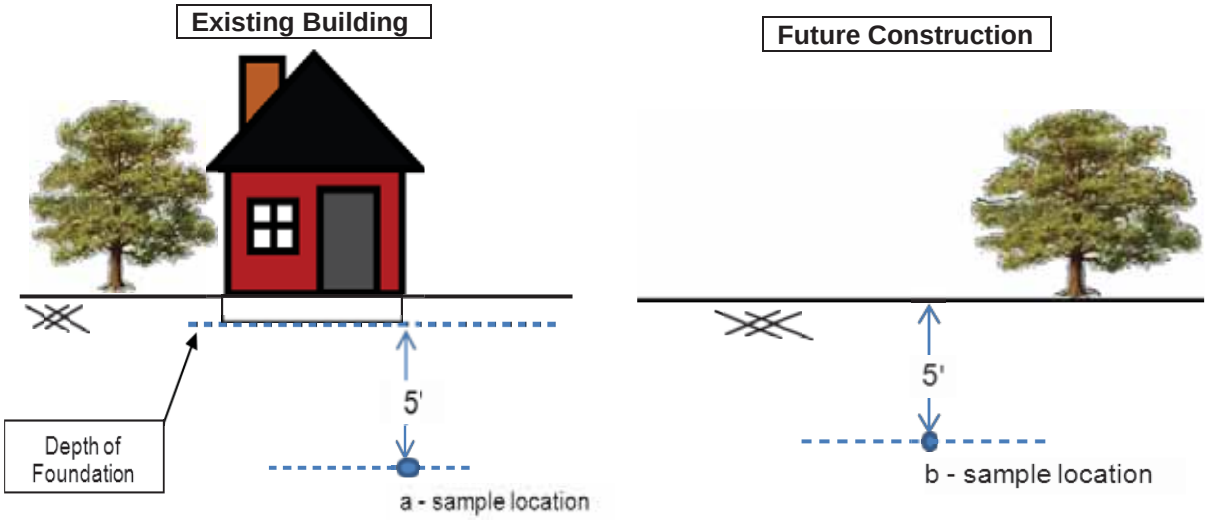
SCENARIO 4 – DIRECT MEASUREMENT OF SOIL GAS CONCENTRATIONS (NO BIOATTENUATION ZONE)

Does the Site Satisfy all of the Characteristics and Requirements of Scenario 4 – No Bioattenuation Zone?	☐ Y	☐ N	☐ NE	☐ NA

Soil Gas Sampling – No Bioattenuation Zone
Existing Building or Future Construction

Soil Gas Sample Location Requirements:

Existing Buildings – At least five feet below the bottom of the building foundation
Future Construction - The soil gas sample shall be collected from at least five feet below ground surface



Were appropriate protocols followed for collecting soil gas samples?	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**
For existing buildings, were soil gas samples collected from at least five feet below the bottom of building foundations?	☐ Y	☐ N	☐ NE	☐ NA
For sites where future construction is planned, were soil gas samples collected from at least five feet below ground surface within the footprints of future buildings?	☐ Y	☐ N	☐ NE	☐ NA
Were samples collected in accordance with the guidance provided in the CA LUFT Manual?	☐ Y	☐ N	☐ NE	☐ NA
Has sufficient data been collected to determine that soil gas concentrations for benzene, ethylbenzene, and napthalene are below the specified residential screening levels?	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**
Benzene < 85 µg/m^3	☐ Y	☐ N	☐ NE	☐ NA
Ethylbenzene < 1,100 µg/m^3	☐ Y	☐ N	☐ NE	☐ NA
Napthalene < 93 µg/m^3	☐ Y	☐ N	☐ NE	☐ NA
Has sufficient data been collected to determine that soil gas concentrations for benzene, ethylbenzene, and napthalene are below the specified commercial screening levels?	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**
Benzene < 280 µg/m^3	☐ Y	☐ N	☐ NE	☐ NA
Ethylbenzene < 3,600 µg/m^3	☐ Y	☐ N	☐ NE	☐ NA
Napthalene < 310 µg/m^3	☐ Y	☐ N	☐ NE	☐ NA

Use Criteria e – Conceptual Site Model sheets to support answers

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

SCENARIO 4 – DIRECT MEASUREMENT OF SOIL GAS CONCENTRATIONS (NO BIOATTENUATION ZONE)

For the no bioattenuation zone scenario, the screening criteria provided in the table on the preceding page are the same as the California Human Health Screening Levels (CHSSLs) with engineered fill below sub-slab.

If building crawl space air samples were collected instead of soil gas samples to evaluate vapor intrusion into buildings, then

Were appropriate protocols followed for collecting the crawl space air samples?	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**
Were samples collected in accordance with the guidance provided in *the CA LUFT Manual* and referenced documents including the DTSC's *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air*?	☐ Y	☐ N	☐ NE	☐ NA
Has sufficient data been collected to determine that crawl space air concentrations for benzene, ethylbenzene, and napthalene are below the appropriate residential screening levels (i.e., CHHSLs for Indoor Air)?	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**
Benzene < 0.084 µg/m^3	☐ Y	☐ N	☐ NE	☐ NA
Ethylbenzene – No screening number currently available	☐ Y	☐ N	☐ NE	☐ NA
Napthalene < 0.072 µg/m^3	☐ Y	☐ N	☐ NE	☐ NA
Has sufficient data been collected to determine that crawl space air concentrations for benzene, ethylbenzene, and napthalene are below the appropriate commercial screening levels (i.e., CHHSLs for Indoor Air)?	☐ **Y**	☐ **N**	☐ **NE**	☐ **NA**
Benzene < 0.141 µg/m^3	☐ Y	☐ N	☐ NE	☐ NA
Ethylbenzene – No screening number currently available	☐ Y	☐ N	☐ NE	☐ NA
Napthalene < 0.120 µg/m^3	☐ Y	☐ N	☐ NE	☐ NA

Use Criteria e – Conceptual Site Model sheets to support answers

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

Case Notes

Case File Document References:

Technical References:

Case Notes:

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

Case Notes

Case Notes (continued):

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

ARCADIS

ACEH LTC Policy Checklist
Low Threat Closure Policy

Media Specific Criteria – Direct Contact and Outdoor Air Exposure

LOW THREAT CLOSURE POLICY
MEDIA SPECIFIC CRITERIA: DIRECT CONTACT AND OUTDOOR AIR EXPOSURE

Does the site qualify for an exemption from the media-specific criteria for Direct Contact and Outdoor Air Exposure? -OR-	☐ Yes	☒ No	☐ NE
Does the site meet the media-specific criteria for Direct Contact and Outdoor Air Exposure?	☒ Yes	☐ No	☐ NE

LTCP Statement: "This policy describes conditions where direct contact with contaminated soil or inhalation of contaminants volatized to outdoor air poses a low threat to human health. Release sites where human exposure may occur satisfy the media-specific criteria for direct contact and outdoor air exposure and shall be considered low-threat if they meet any of the following:

a. Maximum concentrations of petroleum constituents in soil are less than or equal to those listed in Table 1 for the specified depth below ground surface (bgs). The concentration limits for 0 to 5 feet bgs protect from ingestion of soil, dermal contact with soil, and inhalation of volatile soil emissions and inhalation of particulate emissions. The 5 to 10 feet bgs concentration limits protect from inhalation of volatile soil emissions. Both the 0 to 5 feet bgs concentration limits and the 5 to 10 feet bgs concentration limits for the appropriate site classification (Residential or Commercial/Industrial) shall be satisfied. In addition, if exposure to construction workers or utility trench workers is reasonably anticipated, the concentration limits for Utility Worker shall also be satisfied; or

b. Maximum concentration of petroleum constituents in soil are less than levels that a site specific risk assessment demonstrates will have no significant risk of adversely affecting human health; or

c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, the regulatory agency determines that the concentrations of petroleum constituents in soil will have no significant risk of adversely affecting human health."

Has adequate data been collected to demonstrate that the upper 10 feet of soil is free of petroleum contamination and therefore qualifies for the exemption?	☐ Y	☒ N	☐ NE	☐ NA
If the site does not qualify for the exemption, then does the site satisfy the media-specific criteria (a, b, or c) for direct contact and outdoor air exposure?	☒ Y	☐ N	☐ NE	☐ NA

a. Are maximum concentrations of petroleum constituents in soil less than or equal to those listed in Table 1 for the specified depth bgs? ***Use page dc-2 to support answer***	☒ Y	☐ N	☐ NE	☐ NA
b. Are the maximum concentrations of petroleum constituents in soil less than levels that a site specific risk assessment demonstrates will have no significant risk of adversely affecting human health?	☐ Y	☐ N	☐ NE	☒ NA
c. As a result of controlling exposure through the use of mitigation measures or through the use of institutional or engineering controls, has the regulatory agency determined that the concentrations of petroleum constituents in soil will have no significant risk of adversely affecting human health?	☐ Y	☐ N	☐ NE	☒ NA

Use General Criteria e – Conceptual Site Model sheets to support your answers

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

LOW THREAT CLOSURE POLICY
MEDIA SPECIFIC CRITERIA: DIRECT CONTACT AND OUTDOOR AIR EXPOSURE

Maximum Concentrations of Petroleum Constituents in Soil (Scenario a)

Table 1 – Concentrations of Petroleum Constituents in Soil That will Have No Significant Risk of Adversely Affecting Human Health

Chemical	Residential		Commercial/Industrial		Utility Worker
	0 to 5 ft bgs (mg/kg)	5 to 10 ft bgs (mg/kg)	0 to 5 ft bgs (mg/kg)	5 to 10 ft bgs (mg/kg)	0 to 10 ft bgs (mg/kg)
Benzene	**1.9**	**2.8**	**8.2**	**12**	**14**
Max Soil Conc[1]	--	--	<0.0049	0.044	0.044
Ethylbenzene	**21**	**32**	**89**	**134**	**314**
Max Soil Conc[1]	--	--	<0.0049	4.7	4.7
Napthalene	**9.7**	**9.7**	**45**	**45**	**219**
Max Soil Conc[1]	--	--	NA	NA	NA
PAH[2]	**0.063**	**NA**	**0.68**	**NA**	**4.5**
Max Soil Conc[1]	--	--	NA	NA	NA

Notes:

1. The maximum concentrations of petroleum constituents in soil should be compared to those listed in Table 1 (Technical Justification for Soil Screening Levels for Direct Contact and Outdoor Air Exposure Pathways, SWRCB)
2. Based on the seven carcinogenic poly-aromatic hydrocarbons (PAHs) as benzo(a)pyrene toxicity equivalent [BaPe]. Sampling and analysis for PAHs is only necessary where soil is affected by either waste oil or Bunker C oil.

Are all the concentration limits for all the appropriate site classification satisfied?	**☑ Y**	**☐ N**	**☐ NE**	**☐ NA**
Residential: 0 to 5 feet bgs	☐ Y	☐ N	☐ NE	☑ NA
Residential: 5 to 10 feet bgs	☐ Y	☐ N	☐ NE	☑ NA
Commercial/Industrial: 0 to 5 feet bgs	☑ Y	☐ N	☐ NE	☐ NA
Commercial/Industrial: 5 to 10 feet bgs	☑ Y	☐ N	☐ NE	☐ NA
Utility Worker: 0 to 10 feet bgs?	☑ Y	☐ N	☐ NE	☐ NA
Have the requirements for using the screening levels in Table 1 been satisfied (i.e., have the model assumptions presented in the SWRCB document entitled *"Technical Justification for Soil Screening Levels for Direct Contact and Outdoor Air Exposure Pathways"* been met?	**☑ Y**	**☐ N**	**☐ NE**	**☐ NA**
Is the area of impacted soil where a particular exposure occurs ≤ 82 feet by 82 feet?	☑ Y	☐ N	☐ NE	☐ NA
Is the receptor located at the downgradient edge for inhalation exposure?	☐ Y	☑ N	☐ NE	☐ NA
Is the wind speed < 2.25 meters per second (7.38 feet per second) on average?	☑ Y	☐ N	☐ NE	☐ NA
Are there different exposure scenarios than residential, commercial/industrial, utility worker) at the site?	☐ Y	☑ N	☐ NE	☐ NA

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

Direct Contact and Outdoor Air Exposure: Case Notes

Case File Reference Documents:

Technical References:

Case Notes:

Please see Attachment - DC-OA for supporting information for this Criteria.

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable

The LTC Policy requires candidate sites to be evaluated for potential direct contact with impacted soil and inhalation of constituents volatized to outdoor air that may pose unacceptable human health risks.

Site conditions are assessed with respect to criteria in the LTC Policy and determined if any one of the following conditions can be met:

1. Maximum concentrations in soil are less than or equal to values in Table 1 of the LTC Policy;
2. Maximum concentrations in soil are less than levels that a site-specific risk assessment demonstrates no significant risk; or
3. Risks can be managed adequately by controlling exposure via mitigation measures or the use of institutional or engineering controls.

Site data were evaluated to the *Commercial/Industrial* screening levels presented in *Table 1 - Concentrations of Petroleum Constituents in Soil That Will Have No Significant Risk of Adversely Affecting Human Health* of the LTC Policy. Utility Worker screening levels were used as necessary when evaluation was required for hypothetical receptors.

Based on initial evaluation it appears that the Site qualifies as a candidate as a low-threat petroleum UST site under the *Direct Contact and Outdoor Air Exposure Criteria* as it fulfills the requirements in the Soil: 0 to 5 feet bgs, 5 to 10 feet bgs, and 0 to 10 feet bgs scenarios and Volatilization to Outdoor Air scenario. Evaluation to the Low-Threat Policy Direct Contact and Outdoor Air Exposure Criteria is provided below. Appendix D of the SCM includes the historical soil sample results collected from the Site.

Direct Contact and Outdoor Air Exposure - Soil: 0 to 5 feet bgs		
A. Benzene concentration in soil is less than or equal to 8.2 mg/kg.	☒ Yes	☐ No
Benzene was not detected above laboratory reporting limits (<0.0046 mg/kg to <0.0049 mg/kg) in any soil samples collected during the most recent soil sampling event (October 2010) conducted at the Site. <u>For ACEH Checklist</u> Max Benzene Concentration (0 to 5 ft bgs): <0.0049 mg/kg		
B. Ethylbenzene concentration in soil is less than or equal to 89 mg/kg.	☒ Yes	☐ No
Ethylbenzene was not detected above laboratory reporting limits (<0.0046 mg/kg to <0.0049 mg/kg) in any soil samples collected during the most recent soil sampling event (October 2010) conducted at the Site.		

For ACEH Checklist Max Ethylbenzene Concentration (0 to 5 ft bgs): <0.0049 mg/kg		
C. Naphthalene concentration in soil is less than or equal to 45 mg/kg.	☐ Yes	☐ No
Naphthalene soil data between 0 to 5 feet bgs is not present in available records. Available records do not indicate that diesel fuel was ever sold at the Site or stored in site USTs. Only gasoline has been reported in site USTs. For ACEH Checklist Max Naphthalene Concentration (0 to 5 ft bgs): N/A		
D. For waste oil and/or Bunker C impacts ONLY: PAH concentration in soil is less than or equal to 0.68 mg/kg.	☐ Yes	☐ No
PAH soil data between 0 to 5 feet bgs is not present in available records. Available records do not indicate that a waste oil tank was ever present at the Site or that Bunker C oil was ever stored in site USTs. Only gasoline has been reported in site USTs. For ACEH Checklist Max PAH Concentration (0 to 5 ft bgs): N/A		

Direct Contact and Outdoor Air Exposure - Volatilization to Outdoor Air (soil: 5 to 10 feet bgs)		
A. Benzene concentration in soil is less than or equal to 12 mg/kg.	☒ Yes	☐ No
Benzene concentrations do not exceed 12 mg/kg in any soil samples collected from the Site between 5 to 10 feet bgs during the most recent soil sampling event (October 2010). For ACEH Checklist Max Benzene Concentration (5 to 10 ft bgs): 0.044 mg/kg		
B. Ethylbenzene concentration in soil is less than or equal to 134 mg/kg.	☒ Yes	☐ No
Ethylbenzene concentrations do not exceed 134 mg/kg in any soil samples collected from the Site		

between 5 to 10 feet bgs during the most recent soil sampling event (October 2010). For ACEH Checklist Max Ethylbenzene Concentration (5 to 10 ft bgs): 4.7 mg/kg		
C. Naphthalene concentration in soil is less than or equal to 45 mg/kg.	☐ Yes	☐ No
Naphthalene soil data between 5 to 10 feet bgs is not present in available records. Available records do not indicate that diesel fuel was ever sold at the Site or stored in site USTs. Only gasoline has been reported in site USTs. For ACEH Checklist Max Naphthalene Concentration (5 to 10 ft bgs): N/A		
D. For waste oil and/or Bunker C impacts ONLY: No screening level for PAHs data between 5 to 10 feet bgs.	☐ Yes	☐ No
PAH soil data between 5 to 10 feet bgs is not present in available records. Available records do not indicate that a waste oil tank was ever present at the Site or that Bunker C oil was ever stored in site USTs. Only gasoline has been reported in site USTs. For ACEH Checklist Max PAH Concentration (5 to 10 ft bgs): N/A		

Direct Contact and Outdoor Air Exposure – Utility Worker (soil: 0 to 10 feet bgs)		
A. Benzene concentration in soil is less than or equal to 14 mg/kg.	☒ Yes	☐ No
Benzene concentrations do not exceed 14 mg/kg in any soil samples collected from the Site between 0 to 10 feet bgs during the most recent soil sampling event (October 2010). For ACEH Checklist Max Benzene Concentration (0 to 10 ft bgs): 0.044 mg/kg		
B. Ethylbenzene concentration in soil is less than or equal to 314 mg/kg.	☒ Yes	☐ No

Ethylbenzene concentrations do not exceed 314 mg/kg in any soil samples collected from the Site between 5 to 10 feet bgs during the most recent soil sampling event (October 2010). For ACEH Checklist Max Ethylbenzene Concentration (0 to 10 ft bgs): 4.7 mg/kg		
C. Naphthalene concentration in soil is less than or equal to 219 mg/kg.	☐ Yes	☐ No
Naphthalene soil data between 0 to 10 feet bgs is not present in available records. Available records do not indicate that diesel fuel was ever sold at the Site or stored in site USTs. Only gasoline has been reported in site USTs. For ACEH Checklist Max Naphthalene Concentration (0 to 10 ft bgs): N/A		
D. For waste oil and/or Bunker C impacts ONLY: PAH concentration in soil is less than or equal to 4.5 mg/kg.	☐ Yes	☐ No
PAH soil data between 0 to 10 feet bgs is not present in available records. Available records do not indicate that a waste oil tank was ever present at the Site or that Bunker C oil was ever stored in site USTs. Only gasoline has been reported in site USTs. For ACEH Checklist Max PAH Concentration (0 to 10 ft bgs): N/A		

ARCADIS

ACEH LTC Policy Checklist
Low Threat Closure Policy

Conceptual site Model and Data Gap Identification Checklist – Well Survey and Site Well Construction Details

CONCEPTUAL SITE MODEL
AND DATA GAP IDENTIFICATION CHECKLIST

Well Survey

Are there existing water supply wells or other sources of water in the vicinity of the site?	**☐ Y**	**☒ N**	**☐ NE**	**☐ NA**
Has a recent well survey been conducted to identify all wells within 2,000 feet of the site? Name, author, and date of survey document: see reference list in SCM Table for details	☒ Y	☐ N	☐ NE	☐ NA
Have Department of Water Resources records been reviewed?	☒ Y	☐ N	☐ NE	☐ NA
Have Zone 7 Water Agency records been reviewed?	☐ Y	☒ N	☐ NE	☐ NA
Have Alameda County Public Works records been reviewed?	☒ Y	☐ N	☐ NE	☐ NA
Has a background study of the historical land uses of the site and properties in the vicinity of the site been conducted to determine the existence of unrecorded/unknown (abandoned) wells?	☒ Y	☐ N	☐ NE	☐ NA
Has sufficient data been provided on all wells located within 2,000 feet of the site to identify sensitive receptors and determine potential contaminant migration pathways to and from the site?	**☒ Y**	**☐ N**	**☐ NE**	**☐ NA**
Has a figure (with rose diagram) identifying each well location been presented?	☐ Y	☒ N	☐ NE	☐ NA
Have DWR well logs (marked as confidential) been provided?	☐ Y	☒ N	☐ NE	☐ NA
Has a table with details of the well search been provided?	☐ Y	☒ N	☐ NE	☐ NA
Identification number (ID) corresponding to the well location on a figure?	☐ Y	☒ N	☐ NE	☐ NA
State Well ID, Well Owner ID?	☐ Y	☒ N	☐ NE	☐ NA
Well location address?	☐ Y	☒ N	☐ NE	☐ NA
Distance of well from the site?	☐ Y	☒ N	☐ NE	☐ NA
Direction of well from the site (downgradient, upgradient, crossgradient)?	☐ Y	☒ N	☐ NE	☐ NA
Type of well (monitoring, remediation, irrigation, water supply, industrial, livestock, dewatering, cathodic protection)?	☐ Y	☒ N	☐ NE	☐ NA
Well status (active, inactive, decommissioned, unrecorded, and/or abandoned)?	☐ Y	☒ N	☐ NE	☐ NA
Well installation date?	☐ Y	☒ N	☐ NE	☐ NA
Well decommissioned date?	☐ Y	☒ N	☐ NE	☐ NA
Total Well depth (feet bgs)?	☐ Y	☒ N	☐ NE	☐ NA
Well screen interval (feet bgs)?	☐ Y	☒ N	☐ NE	☐ NA
Well seal interval (feet bgs)?	☐ Y	☒ N	☐ NE	☐ NA
Well diameter (inches)?	☐ Y	☒ N	☐ NE	☐ NA
Are these supply wells or other sources of water used by property owners/tenants in the vicinity of the site?	**☐ Y**	**☒ N**	**☐ NE**	**☐ NA**
Has a neighborhood backyard domestic water/irrigation well assessment been conducted?	☐ Y	☒ N	☐ NE	☐ NA
Have wells been impacted by the release site?	☐ Y	☒ N	☐ NE	☐ NA
Have the wells been sampled for chemicals of concern associated with the release site and analytical results been provided?	☐ Y	☒ N	☐ NE	☐ NA
Have impacted wells been decommissioned and well destruction records provided?	☐ Y	☒ N	☐ NE	☐ NA

Key: ■ NE = Identified Data Gap - Needs Further Evaluation ■ NA = Not Applicable ■ UNK = Unknown

Site Well Construction Details

Well ID	Location (Onsite/Offsite, Downgradient, Upgradient or Cross Gradient)	Highest Measured Depth to Water		Lowest Measured Depth to Water		Screen Interval (ft bgs)	Total Depth	Submerged (% of events)	Dry (% of Events)	Status (Active, Abandoned, Lost)
		Date	Feet bgs	Date	Feet bgs					
A-2	onsite	8/12/1997	11.11	3/18/2011	2.89	unknown	19.50	--	--	active
A-3	onsite	10/14/1993	15.11	12/31/2001	3.70	unknown	16.30	--	--	active
A-4	onsite	10/14/1993	15.37	3/18/2011	5.34	unknown	28.90	--	--	active
A-5	onsite	10/14/1993	14.99	3/18/2011	5.45	unknown	9.50	--	--	active
A-6	onsite	10/14/1993	12.82	12/31/2001	4.81	unknown	unknown	--	--	paved over
A-7	onsite	8/6/1993	12.67	12/31/2001	4.78	unknown	26.37	--	--	active
A-8	onsite	12/16/1993	13.40	12/31/2001	4.34	unknown	16.35	--	5 (4 events total)	active
A-9	onsite	10/14/1993	14.11	3/18/2011	4.40	5 - 40	40	3	--	active
A-10	onsite	10/14/1993	15.22	3/18/2011	6.52	5 - 30	30	0	--	active
A-11	offsite; downgradient	10/14/1993	14.72	12/31/2001	6.06	5 - 30	30	0	--	active
A-12	offsite; downgradient	10/14/1993	13.28	12/31/2001	5.74	5 - 30	30	0	--	active
A-13	offsite; cross-gradient	10/14/1993	14.02	3/18/2011	6.33	10 - 30	30	68	--	paved over
AR-1	onsite	12/16/1993	19.44	12/31/2001	5.91	10 - 30	30	35	--	active
AR-2	onsite	8/9/1994	18.25	2/28/2008	1.82	8 - 28	30	87	--	active
AR-3	onsite	11/16/1993	16.38	12/31/2001	5.18	10 - 30	20	72	--	active

STATE WATER RESOURCES CONTROL BOARD

GEOTRACKER ESI

UPLOADING A GEO_REPORT FILE

SUCCESS

Your GEO_REPORT file has been successfully submitted!

Submittal Type:	**GEO_REPORT**
Report Title:	**ACEH LOW THREAT CLOSURE POLICY CHECKLIST AND SITE CONCEPTUAL MODEL 070113**
Report Type:	**Request for Closure**
Report Date:	**7/1/2013**
Facility Global ID:	**T0600100110**
Facility Name:	**ARCO #04931**
File Name:	**RO0000076_RFC_R_2013-07-01.pdf**
Organization Name:	**ARCADIS**
Username:	**ARCADISBP**
IP Address:	**216.207.98.101**
Submittal Date/Time:	**7/1/2013 1:06:10 PM**
Confirmation Number:	**3389997363**