Atlantic Richfield Company

Shannon Couch
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RECEIVED

2:17 pm, Jan 04, 2012

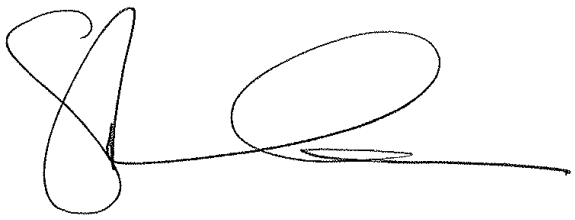
Alameda County
Environmental Health

November 28, 2011

Re: Case Evaluation and Justification for No Further Action
Former Richfield Oil Company Station #472
6415 International Boulevard, Oakland, California
ACEH Case #RO0002982

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

Submitted by,



Shannon Couch
Operations Project Manager

Attachment

Broadbent & Associates, Inc.
1324 Mangrove Ave., Suite 212
Chico, CA 95926
Voice (530) 566-1400
Fax (530) 566-1401

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

November 28, 2011

Project No. 09-88-601

Atlantic Richfield Company
P.O. Box 1257
San Ramon, CA 94583
Submitted via ENFOS

Attn.: Ms. Shannon Couch

Re: Case Evaluation and Justification for No Further Action, Former Richfield Oil Company Station #472, 6415 International Blvd, Oakland, California; ACEH Case #RO0002982

Dear Ms. Couch:

Attached is the *Case Evaluation and Justification for No Further Action* for the Former Richfield Oil Company Station #472 located at 6415 International Boulevard, Oakland, California (Site). A summary of existing Site conditions and the technical justification for a finding of No Further Action Status is presented in this document.

The subject environmental case has been open for over four years. One or two USTs were previously removed from the northeast corner of the property prior to 1976, but no soil sampling data or removal report were found to confirm the information given. Low levels of petroleum hydrocarbon contamination were found during a Limited Phase II environmental site investigation conducted in 2008.

Contaminant concentrations of TPH-G, TPH-D, BTEX, and MTBE are presently minimal or non-existent at the Site. No wells or surface water bodies are likely to be affected by the Site. These observations, plus additional lines of evidence presented in the attached document are the basis for this closure request.

Should you have questions regarding this submittal, please do not hesitate to contact us at 530-566-1400.

Sincerely,
BROADBENT & ASSOCIATES, INC.

Thomas A. Venus, P.E.
Senior Engineer

REGISTERED PROFESSIONAL ENGINEER
THOMAS A. VENUS
No. 54698
Expires 12-31-11
CIVIL
STATE OF CALIFORNIA

Enclosures

cc: Mr. Paresh Khatri, Alameda County Environmental Health (submitted via ACEH ftp site)
Mr. Mahmud Ghanem, 6207 International Boulevard, Oakland, California 94621
Electronic copy uploaded to GeoTracker

CASE EVALUATION AND
JUSTIFICATION FOR NO FURTHER ACTION
FORMER RICHFIELD OIL COMPANY STATION #472
OAKLAND, CALIFORNIA

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CASE EVALUATION AND JUSTIFICATION FOR NO FURTHER ACTION FORMER RICHFIELD OIL COMPANY STATION #472 OAKLAND, CALIFORNIA

1. SITE SUMMARY

1.1 Location and Setting

The Site is located in a mixed residential and commercial area. Site improvements consist of a single-story concrete-block building, several perimeter and interior metal fences and predominantly covered with asphalt and concrete. Two large metal storage/shipping containers are presently located onsite on the south side of the building. The Site is located on an approximately 0.27 acre parcel of property recognized by Alameda County as Assessors Parcel Number 41-4050-21. The Site is located in Section 16, Township 2 South, Range 3 West, relative to the Mount Diablo Baseline and Meridian of Northern California. The Site can be located on the Oakland East, California 7½-minute topographic quadrangle map of the United States Geological Survey (USGS). A Site Location Map is presented as Drawing 1.

The land use in the immediate area is mainly commercial. The property across 64th Avenue to the west is a car wash. The property to the east is a Little Caesars restaurant. Across International Blvd. to the north of the Site is a McDonald's restaurant. To the south, and adjacent to the Site, are residential houses.

1.2 Current Use

Most recently, the Site is a former liquor store located on the south corner of the intersection of International Boulevard (formerly East 14th Street) and 64th Avenue in Oakland, California (Drawing 1). It currently consists of a single-story concrete-block building and several perimeter and interior metal fences.

1.3 Regional Geology and Hydrogeology

According to the East Bay Plain Groundwater Basin Beneficial Use Evaluation Report (California Regional Water Quality Control Board – San Francisco Bay Region/SFRWQCB, June 1999), the Site is located within the Oakland Sub-Area of the East Bay Plain of the San Francisco Basin. The Oakland Sub-Area contains a sequence of alluvial fans. The alluvial fill thickness ranges from 300 to 700 feet deep. 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 at 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.

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 ground-water flow is from east to west or from the Hayward Fault to the San Francisco Bay. Ground-water 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. The nearest natural drainage is Lion Creek, located approximately 0.43 miles southwest of the Site. Lion Creek flows generally northeast to southwest near the Site vicinity. The San Leandro Bay is located approximately 1.1 miles west of the Site.

According to the East Bay Plain Groundwater Basin Beneficial Use Evaluation Report, the City of Oakland does not have "any plans to develop local groundwater resources for drinking water purposes, because of existing or potential saltwater intrusion, contamination, or poor or limited quantity." However, the RWQCB's Basin Plan denotes existing beneficial uses of municipal and domestic supply (MUN), industrial process supply (PROC), industrial service supply (IND), and agricultural supply (AGR) for the East Bay Plain groundwater basin (SFRWQCB, 6/1999).

Groundwater was initially encountered during Phase II drilling activities at approximately 21 ft bgs and rose to stabilize at approximately 9 ft bgs within the borings. No historical groundwater gradient magnitude or direction data was available for the Site prior to the installation of monitoring wells.

1.4 Local Hydrogeology

Depth to groundwater at the Site fluctuates at least seasonally and is typically encountered between 7 to 11 ft, although it has ranged from as little as 6.80 ft (well MW-2 on 2/17/2010) to more than 11.07 ft (well MW-3 on 8/25/2009). Based on groundwater monitoring conducted by BAI since 2009, groundwater flows predominantly towards the south or southwest. During the First Quarter 2011 groundwater monitoring event the flow direction was towards the South at 0.006 ft/ft. A groundwater elevation contours map from the First Quarter 2011 groundwater monitoring event is presented as Drawing 3. Groundwater elevation data since 2009 are presented within Appendix A.

1.5 Lithology

The Site elevation is approximately 25 feet above mean sea level. According to soil boring logs from the Phase II investigation, soils encountered at the Site consisted primarily of sandy and silty clay from near ground surface to the total depth of 31 ft bgs at boring SB-6. Clayey gravel was encountered in borings SB-1 through SB-3 and SB-6 at depths ranging from six to twelve ft bgs, and in boring SB-1 and SB-2 at depths of 14 to 15 ft bgs. Some gravely sand was also observed in boring SB-3 from 12 to 16 ft bgs, in boring SB-4 from five to eight ft bgs, SB-5 from 14 to 16 ft bgs, and boring SB-6 from 7.5 to nine ft bgs. In soil boring SB-5, 10 feet of fill was observed. Due to the presence of the fill, SB-5 is within the assumed location of a former UST(s), since removed. Available soil boring logs and well construction details are provided in Appendix C.

1.6 Sensitive Receptors

In July 2011, BAI conducted a well survey by reviewing confidential well record information provided by the California Department of Water Resources (DWR). The purpose of the survey was to identify wells that may be located within a 0.5 mile radius of the Site. The DWR furnished information for a total of 155 wells in the vicinity of the Site. These wells were located in Township 2 South, Range 3 West, Sections 9, 10, 15, and 16.

Results of this sensitive receptor survey/well search indicated a total of 37 well logs were located within a 0.5 mile radius of the Site. Of the 37 wells, there are 32 environmental monitoring/remediation wells (including those at the Site), one irrigation water supply well, one industrial well, and three cathodic protection wells. The irrigation water supply well is

relatively shallow for a residential property and is 0.43 miles from the Site to the north northeast (up-gradient). The industrial water supply well is located 0.29 miles from the Site to the south (cross-gradient). Neither of the two identified water supply wells is likely to be impacted from past releases at the Site.

The closest surface water body to the Site in the downgradient direction is San Leandro Bay located approximately 1.1 miles southwest. A tributary of the open channel storm drain leading to San Leandro Bay is approximately 0.2 miles to the south-southwest.

1.7 Summary of Previous Investigations

In 1947, Richfield Oil Company purchased the property for the construction of a service station with completion taking place in 1949. The service station was operated by various Richfield Oil Company dealers from 1949 to 1970. In 1966, two 4,000 gallon and one 6,000 gallon replacement underground storage tanks (USTs) were installed on the property. Richfield Oil Company sold the property in 1971 to the Nattrass Corporation.

In May 2007, AAI Environmental Corporation (AAI) conducted a Phase I Environmental Site Assessment (ESA) on the property. Work included review of environmental and regulatory databases and site reconnaissance prior to selling the property. AAI reported that one or two USTs were previously removed from the northeast corner of the property prior to 1976, but no soil sampling data or removal report were found to confirm the information given. Sampling and reporting information was likely not required at that time. The AAI site reconnaissance reportedly did not identify potential concerns. However, AAI recommended a limited Phase II Environmental Site Assessment on the property to assess the former presence of the USTs and/or legacy environmental contamination (AAI, 5/9/2007).

In April 2008, GEOCON conducted a Limited Phase II Environmental Site investigation on the Site. Work included the advancement of six soil borings (SB-1 through SB-6) down to 31 feet below ground surface (ft bgs) at the locations shown on Drawing 2. Soil samples were collected from each boring and ground-water samples were collected from borings SB-1, SB-2, SB-3 and SB-5. Soil boring SB-1 was drilled on the backside of the property to assess the potential for off-site contaminant migration. Borings SB-2, SB-3, SB-5 and SB-6 were advanced in the area suspected of containing the former USTs. SB-4 was advanced to assess a former pump island. Soil samples from borings SB-1 through SB-6 contained Total Petroleum Hydrocarbons in the Gasoline Range (TPH-G) at concentrations up to 95 milligrams per kilogram (mg/kg) (SB-6 at 14 ft bgs), Total Petroleum Hydrocarbons in the Diesel Range (TPH-D) at concentrations up to 20 mg/kg (SB-2 at 20 ft bgs), and Total Petroleum Hydrocarbons in the Motor Oil Range (TPH-MO) at concentrations up to 51 mg/kg (SB-2 at 20 ft bgs). Grab groundwater samples from borings SB-1, SB-2, SB-3 and SB-5 contained TPH-G at concentrations up to 8.1 milligrams per liter (mg/L) (SB-3), TPH-D at concentrations up to 7.2 mg/L (SB-3), and TPH-MO at concentrations up to 0.18 mg/L (SB-5). No concentrations of Benzene, Toluene, Ethylbenzene, or Xylenes (BTEX) were detected above the laboratory reporting limits in the soil or groundwater samples collected (GEOCON, 5/7/2008).

In a letter dated 29 January 2009, ACEH requested completion of an Unauthorized Release Report (URR), and soil and groundwater investigation work plan. A URR was

submitted to ACEH on 20 February 2009. A work plan for a soil and groundwater investigation was submitted to ACEH on 30 March 2009. In a letter dated 16 April 2009, ACEH requested an addendum work plan. An addendum work plan for a soil and groundwater investigation was submitted to ACEH on 28 May 2009. In a letter dated 11 June 2009, ACEH approved the addendum work plan. BAI submitted the *Revised Soil & Ground-Water Investigation with Third Quarter 2009 Ground-Water Monitoring Report* for Station #472, located at 6415 International Boulevard, Oakland, California detailing the installation of three groundwater monitoring wells on November 17, 2009. No petroleum hydrocarbons were detected in the 20 soil samples collected during monitoring well installation activities with the exception of one sample containing Gasoline Range Organics (GRO), which was detected at a concentration of 0.87 mg/kg in boring MW-1 at 14.5 ft bgs.

1.8 Groundwater Constituents of Concern

Concentrations of Diesel Range Organics (DRO) and GRO have been decreasing in wells since initial sampling. Recent concentrations of GRO were found to be the highest in well MW-1 at 1,000 micrograms per liter (µg/L, parts per billion, ppb) during the Third Quarter 2010 sampling event. DRO concentrations were found to be highest in well MW-1 during the Second Quarter 2011 sampling event at 110 µg/L. However, when a silica gel cleanup procedure was performed, a concentration of 83 µg/L was detected. A silica gel cleanup procedure is used when a sample is suspect of containing non-petroleum organic matter that could be responsible for an elevated concentration of DRO. The silica gel contains the Si-O (Silica-Oxygen) combination within the molecule. The oxygen in this combination carries a partial negative charge, making this a polar compound. The oxygen will readily bond with positively charged hydrogen molecules forming an OH (Oxygen-Hydrogen) combination. Therefore, polar compounds bearing hydrogen atoms are good candidates for adsorption to silica gel. The breakdown of organic matter results in polar C-H (Carbon-Hydrogen) combinations that fall within the C10-C40 range of the EPA 8015 analysis. These polar compounds contrast with the non-polar C-H combinations found in diesel and motor oil. The polar components of diesel and motor oil are removed during production. The decrease in concentration indicates contamination may not be petroleum based and the resulting DRO concentration is below the SFRWQCB's Environmental Screening Level (ESL) of 100 µg/L. BTEX and MTBE have not been detected in any of the wells sampled with the exception of a concentration of 1.2 µg/L of Toulene in well MW-3 (8/25/2009) and 0.54 µg/L of MTBE in well MW-1 (8/25/2009). These two concentrations are well below the California Primary MCL for Toulene (150 µg/L) and the California Secondary MCL for MTBE (5 µg/L). Therefore the current Constituent of Concern (CoC's) is GRO.

The following table presents the previous and current constituents of concern (CoCs) as well as their respective Water Quality Objectives. BAI considers the Water Quality Objective for CoCs to be the secondary Maximum Contaminant Level (MCL), or the Primary MCL if the secondary MCL has not been established. If neither has been established, the SFRWQCB's Environmental Screening Level (ESL) is used.

Contaminant	Maximum Concentration	Water Quality Objective	Water Quality Objective Basis
TPH-G/GRO	1,000 µg/L	100 µg/L	SFRWQCB ESL
TPH-D/DRO	83 µg/L	100 µg/L	SFRWQCB ESL

1.9 Current Regulatory Status

Most recent correspondence with the ACEH granted approval to implement quarterly groundwater monitoring. This monitoring was suggested by BAI in order to establish trends in groundwater elevations, flow-directions, horizontal gradients, and contaminate concentrations. There are currently no other regulatory directives for further investigation or remediation.

According to information provided on the State's GeoTracker website, impediments to closure include the following:

- *Plume Instability – Verification Monitoring Not Complete. On July 14, 2009, three groundwater monitoring wells were installed at the site. Verification monitoring required to confirm that concentrations of dissolved phase hydrocarbons are decreasing over time from elevated levels.*
- *Other Impediments – Currently known and immediately relevant impediments to closure have been identified above in the context of this Closure Review Form. However, the impediments to closure identified above do not comprehensively describe the full scope of work that may be necessary to achieve case closure nor do they necessarily represent the full range of conditions to be evaluated on a site-specific basis during case closure review. In addition, as more information becomes available during progress of the case, additional impediments to closure may become known.*

2. ENVIRONMENTAL CONDITIONS

2.1 Extent of Groundwater Impact

As noted in Section 1.8 above, the groundwater CoC is GRO. The GRO in groundwater is concentrated around the former UST's and pump dispenser with the highest recent concentration in MW-1 at 1,000 µg/L during the Third Quarter 2010 sampling event. Wells down-gradient to the south of the assumed location of the former USTs have had low detections or been non-detect for CoCs. It is determined that the contaminant plume for GRO is fully delineated, and restricted to the area surrounding the former USTs and pump dispenser. A groundwater analytical summary map including groundwater gradients from the First Quarter 2011 monitoring/sampling event is provided as Drawing 3. A groundwater analytical summary map from the Third Quarter 2011 monitoring/sampling event is provided as Drawing 4. A summary of historic groundwater concentration results are provided in Appendix A.

2.2 Extent of Soil Impact

Soil investigations have been performed around the former fuel dispenser islands on the east and northeast side of the former station building, where the former USTs were suspected to have been located on the northeast and west side of the property, and down-gradient of the former USTs and fuel dispenser islands along the southwest border of the site.

In 1966, two 4,000 gallon and one 6,000 gallon replacement USTs were installed on the property. Soil samples were not collected (they were not likely required at the time). In AAI Environmental Corporation's (AAI) Phase I Environmental Site Assessment (ESA), they reported that one or two USTs were previously removed from the northeast corner of the property prior to 1976, but no soil sampling data or removal report were found to confirm the information given. Sampling and reporting information was likely not required at that time.

In April 2008, GEOCON conducted a Limited Phase II environmental investigation on the Site. Work included the advancement of six soil borings (SB-1 through SB-6) down to 31 feet. Soil boring SB-1 was drilled on the backside of the property to assess the potential for contaminant migration. Borings SB-2, SB-3, SB-5 and SB-6 were advanced in the area suspected of containing the former USTs. SB-4 was advanced to assess a former pump island. BTEX compounds were reported as non-detect in all soil samples collected. TPH-D and TPH-MO were reported in all but one soil sample (SB-3 20') submitted for laboratory analysis. The detected TPH-D concentrations ranged from 1.5 mg/kg in the 20-foot soil sample collected at SB-6 to 20 mg/kg in the 20-foot soil sample collected at SB-2. TPH-MO concentrations in soil ranged from 1.6 mg/kg in the 20-ft soil sample collected at SB-3 to 6.3 mg/kg in the 16-foot soil sample collected from SB-5. TPH-G was detected in three of the ten soil samples submitted for analysis. TPH-G was reported at a concentration of 7.3 mg/kg in the 15-foot soil sample collected from SB-1, 21 mg/kg in the 15-foot soil sample collected from SB-2, and 95 mg/kg in the 14 foot soil sample collected from SB-6.

On 14 July 2009, Stratus Environmental field personnel observed RSI Drilling Company advance three soil borings (MW-1, MW-2, and MW-3) to total depths of 17 ft bgs. Physical soil samples were collected at specific depths for laboratory analysis as recommended in the work plan, based on field observations, and the recommendations from ACEH. The tested analytes were not detected above their respective reporting limits in the 20 soil samples collected for laboratory analysis with the exception of one sample containing GRO, which was detected at a concentration of 0.87 mg/kg in boring MW-1 at 14.5 ft bgs. Based on laboratory results and visual and olfactory observations during boring advancement at each location, petroleum hydrocarbon impacted soil and groundwater does not appear to be present from ground surface to total depth explored, approximately 17 ft bgs.

3. TECHICAL JUSTIFICATION FOR NO FURTHER ACTION

Because groundwater is relatively shallow and the soil impacts limited in extent and magnitude, we can infer that the contaminant mass in soil above the groundwater table is not appreciable, and the potential for further leaching is limited.

Vapor intrusion into the Station Building is not thought to be a viable exposure pathway of concern for the conditions present at this Site. There is approximately 8-10 feet of essentially clean/non-impacted soil in the vadose zone under the Station Building. Numerous studies have indicated that significant bio-attenuation of vapors occurs and the vapor intrusion to the indoor air pathway is not likely to be complete for petroleum vapors if there are at least five feet of clean coarse-grained soil or two feet of fine-grained soil overlying the contaminant source (R. Davis 2005 & 2006, G.B. Davis et al 2009, McHugh et al 2010). Current draft guidance indicates there is no need to assess the vapor intrusion pathway with low concentrations of dissolved petroleum hydrocarbons in groundwater and greater than five feet separation between a contaminant source and building. According to SWRCB draft guidance, there have been no published examples of petroleum vapor intrusion for this condition and modeling studies indicate bio-attenuation will limit the potential for vapor intrusion (SWRCB, 2010).

Constituents of Concern have been adequately delineated to concentrations below laboratory reporting limits in wells down-gradient of the Site. BAI believes that the adverse effect of Site contaminants on shallow groundwater will be minimal and localized, and there will be no adverse effect on the groundwater contained in deeper aquifers, given the physical and chemical characteristics of petroleum constituents, the hydrogeological characteristics of the groundwater and direction of groundwater flow.

Numerous studies of the fate and transport of petroleum hydrocarbons and fuel oxygenates have been performed, including the Lawrence Livermore Reports (Lawrence Livermore National Laboratories, 1995 & 1998) and the 2004 Los Angeles Area Petroleum Hydrocarbon and Fuel Oxygenate Study (Shih et al, 2004). These studies indicate that unabated, petroleum hydrocarbon and MTBE groundwater plumes reach a maximum length before the processes of natural attenuation, diffusion, advection, and dispersion reduce the concentration to Water Quality Objectives or levels adequately protective of human health. The 1995 and 1998 Lawrence Livermore Reports indicate that the lateral dimensions of most (non-MTBE) LUFT sites do not exceed more than a few hundred feet, and that in 90% of cases, the Benzene concentration had decreased to below 1 mg/L within 400 feet of the source area. The 2004 Los Angeles Study indicated that the longest MTBE plume length observed (5 µg/L) was approximately 1,040 feet, and that 90% of MTBE cases resulted in a plume length of 540 feet or less.

Additionally, according to a study by the California Leaking Underground Fuel Tank Task Force conducted in 2009 (Chinn, 2009), it is recognized that domestic drinking water wells are not commonly being installed in urban areas already served by municipal drinking water sources. Typically municipal wells are installed at a greater depth and with a more robust sanitary seal. This implies that in areas already serviced by municipal sources, groundwater in shallow water bearing zones is not likely to be used for drinking water purposes except in the immediate vicinity of any already existing wells. Releases from petroleum USTs typically only impact the shallowest water bearing zones and therefore should not be prevented from case closure unless it can be reasonably expected that Water Quality Objectives will not be met prior to impacting existing or potential future wells.

Because the Site is located in an area already serviced by public water supply system, it is not reasonably expected that new drinking water wells will be installed in the vicinity of the Site. If a municipal well were to be installed, it is unlikely to draw from shallow groundwater, and the well's sanitary seal would protect against the incursion of contaminants into the well.

If further investigation and remediation are not warranted at the Site, then long-term groundwater monitoring serves no useful purpose.

4. QUALIFICATION AS LOW RISK CASE

Broadbent & Associates, Inc. recognizes that SWRCB Resolution 68-16 (*Statement of Policy with Respect to Maintaining High Quality of Waters in California*), Resolution 88-63 (*Sources of Drinking Water*), and Resolution 92-49 (*Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under Water Code Section 13304*) require the cleanup of unauthorized releases to background concentrations or the highest water quality protective of the designated beneficial uses. However, BAI believes that the environmental case at the subject Site should be granted No Further Action status at this time for numerous technical and regulatory reasons. These reasons are outlined in the following sections.

4.1 Qualification as a Low-Risk Environmental Case

On December 8, 1995, Mr. Walt Pettit, SWRCB Executive Director, issued an advisory to the Regional Water Quality Control Boards indicating that oversight agencies should proceed aggressively to close low risk cases. *Supplemental Instructions to State Water Board December 8, 1995, Interim Guidance on Required Cleanup at Low Risk Fuel Sites*, prepared by SFRWQCB on January 5, 1996 defined and explained low-risk criteria for environmental UST cases. These low-risk criteria are presented below, with justification why each criteria element is satisfied:

1) ***The leak has been stopped and ongoing sources, including free product, removed or remediated to the extent practicable.*** The former USTs, fuel dispensers, and piping have been removed prior to 1976. Free-phase product (FPP) has not been observed in on-site soil borings or wells. There is no evidence of an ongoing release. As such, this criterion is satisfied.

2) ***The Site has been adequately characterized.*** For this environmental case, the lateral extent of CoCs in groundwater is delineated cross-gradient and down-gradient by the existing monitoring well network. Constituents of concern have been delineated to concentrations below Water Quality Objectives in downgradient well MW-3. Based on Site reports it appears that the bulk of petroleum hydrocarbon impacts to soil reported in the suspected vicinity of the former USTs, dispenser islands, and product piping were removed by over-excavation prior to 1976. Borings SB-2, SB-3, and SB-5 exhibited the presence of a minimum of 15 feet of essentially clean/non-impacted vadose zone soil above the groundwater table in the suspected area of the former dispenser island, UST excavation, and on the

west side of the former Station Building. It is not necessary to perform a Vapor Intrusion Assessment as there is no basis from historic studies and guidance.

3) ***The dissolved hydrocarbon plume is not migrating.*** The wells on-site show a decreasing trend in concentrations for CoCs. TPHg/GRO and TPHd/DRO have not been detected in well MW-3 down-gradient of the believed source of contamination since September 2010. BTEX has not been detected in well MW-3, with the exception of Toluene at a concentration of 1.2 µg/L in August of 2009. It is important to note that the absence of BTEX constituents indicates aged and degraded contamination.

4) ***No water wells, deeper drinking water aquifers, surface water, or other sensitive receptors are likely to be impacted.*** A water well survey was conducted by BAI in July 2011. This survey concluded that one irrigation well was located within 2,640 feet (0.5 miles) of the Site. Based on the results of the well survey, it is unlikely that the ground-water contamination associated with the Site poses a potential threat to the well. The irrigation well is approximately 2270 feet up-gradient and to the north-northeast of the Site. The well was completed in 1977 at a total depth of 102 feet. The screen interval extends from 40 feet bgs (below ground surface) to 100 feet bgs. The well is located on a residential property and it is unknown if it is still providing water for irrigation. Due to the distance from the Site, depth of the irrigation well, and the gradient of the ground water, it is unlikely the contamination associated with the Site poses a threat to the irrigation well.

5) ***The Site presents no significant risk to human health.*** The absence of GRO, DRO, and BTEX in shallow vadose zone soils collected from boring SB-2 and SB-5 indicates the potential for vapor intrusion into the Station Building is extremely unlikely. No water supply wells are likely to be impacted now or in the foreseeable future. Therefore, BAI believes that the Site presents no significant risk to human health and that no further investigation is warranted.

6) ***The Site presents no significant risk to the environment.*** The closest down-gradient surface water body is San Leandro Bay located approximately 1.1 miles southwest. Due to the distance of this water body from the Site, it is not reasonably anticipated that groundwater from beneath the Site would affect this receptor.

4.2 Qualification as Low-Risk Case Based on Groundwater Concentration

On May 19, 2009 the SWRCB formed the UST Cleanup Program Task Force under Resolution 2009-0042. The task force was directed to make recommendations to improve the UST cleanup regulatory program, including additional approaches to risk-based cleanup. The Task Force Final Report (January 13, 2010) included a recommendation that cases be considered for low-risk closure if the concentration of petroleum hydrocarbons and fuel oxygenates in groundwater are below the following levels:

- 10 mg/L for TPH-G and TPH-Diesel;
- 1 mg/L for each of the individual petroleum constituents;
- 0.5 mg/L for each of the individual oxygenates.

It is understood that while these criteria cannot be uniformly applied to all sites, in "the vast majority of cases," unless an existing water well or surface water body is located within 1,000 feet of the source area in the down-gradient direction, cases that exhibit concentrations similar to those established above should be considered strong candidates for low-risk closure. It is also noted that "[i]n cases where the TPH concentration is high, but MTBE and Benzene concentrations are low or not present above laboratory detection limits, the case should be considered to be low-risk irrespective of the TPH concentration."

In the subject case, GRO and DRO are detected at relatively low concentrations and display a decreasing trend over time. The BTEX and MTBE have not been detected above the laboratory reporting limits with the exception of 0.54 µg/L MTBE in MW-1 and 1.2 µg/L Toluene in MW-3 during the Third Quarter 2009 sampling event. The highest recent concentrations of GRO (1,000 µg/L in MW-1), and DRO (83 µg/L in MW-1) are several orders of magnitude below the criteria threshold listed above of 10 mg/L (10,000 µg/L) for GRO and DRO. Therefore, the Site case is considered to be a strong candidate for low-risk closure.

4.3 Achievement of Water Quality Objectives Being Met Before Resource Is Used

The SWRCB Resolution 92-49 sets forth the policies and procedures for the investigation and cleanup of discharges from leaking UST cases. Resolution 92-49 does not require, however, that the Water Quality Objectives be met at the time of site closure. Even if the requisite level of water quality has not yet been attained, a site may be closed if the level will be attained within a reasonable time frame. SWRCB Water Quality Order 98-04 (Matthew Walker) explicitly interprets a "reasonable time frame" as "anywhere from a couple of decades to hundreds of years." The Matthew Walker petition further states "…[I]f complete removal of detectable traces of petroleum hydrocarbon constituents become the standard for UST corrective actions, the statewide technical and economic implications will be enormous."

The SWRCB Resolution 2009-042 states that "[i]t is the responsibility of Regional Water Boards, LOP agencies, and other local agencies to close UST cases that are ready for closure." This resolution further states "[i]n previous decisions, the State Water Board, when determining a reasonable period, has considered all relevant factors including, but not limited to, existing and anticipated beneficial uses of water." Resolution 2009-081 further clarifies this issue by stating that "[i]n the orders issued by the State Water Board regarding UST case closure, several factors relevant to the particular UST case were considered, such as: (1) whether remaining petroleum constituents would migrate beyond the limited spatial extent, (2) the presence and location of drinking water wells in the area, (3) the likelihood that the impacted groundwater will be used as a source of drinking water in the reasonably foreseeable future, and (4) the protective nature of standard well-construction practices."

The SWRCB Resolution 2009-042 makes it clear that the decisional framework used in previous UST closure orders interpreted a "reasonable time frame" to be the amount of time before the resource is actually used, based on *existing* or *anticipated* beneficial use. SWRCB Resolution 2009-081 clarifies that the decisional framework in UST closure orders contemplate whether the impacted groundwater will be used as a source of *drinking water* in the *foreseeable future*. These Resolutions indicate that closure policy based on "potential

beneficial use" or "possible future beneficial use" is inappropriate. These Resolutions indicate that the decisional framework previously used by SWRCB when considering UST closure is based on "existing" beneficial use, or "anticipated beneficial use within the foreseeable future." SWRCB Resolution 2009-081 resolves that "[w]hen considering whether a UST cleanup case should be closed, Agencies shall apply the decisional framework established in previous State Water Board UST closure orders."

One or more petroleum constituents (DRO, GRO) have been detected in groundwater from on-site wells MW-1 and MW-3 at concentrations slightly above the Water Quality Objective (SFRWQCB ESL). However, this occurrence is of low concentration, displaying a decreasing trend over time, and highly localized within the suspected vicinity of the former UST complex. They have not been detected in the downgradient well MW-3 since September 2010.

The first step when evaluating whether Water Quality Objectives will be met (due to natural attenuation processes) within a reasonable time frame is to perform statistical analysis to demonstrate whether contaminant concentrations are declining with respect to time. For the purposes of this evaluation, BAI utilizes a Mann-Kendall trend test followed by a logarithmic regression analysis. However, due to lack of detections of contaminants as well as sampling points, there is not enough data to execute trend analysis. Observing the given data, natural attenuation seems to have, and continues to take place. Concentrations have been non-detect for the CoCs for the past two sampling events, with the exception of a concentration of 83 µg/L of DRO during the Third Quarter 2011 sampling event and a concentration of 53 µg/L of GRO during the First Quarter 2011 sampling event, both of which are below the SFRWQCB ESL. There has been no detection of BTEX since a 1.2 µg/L concentration of Toluene during the Third Quarter 2009 sampling event. It is important to note that an absence of BTEX concentrations indicated aged and degraded contamination. As such, it is believed that Water Quality Objectives will be reached within a 'reasonable time frame' without the need for active remediation.

5. BENEFIT OF ADDITIONAL WORK

While the concentration of the single current CoC (DRO) is currently above the Water Quality Objective, the concentration is significantly low and the impact is limited in extent. The lateral extent of the CoCs in groundwater has been adequately delineated for the purposes of low-risk closure. The plume appears to be stable and is not expected to migrate. Based on the available Site data, the contaminant plume does not appear to represent a significant threat to existing or reasonably anticipated beneficial uses in the foreseeable future. The potential for vapor intrusion and exposure to Station Building occupants is considered highly unlikely and current guidance recommends against the necessity of vapor intrusion assessment for the situational conditions present at the Site. The Site appears to be adequately characterized and no further investigation appears to be warranted to evaluate potential impacts to human health or environmental receptors.

If Atlantic Richfield Company were to pursue active remediation of the DRO contaminant plume at the Site, a likely remedial approach would be the implementation of enhanced anerobic biodegradation or abiotic biodegradation using a reaction with Iron(II) Sulfide minerals. This type of system would require the installation of remediation system

infrastructure, equipment, and ongoing operations and maintenance for perhaps an extended period of time before concentrations would be below laboratory reporting limits. While pursuing the installation and operation of such a system would be a significant cost, it is not expected that installation and operation of such a system would confer appreciable benefit to human health or the environmental receptors. As noted in Water Quality Order 98-04, "[i]f the complete removal of detectable traces of petroleum hydrocarbon constituents becomes the standard for UST corrective actions, the statewide technical and economic implications will be enormous." As such, it appears that the Site-specific benefit of additional work, if any, is dwarfed by the cost and statewide implications for corrective action.

6. CLOSURE RECOMMENDATION

This Request for No Further Action presents a summary of the current environmental status of the Site, as well as rationale justifying case closure both from technical and regulatory perspectives. In addition to the technical and regulatory justification, there are strong economic reasons for closing the case. Maintaining a backlog of open low-risk environmental cases diverts available funding from cases with significantly greater threat to human health and the environment. By closing low-risk environmental cases, the available funding for the investigation and remediation of environmental cases with significantly greater threat to human health and the environment can be increased, which will, in turn accelerate the cleanup of UST cases within Alameda County and statewide.

Further investigation of the Site is not necessary to ensure that human health and the environment are protected since the plume already appears to be stable and that Water Quality Objectives will be met within a reasonable time frame. Active remediation of the existing contaminants cannot be justified from a technical or economic perspective since the constituent of concern DRO have been documented to degrade naturally to the Water Quality Objective within a reasonable time frame. If further investigation and remediation are not warranted at the Site, then long term groundwater monitoring serves no beneficial purpose. It is recommended that Atlantic Richfield Company formally request that No Further Action status be granted at this time for ACEH Environmental Case #RO0002982.

7. LIMITATIONS

The findings presented in this report are based upon observations of field personnel, points investigated, results of laboratory tests performed by various laboratories, and our understanding of SWRCB, RWQCB and ACEH requirements. Our services were performed in accordance with the generally accepted standard of practice at the time this report was written. No other warranty, expressed or implied was made. This report has been prepared for the exclusive use of the Atlantic Richfield Company. It is possible that variations in soil or groundwater conditions could exist beyond points explored in this investigation. Also, changes in site conditions could occur in the future due to variations in rainfall, temperature, regional water usage, or other factors.

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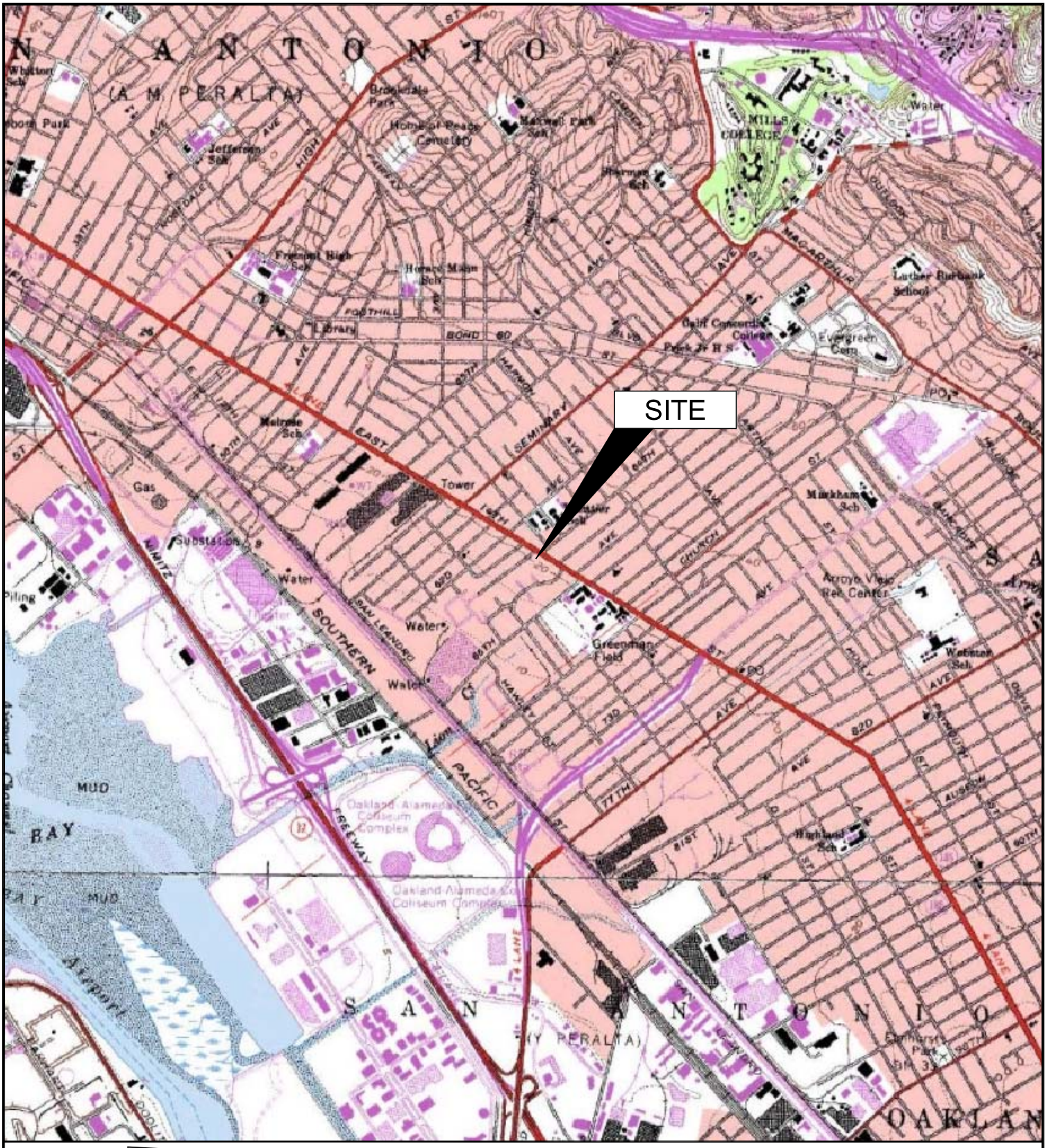


N

0 2000 4000

APPROXIMATE SCALE (ft)

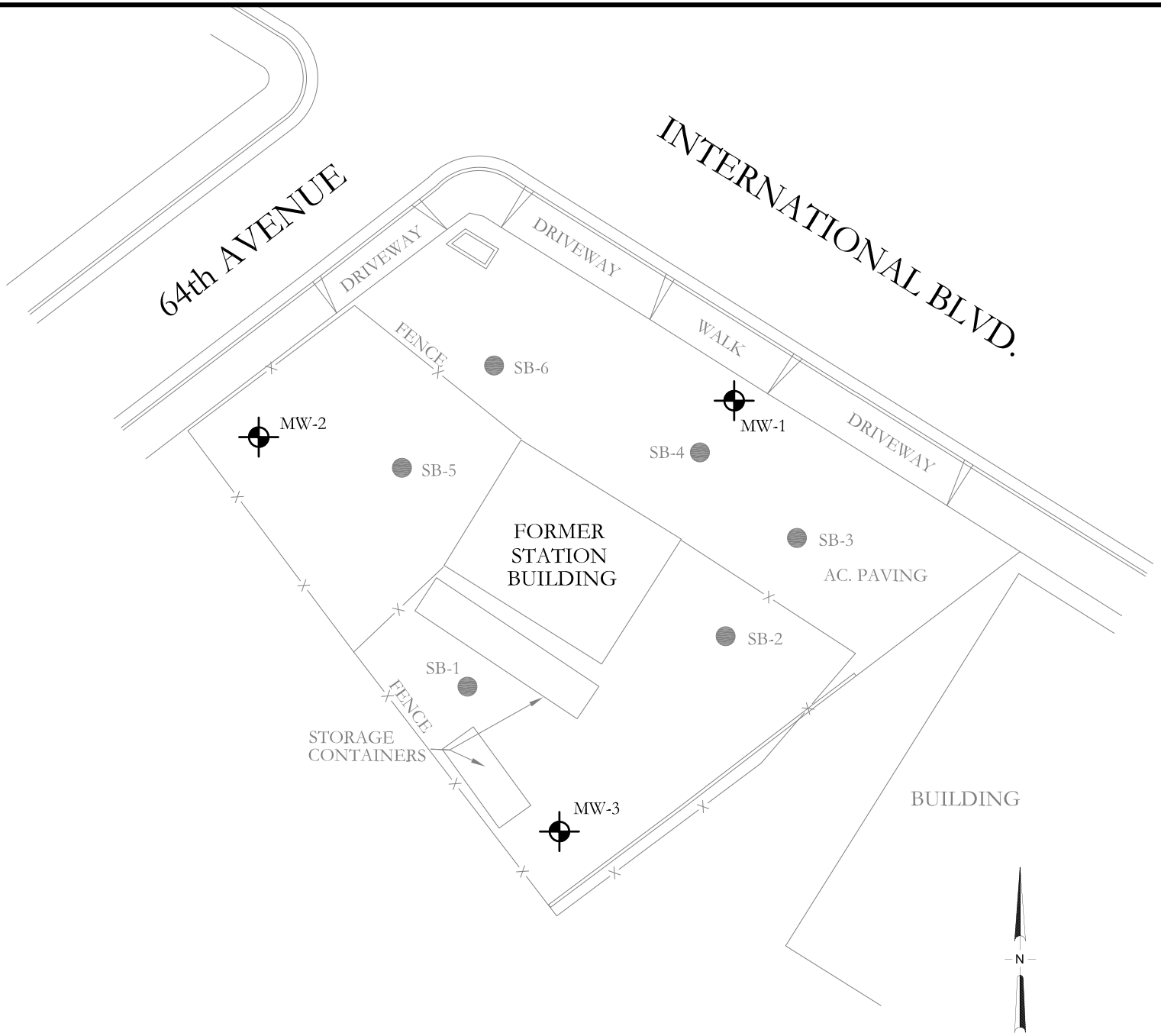
IMAGE SOURCE: USGS

BROADBENT & ASSOCIATES, INC.
ENGINEERING, WATER RESOURCES & ENVIRONMENTAL
1324 Mangrove Ave. Suite 212, Chico, CA 95926
Project No.: 09-88-601 Date: 07/31/09

Former Station #472
6415 International Boulevard
Oakland, California

Site Location Map

Drawing
1



LEGEND

- MONITORING WELL
- SOIL BORING

0 30 60

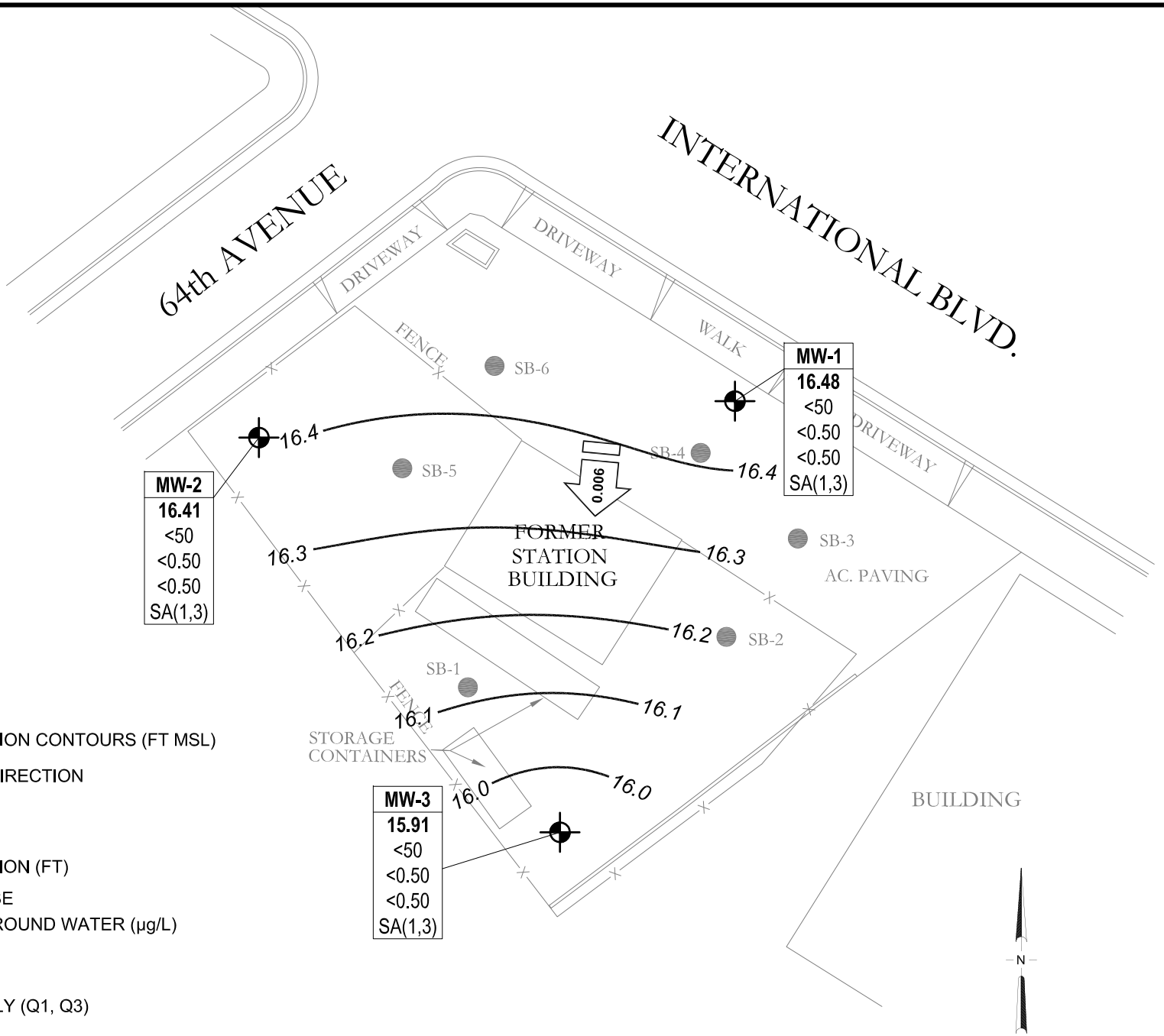
SCALE (ft)

BROADBENT & ASSOCIATES, INC.
ENGINEERING, WATER RESOURCES & ENVIRONMENTAL
1324 Mangrove Ave. Suite 212, Chico, California
Project No.: 09-88-601 Date: 4/21/2011

Former Station #472
6415 International Boulevard
Oakland, California

Site Layout Plan

Drawing
2



LEGEND

- MONITORING WELL
- SOIL BORING
- 16.0 GROUNDWATER ELEVATION CONTOURS (FT MSL)
- 0.006 GROUNDWATER FLOW DIRECTION AND GRADIENT (FT/FT)

Well	WELL DESIGNATION
ELEV	GROUNDWATER ELEVATION (FT)
GRO	GRO, BENZENE AND MTBE CONCENTRATIONS IN GROUND WATER (µg/L)
Benzene	
MTBE	
Q/SA/A	SAMPLING FREQUENCY

SA(1,3) SAMPLED SEMI-ANNUALLY (Q1, Q3)

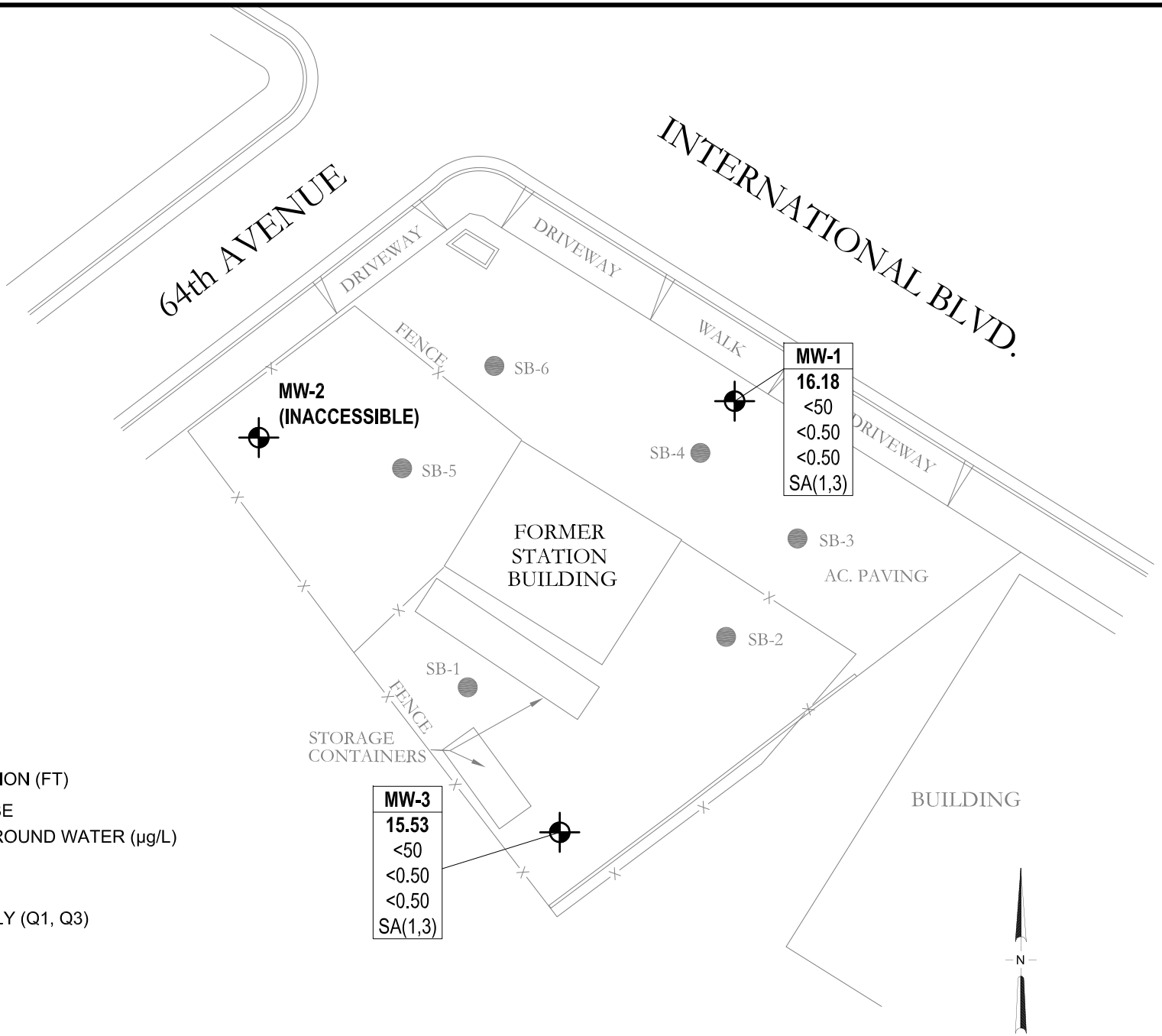
0 30 60
SCALE (ft)

BROADBENT & ASSOCIATES, INC.
ENGINEERING, WATER RESOURCES & ENVIRONMENTAL
1324 Mangrove Ave. Suite 212, Chico, California
Project No.: 09-88-601 Date: 4/21/2011

Former Station #472
6415 International Boulevard
Oakland, California

Groundwater Elevation Contours
and Analytical Summary Map
8 February 2011

Drawing
3



LEGEND

- MONITORING WELL
- SOIL BORING

Well	WELL DESIGNATION
ELEV	GROUNDWATER ELEVATION (FT)
GRO Benzene MTBE	GRO, BENZENE AND MTBE CONCENTRATIONS IN GROUND WATER (µg/L)
Q/SA/A	SAMPLING FREQUENCY
SA(1,3)	SAMPLED SEMI-ANNUALLY (Q1, Q3)

0 30 60
SCALE (ft)

BROADBENT & ASSOCIATES, INC.
ENGINEERING, WATER RESOURCES & ENVIRONMENTAL
1324 Mangrove Ave. Suite 212, Chico, California
Project No.: 09-88-601 Date: 8/16/2011

Former Station #472
6415 International Boulevard
Oakland, California

Groundwater Elevation and
and Analytical Summary Map
18 July 2011

Drawing
4

APPENDIX A

HISTORIC GROUNDWATER ELEVATION AND ANALYTICAL DATA

Table 1. Summary of Groundwater Monitoring Data: Relative Water Elevations and Laboratory Analyses

ARCO Service Station #472, 6415 International Boulevard, Oakland, CA

Well ID and Date Monitored	P/NP	TOC Elevation (feet)	DTW (feet)	Product Thickness (feet)	Water Level Elevation (feet)	Concentrations in µg/L								DO (mg/L)	pH	Footnote
						GRO/ TPHg	DRO/ TPHd	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	MtBE	TOG			
MW-1																
8/25/2009	P	24.17	9.29	0.00	14.88	530	190	<0.50	<0.50	<0.50	<0.50	0.54	--	--	7.21	LX (DRO)
11/11/2009	NP		8.22	0.00	15.95	<50	--	<0.50	<0.50	<0.50	<0.50	<0.50	--	--	--	
2/17/2010	NP		7.36	0.00	16.81	<50	70	<0.50	<0.50	<0.50	<0.50	<0.50	--	1.69	7.03	LX (DRO)
6/2/2010	NP		7.61	0.00	16.56	110	120	<0.50	<0.50	<0.50	<0.50	<0.50	--	1.21	7.0	LW (GRO), LX (DRO)
9/3/2010	NP		8.99	0.00	15.18	1,000	190	<0.50	<0.50	<0.50	<0.50	<0.50	--	0.74	7.30	LW (GRO), LX (DRO)
2/8/2011	NP		7.69	0.00	16.48	<50	53	<0.50	<0.50	<0.50	<0.50	<0.50	--	0.64	6.8	LX (DRO)
7/18/2011	**NP**		**7.99**	**0.00**	**16.18**	**<50**	**110**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**--**	**0.70**	**7.2**	**LX (DRO)**
MW-2																
8/25/2009	P	23.62	9.65	0.00	13.97	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	--	7.30	
11/11/2009	NP		8.09	0.00	15.53	<50	--	<0.50	<0.50	<0.50	<0.50	<0.50	--	--	--	
2/17/2010	P		6.80	0.00	16.82	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	2.62	7.15	
6/2/2010	NP		7.11	0.00	16.51	<50	65	<0.50	<0.50	<0.50	<0.50	<0.50	--	2.85	7.3	LX (DRO)
9/3/2010	NP		8.79	0.00	14.83	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	1.19	7.90	
2/8/2011	NP		7.21	0.00	16.41	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	2.15	7.0	
7/18/2011	**--**		**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**Inaccessible**
MW-3																
8/25/2009	P	24.73	11.07	0.00	13.66	63	85	<0.50	1.2	<0.50	<0.50	<0.50	--	--	7.09	
11/11/2009	NP		9.56	0.00	15.17	88	--	<0.50	<0.50	<0.50	<0.50	<0.50	--	--	--	LW (GRO)
2/17/2010	NP		8.52	0.00	16.21	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	2.04	7.09	
6/2/2010	NP		8.64	0.00	16.09	100	130	<0.50	<0.50	<0.50	<0.50	<0.50	--	1.22	7.1	LW (GRO), LX (DRO)
9/3/2010	NP		8.41	0.00	16.32	200	140	<0.50	<0.50	<0.50	<0.50	<0.50	--	0.87	6.9	LW (GRO), LX (DRO)
2/8/2011	NP		8.82	0.00	15.91	<50	<50	<0.50	<0.50	<0.50	<0.50	<0.50	--	0.88	7.0	
7/18/2011	**NP**		**9.20**	**0.00**	**15.53**	**<50**	**<50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**--**	**0.93**	**6.9**	

Symbols & Abbreviations:
--- = Not analyzed/applicable/measured/available
< = Not detected at or above specified laboratory reporting limit
DO = Dissolved oxygen
DRO = Diesel range organics
DTW = Depth to water in ft bgs
GRO = Gasoline range organics, range C4-C12
GWE = Groundwater elevation measured in ft
HVOC = Halogenated volatile organic compounds
mg/L = Milligrams per liter
MTBE = Methyl tert-butyl ether
NP = Well not purged prior to sampling
P = Well purged prior to sampling
TOC = Top of casing measured in ft
TOG = Total oil and grease
TPH-d = Total petroleum hydrocarbons as diesel
TPH-g = Total petroleum hydrocarbons as gasoline
µg/L = Micrograms per liter
CEL = CalScience Environmental Laboratories, Inc.

Footnotes:
LW = Quantitation of unknown hydrocarbon(s) in sample based on gasoline
LX = Quantitation of unknown hydrocarbon(s) in sample based on diesel

Table 2. Summary of Fuel Additives Analytical Data

ARCO Service Station #472, 6415 International Boulevard, Oakland, CA

Well ID and Date Monitored	Concentrations in µg/L								Footnote
	Ethanol	TBA	MTBE	DIPE	ETBE	TAME	1,2-DCA	EDB	
MW-1									
8/25/2009	<300	<10	0.54	<0.50	<0.50	<0.50	<0.50	<0.50	
11/11/2009	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/17/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
6/2/2010	<50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.72 µg/L sec-Butylbenzene, 1.4 µg/L tert-Butylben
9/3/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/8/2011	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
7/18/2011	**<300**	**<10**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	
MW-2									
8/25/2009	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
11/11/2009	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/17/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
6/2/2010	<50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
9/3/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/8/2011	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
7/18/2011	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**Inaccessible**
MW-3									
8/25/2009	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
11/11/2009	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/17/2010	<300	<20	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
6/2/2010	<50	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
9/3/2010	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
2/8/2011	<300	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
7/18/2011	**<300**	**<10**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	**<0.50**	

Symbols & Abbreviations:
-- = Not analyzed/applicable/measured/available
< = Not detected at or above specified laboratory reporting limit
1,2-DCA = 1,2-Dichloroethane
DIPE = Di-isopropyl ether
EDB = 1,2-Dibromoethane
ETBE = Ethyl tert-butyl ether
MTBE = Methyl tert-butyl ether
TAME = tert-Amyl methyl ether
TBA = tert-Butyl alcohol
µg/L = Micrograms per Liter

Notes:
All volatile organic compounds were analyzed using EPA Method 8260B

Table 3. Historical Groundwater Gradient - Direction and Magnitude

ARCO Service Station #472, 6415 International Boulevard, Oakland, CA

Date Measured	Approximate Gradient Direction	Approximate Gradient Magnitude (ft/ft)
8/25/2009	Southwest	0.01
11/11/2009	South-Southwest	0.008
2/17/2010	South	0.006
6/2/2010	South	0.003
9/3/2010	North-Northwest	0.015
2/8/2011	South	0.006
7/18/2011	**(a)**	**(a)**

Footnotes:

a = Groundwater gradient unable to be calculated due to MW-2 being inaccessible

APPENDIX B

HISTORIC SOIL ANALYTICAL DATA

Table 1
Summary of Soil Sample Results
Plucky's Liquors / Former Gasoline Station
6415 International Blvd.
Oakland, California

Borehole Location	Collection Date	Depth (feet bgs)	TPHg (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)	Benzene (ug/kg)	Toluene (ug/kg)	Ethylbenzene (ug/kg)	Total Xylenes (ug/kg)
SB-1	4/22/2008	15	7.3	6.3	5.5	<5.0	<5.0	<5.0	<15
SB-2	4/22/2008	16	21	2.6	3.5	<5.0	<5.0	<5.0	<15
SB-2	4/22/2008	20	<1.0	20	51	<5.0	<5.0	<5.0	<15
SB-3	4/22/2008	13	<1.0	5.8	5.8	<5.0	<5.0	<5.0	<15
SB-3	4/22/2008	20	<1.0	<1.0	1.6	<5.0	<5.0	<5.0	<15
SB-4	4/22/2008	8	<1.0	4.6	6.2	<5.0	<5.0	<5.0	<15
SB-5	4/22/2008	16	<1.0	7.6	6.3	<5.0	<5.0	<5.0	<15
SB-6	4/22/2008	14	95	7.8	4.4	<25	<25	<25	<75
SB-6	4/22/2008	20	<1.0	1.5	4.0	<5.0	<5.0	<5.0	<15
SB-6	4/22/2008	31	<1.0	3.2	2.7	<5.0	<5.0	<5.0	<15

Table 2
Summary of Grab Groundwater Sample Results
Plucky's Liquors / Former Gasoline Station
6415 International Blvd.
Oakland, California

Borehole Location	Collection Date	Depth (feet bgs)	TPHg (mg/l)	TPHd (mg/l)	TPHmo (mg/l)	Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Total Xylenes (ug/l)
SB-1	4/22/2008	21	0.080	0.076	0.11	<0.50	<0.50	<0.50	<1.5
SB-2	4/22/2008	21	1.5	0.71	0.13	<0.50	<0.50	<0.50	<1.5
SB-3	4/22/2008	26	8.1	7.2	0.15	<5.0	<5.0	<5.0	<15
SB-5	4/22/2008	14	0.14	0.11	0.18	<0.50	<0.50	<0.50	<1.5

NOTES:
TPHg- Total Petroleum Hydrocarbons as Gasoline
TPHd - Total Petroleum Hydrocarbons as Diesel
TPHmo - Total Petroleum Hydrocarbons as Motor Oil
mg/kg- Milligrams per kilogram
ug/kg- Micrograms per kilogram
mg/l - Milligrams per liter
ug/l - Micrograms per liter

Table 1. Summary of Soil Sampling Analytical Data
Station #472, 6415 International Boulevard, Oakland, CA

Sample ID	Sample Depth (ft)	Date Sampled	DRO/ TPHd	ORO/ TPHo	GRO/ TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes
			Concentrations in (mg/kg)						
MW-1 6.5'	6.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-1 8'	8.0	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-1 9.5'	9.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-1 11'	11.0	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-1 12.5'	12.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-1 14.5'	14.5	7/14/2009	ND <5.0	ND <25	**0.87**	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-2 6.5'	6.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-2 8'	8.0	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-2 9.5'	9.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-2 11'	11.0	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-2 12.5'	12.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-2 14.5'	14.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-2 17'	17.0	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-3 6.5'	6.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-3 8'	8.0	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-3 9.5'	9.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-3 11'	11.0	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-3 12.5'	12.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-3 14.5'	14.5	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010
MW-3 17'	17.0	7/14/2009	ND <5.0	ND <25	ND <0.50	ND <0.0010	ND <0.0010	ND <0.0010	ND <0.0010

ND = Not Detected above the laboratory detection limit
DRO/TPHd = Diesel Range Organics/Total Petroleum Hydrocarbons in the diesel range (C10-C28)
ORO/TPHo = Oil Range Organics/Total Petroleum Hydrocarbons in the oil range (C17-C44)
GRO/TPHg = Gasoline Range Organics/Total Petroleum Hydrocarbons in the gasoline range (C6-C12)
mg/kg = milligrams per killogram

APPENDIX C

SOIL BORING AND WELL CONSTRUCTION LOGS

PROJECT NO. E8448-06-01

BORING NO. SB-1

DATE DRILLED 4/22/08 WATER LEVEL (ATD) _____

EQUIPMENT GEOPROBE DRILLER En Prob

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO	LITHOLOGY	SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				**ASPHALT AND BASE ROCK**		
2				Stiff, moist, black, fine Sandy CLAY, low to medium plasticity, no odor	CL	
3						
4						
5						
6						
7				Stiff, moist, olive, medium Sandy CLAY, low plasticity, no odor	CL	
8				Dense, moist to very moist, olive, Clayey coarse angular	GC	
9				▽ GRAVEL, no odor		
10						
11						
12				Stiff, moist, yellowish red with light green, Sandy CLAY, low to medium plasticity, no odor	CL	
13						
14				Dense, moist, pale green, Clayey GRAVEL, with coarse angular sand, slight plasticity, slight odor	GC	
15				Firm to soft, moist, brown, Silty CLAY, low to medium plasticity, no odor	CL	
16						
17						
18						
19						
20						
21				▼ Soft, very moist, brown, Silty CLAY, with interbedded clayey fine sand, low to medium plasticity, no odor	CL	
22						
23						
24				BORING TERMINATED AT 24 FEET		

Figure 1, Log of Boring SB-1, page 1 of 1

ENV_NO_WELL PLUCKYS BORINGS.GPJ 05/06/08

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS

PROJECT NO. E8448-06-01

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	BORING NO. SB-2 DATE DRILLED 4/22/08 WATER LEVEL (ATD) EQUIPMENT GEOPROBE DRILLER En Prob SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				ASPHALT		
2				Stiff, moist, black, fine Sandy CLAY, low to medium plasticity, no odor	CL	
3						
4						
5						
6						
7				Stiff, moist, olive, medium Sandy CLAY, low plasticity, no odor	CL	
8				Dense, moist to very moist, olive, Clayey coarse angular	GC	
9				▽ GRAVEL, no odor		
10						
11						
12				Stiff, moist, yellowish red with light green, Sandy CLAY, low to medium plasticity, no odor	CL	
13						
14				Dense, moist, pale green, Clayey GRAVEL with coarse angular sand, slight plasticity, petroleum odor	GC	
15				Firm to soft, moist, brown, Silty CLAY, low to medium plasticity, petroleum odor	CL	
16						
17						
18						
19						
20						
21				▼ Soft, very moist, brown, Silty CLAY with interbedded clayey fine sand, petroleum odor	CL	
22						
23						
24				BORING TERMINATED AT 24 FEET		

Figure 2, Log of Boring SB-2, page 1 of 1

ENV_NO_WELL PLUCKYS BORINGS GPJ 05/06/08

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

PROJECT NO. E8448-06-01

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	BORING NO. SB-3 DATE DRILLED 4/22/08 WATER LEVEL (ATD) ____ EQUIPMENT GEOPROBE DRILLER En Prob	SOIL (USCS)	HEADSPACE (PPM)
				SOIL DESCRIPTION		
1				**ASPHALT**		
2				Stiff, moist, black to brown, Sandy CLAY, low plasticity, no odor	CL	
3						
4						
5						
6				Dense, moist, brown, Clayey GRAVEL with angular sand and gravel, no odor	GC	
7						
8				Firm, moist, reddish yellow, Sandy CLAY, low to medium plasticity, no odor	CL	
9						
10						
11				Stiff, moist, pale green, Sandy CLAY, medium plasticity, no odor	CL	
12				Moist, Gravelly SAND with some clay and interbedded brick fragments, petroleum odor	SW	
13						
14						
15						
16				Stiff, moist, brown, Silty CLAY, medium plasticity, no odor	CL	
17						
18						
19						
20						
21						
22						
23						
24						

Figure 3, Log of Boring SB-3, page 1 of 2

ENV_NO_WELL PLUCKYS BORINGS GPJ 05/06/08

BORING ELEVATION:	ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

PROJECT NO. E8448-06-01

DEPTH IN FEET	PENETRAT RESIST BLOWS/FT	SAMPLE NO.	LITHOLOGY	BORING NO. SB-3 DATE DRILLED 4/22/08 WATER LEVEL (ATD) EQUIPMENT GEOPROBE DRILLER En Prob	SOIL (USCS)	HEADSPACE (PPM)
				SOIL DESCRIPTION		
26				Strong petroleum odor in groundwater		
27						
28				BORING TERMINATED AT 28 FEET		

Figure 4, Log of Boring SB-3, page 2 of 2

ENV_NO_WELL PLUCKYS BORINGS.GPJ 05/06/08

BORING ELEVATION:	ENGINEER/GEOLOGIST: JOHN LOVE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

PROJECT NO. E8448-06-01

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	BORING NO. SB-4 DATE DRILLED 4/22/08 WATER LEVEL (ATD) ____ EQUIPMENT GEOPROBE DRILLER En Prob	SOIL (USCS)	HEADSPACE (PPM)
				SOIL DESCRIPTION		
1				**ASPHALT AND BASE**		
2				Stiff, moist, black, Sandy CLAY, medium plasticity, no odor	CL	
3						
4						
5				Dense, slightly moist, fine Gravelly SAND, variegated, no odor	SW	
6						
7						
8				BORING TERMINATED AT 8 FEET		

Figure 4, Log of Boring SB-4, page 1 of 1

ENV_NO_WELL PLUCKYS BORINGS.GPJ 05/06/08

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

PROJECT NO. E8448-06-01

DEPTH IN FEET	PENETRAT. RESIST BLOWS/FT.	SAMPLE NO.	LITHOLOGY	BORING NO. SB-5 DATE DRILLED 4/22/08 WATER LEVEL (ATD) EQUIPMENT GEOPROBE DRILLER En Prob	SOIL (USCS)	HEADSPACE (PPM)
				SOIL DESCRIPTION		
1				ASPHALT AND FILL		
2						
3						
4						
5						
6						
7						
8						
9				▽		
10				Soft to stiff,saturated, brown to light green, Silty and Sandy CLAY, low plasticity, slight odor in water, no odor in soil	CL	
11						
12						
13						
14				▽ Dense, moist, variegated Gravelly SAND, fine gravel, well graded sand, no odor	SW	
15						
16				BORING TERMINATED AT 16 FEET		

Figure 5, Log of Boring SB-5, page 1 of 1

ENV_NO_WELL PLUCKYS BORINGS.GPJ 05/06/08

BORING ELEVATION:	ENGINEER/GEOLOGIST: JOHN LOVE

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

PROJECT NO. E8448-06-01

DEPTH IN FEET	PENETRAT. RESIST. BLOWS/FT.	SAMPLE NO.	LITHOLOGY	BORING NO. SB-6 DATE DRILLED 4/22/08 WATER LEVEL (ATD) EQUIPMENT GEOPROBE DRILLER En Prob SOIL DESCRIPTION	SOIL (USCS)	HEADSPACE (PPM)
1				**ASPHALT AND BASE**		
2				Very stiff, moist, black, Sandy CLAY, low to medium plasticity, no odor	CL	
3						
4						
5				Dense, moist, brown, Clayey GRAVEL with angular sand, low plasticity, no odor	GC	
6						
7						
8				Dense, moist, brown, angular Gravelly SAND, no odor	SW	
9				Stiff, moist, brown with olive, Sandy CLAY, medium plasticity, no odor	CL	
10						
11						
12						
13				Soft		
14				Slight petroleum odor		
15				Pale green		
16				Stiff to very stiff, moist, brown, Silty CLAY, medium plasticity, no odor	CL	
17						
18						
19						
20						
21						
22						
23						
24						

Figure 6, Log of Boring SB-6, page 1 of 2

ENV_NO_WELL PLUCKYS BORINGS.GPJ 05/06/08

BORING ELEVATION:

ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

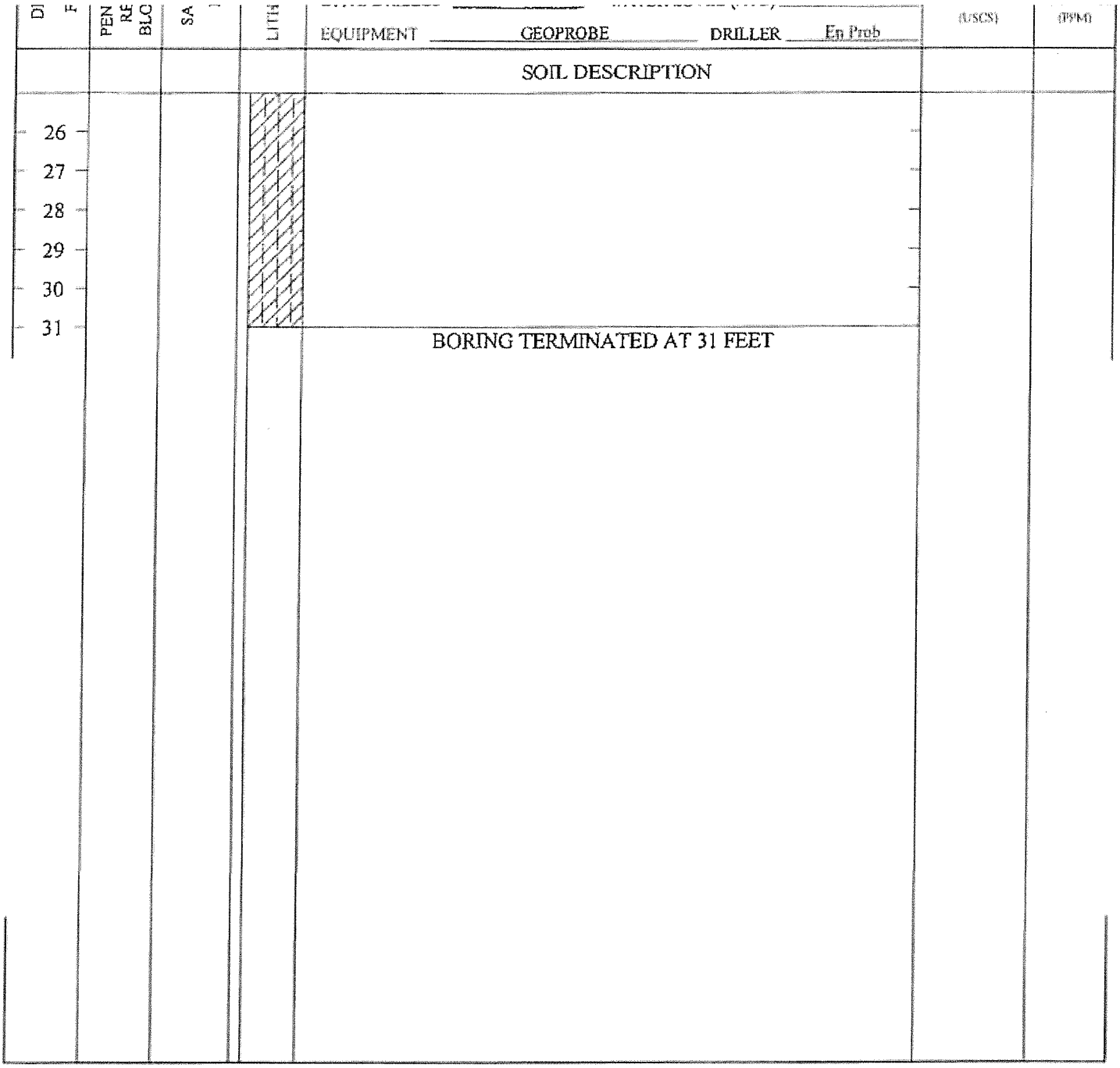


Figure 7, Log of Boring SB-6, page 2 of 2

ENV_NO_WELL PLUCKYS BORINGS GPJ 05/06/08

BORING ELEVATION:	ENGINEER/GEOLOGIST: **JOHN LOVE**

NOTE: THE LOG OF SUBSURFACE CONDITIONS SHOWN HEREON APPLIES ONLY AT THE SPECIFIC BORING OR TRENCH LOCATION AND AT THE DATE INDICATED. IT IS NOT WARRANTED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES. ALL BLOW COUNTS HAVE BEEN CONVERTED TO EQUIVALENT STANDARD PENETRATION TEST (SPT) BLOW COUNTS.

SOIL BORING LOG **Boring No. MW-1** **Sheet: 1 of 1**

Client	Former ARCO 472	Date	July 14, 2009
Address	6415 International Boulevard	Drilling Co.	RSI Drilling rig type: Geoprobe 6620 DT
	Oakland, CA	Driller	Norman
Project No.	E472	Method	Hollow Stem Auger Hole Diameter: 10 inches
Logged By:	Collin Fischer	Sampler:	Continuous core
Well Pack	sand: 5 ft. to 17 ft	Well Construction	Casing Material: Schedule 40 PVC Screen Interval: 7 ft. to 17 ft.
	bent.: 3 ft. to 5 ft.		Casing Diameter: 4 in. Screen Slot Size: 0.010-in.
	grout: 0 ft. to 3 ft.	Depth to GW:	▽ first encountered static ▼

Sample Type	Sample No.	Blow Count	Sample Time	Sample Recov.	Well Details	Depth Scale	Lithologic Column	Descriptions of Materials and Conditions	PID (PPM)
						1			
						2			
						3			
						4	SC	Clayey sand with silt and gravel, SC, (0'-7.5'), grayish brown, moist 40% medium grained sand, 25% clay, 20% silt, 15% medium gravel	
						5			
						6			
S	MW-1 6.5'	N/A	1055	100		7			0
S	MW-1 8'	N/A	1058	100		8			0
						9			
S	MW-1 9.5'	N/A	1100	100		10	ML	Clayey silt with sand and gravel, ML, (7.5'-12'), dark yellowish brown moist, low plasticity, 50% silt, 30% clay, 10% fine grained sand	0
S	MW-1 11'	N/A	1102	100		11		10% medium gravel	0
						12			
S	MW-1 12.5'	N/A	1105	100		13	SC	Clayey sand, SC, (12'-12.5'), grayish brown, moist 60% medium grained sand, 40% clay	0
							ML	Clayey silt, ML, (12.5'-13.5'), dark yellowish brown, moist, medium plasticity 60% silt, 40% clay	
S	MW-1 14.5'	N/A	1107	100		14	SC	Clayey sand, SC, (13.5'-14.5'), dark grayish brown, moist 60% medium grained sand, 40% clay	21
						15			
						16	ML	Clayey silt, ML, (14.5'-17'), grayish brown, moist, medium plasticity 60% silt, 40% clay	
						17			
						18			
						19			
						20			

Comments:

STRATUS ENVIRONMENTAL, INC.

SOIL BORING LOG **Boring No. MW-2** **Sheet: 1 of 1**

Client	Former ARCO 472	Date	July 14, 2009
Address	6415 International Boulevard	Drilling Co.	RSI Drilling rig type: Geoprobe 6620 DT
	Oakland, CA	Driller	Norman
Project No.	E472	Method	Hollow Stem Auger Hole Diameter: 10 inches
Logged By:	Collin Fischer	Sampler:	Continuous core
Well Pack	sand: 5 ft. to 17 ft	Well Construction	Casing Material: Schedule 40 PVC Screen Interval: 7 ft. to 17 ft.
	bent.: 3 ft. to 5 ft.		Casing Diameter: 4 in. Screen Slot Size: 0.010-in.
	grout: 0 ft. to 3 ft.	Depth to GW:	▽ first encountered static ▼

Sample Type	Sample No.	Blow Count	Sample Time	Sample Recov.	Well Details	Depth Scale	Lithologic Column	Descriptions of Materials and Conditions	PID (PPM)
						1	SC	Clayey sand with silt and gravel, SC, (0'-8'), grayish brown, moist 40% medium grained sand, 25% clay, 20% silt, 15% medium gravel	
S	MW-2 6.5'	N/A	1600	100		7			0
S	MW-2 8'	N/A	1602	100		8			0
						9	ML	Clayey silt, ML, (8'-9.5'), dark yellowish brown, moist, medium plasticity 60% silt, 40% clay	
S	MW-2 9.5'	N/A	1605	100		10			0
S	MW-2 11'	N/A	1607	100		11	SC	Clayey sand with silt and gravel, SC, (9.5'-11.5'), dark brown, wet 40% medium grained sand, 25% clay, 20% silt, 15% medium gravel	0
						12	ML	Clayey silt, ML, (11.5'-12.5'), yellowish brown, moist, medium plasticity 60% silt, 40% clay	
S	MW-2 12.5'	N/A	1610	100		13	SC	Clayey sand with silt and gravel, SC, (12.5'-13'), dark brown, moist 40% medium grained sand, 25% clay, 20% silt, 15% medium gravel	0
						14	ML	Clayey silt, ML, (13'-14'), dark yellowish brown, moist, medium plasticity 60% silt, 40% clay	
S	MW-2 14.5'	N/A	1612	100		15	SC	Clayey sand with silt and gravel, SC, (14'-14.5'), yellowish brown, moist 40% medium grained sand, 25% clay, 20% silt, 15% medium gravel	0
						16	ML	Clayey silt, ML, (14.5'-17'), dark yellowish brown, moist, medium plasticity 60% silt, 40% clay	
S	MW-2 17'	N/A	1615	100		17			0
						18			
						19			
						20			

Comments:

STRATUS ENVIRONMENTAL, INC.

SOIL BORING LOG **Boring No. MW-3** **Sheet: 1 of 1**

Client	Former ARCO 472	Date	July 14, 2009
Address	6415 International Boulevard	Drilling Co.	RSI Drilling rig type: Geoprobe 6620 DT
	Oakland, CA	Driller	Norman
Project No.	E472	Method	Hollow Stem Auger Hole Diameter: 10 inches
Logged By:	Collin Fischer	Sampler:	Continuous core
Well Pack	sand: 5 ft. to 17 ft	Well Construction	Casing Material: Schedule 40 PVC Screen Interval: 7 ft. to 17 ft.
	bent.: 3 ft. to 5 ft.		Casing Diameter: 4 in. Screen Slot Size: 0.010-in.
	grout: 0 ft. to 3 ft.	Depth to GW:	▽ first encountered static ▼

Sample Type	Sample No.	Blow Count	Sample Time	Sample Recov.	Well Details	Depth Scale	Lithologic Column	Descriptions of Materials and Conditions	PID (PPM)
						1			
						2			
						3			
						4			
						5	CL	Silty clay with sand, CL, (0'-8'), dark brown, moist, medium plasticity 50% clay, 40% silt, 10% fine grained sand	
						6			
S	MW-3 6.5'	N/A	1405	100		7			0
S	MW-3 8'	N/A	1407	100		8			0
						9		Silty clay with sand and gravel, CL, (8'-9'), dark yellowish brown, moist low plasticity, 40% silt, 30% clay, 20% fine gravel, 10% fine grained sand	
S	MW-3 9.5'	N/A	1410	100		10	SC	Clayey sand with silt and gravel, SC, (9'-10'), dark grayish brown, moist 40% medium grained sand, 25% clay, 20% silt, 15% medium gravel	0
S	MW-3 11'	N/A	1412	100		11			0
						12			
S	MW-3 12.5'	N/A	1415	100		13	ML	Clayey silt, ML, (10'-15'), dark yellowish brown, moist, medium plasticity 60% silt, 40% clay	0
						14			
S	MW-3 14.5'	N/A	1417	100		15			0
						16	SC	Clayey sand with silt and gravel, SC, (15'-16.5'), dark grayish brown, wet 40% medium grained sand, 25% clay, 20% silt, 15% medium gravel	
S	MW-3 17'	N/A	1420	100		17	ML	Clayey silt, ML, (16.5'-17'), dark yellowish brown, moist, medium plasticity 60% silt, 40% clay	0
						18			
						19			
						20			

Comments:

STRATUS ENVIRONMENTAL, INC.