CAMBRIA

Alameda County

SEP 26 2002

Environmental Health

September 23, 2002

Mr. Barney Chan
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

R0305

Re: **Agency Response, Closure Request, and Contingency Work Plan**
2001 Fruitvale Avenue
Oakland, California 94601
Incident # 97109122
Cambria Project # 244-1296-006

Mr. Chan,

On behalf of Equilon Enterprises LLC dba Shell Oil Products US (Shell), Cambria Environmental Technology Inc. (Cambria) is responding to your August 6, 2001 letter to Shell regarding the referenced site. In that letter you presented several bulleted comments and requests; each comment and request is enumerated and presented in italics below. Our responses to each comment or request follow the comment or request. At the end of this letter, we present our conclusions and recommendations, a request for case closure, and a contingency work plan for monitoring well installation.

RESPONSES TO COMMENTS

Comment 1) Please provide summary tables for all soil and groundwater data.

Summary tables of all soil and groundwater analytical data are presented in Attachment A.

Comment 2) Please provide a to scale figure indicating the location of these samples and the assumed location of the former underground tanks, piping and dispensers.

Figure 1 shows the site's location and the location of wells identified during a well search of State Water Resources Board records. Figure 2 is a site plan (revised slightly from our previous site plan) based on a Shell Oil Company "Plot Plan, Modernization of S.S. L-530", dated January 18, 1957. A copy of the original plot plan is included as Attachment B. A full-size blueprint of the 1957 plot plan was located by Shell in its records and provided to Cambria. The locations of all known soil and groundwater samples, as scaled from field notes and previous reports, are shown on the updated Figure 2.

Oakland, CA
San Ramon, CA
Sonoma, CA

Cambria Environmental Technology, Inc.

1144 65th Street
Suite B
Oakland, CA 94608
Tel (510) 420-0700
Fax (510) 420-9170

The 1957 plan indicates the proposed layout of the "modernized" service station, and the layout existing at that time is shown in dashed lines. Neither Shell nor Cambria has confirmed whether the proposed modernization was ever built, or built per these plans. However, chain-of-title records indicate that Shell Oil Company leased the site on October 20, 1966 and quitclaimed the property on April 20, 1984. Cambria and Shell assume, therefore that the "modernized" service station was built after 1957 and ceased operations prior to 1984.

The 1957 plan indicates the "existing" location for the building, four underground storage tanks (USTs) and two dispenser islands. The location of the "existing" product piping is not shown. It is unclear from the plans whether the dashed lines indicating the "Approx. location for 1,000 (gallon) tank for w.o. (waste oil) -relocated" in the northwest corner of the site represents an existing feature or a proposed feature. The solid line box indicating a " 3'-0" x 3'-0" Conc. Slab" suggests a feature that was to be constructed. Also, a "1-1/2" vent" pipe to be built adjacent to the proposed building is also indicated. If the convention of using dashed lines for existing features was used consistently, then the map seems to indicate that the waste oil tank was existing. For the purposes of this environmental investigation, Cambria assumes that this tank was actually installed at some time.

The notes on the plans state:

> . . . Existing pumps, air compressor, 8-30 gal hyboys, 2-1000 gal. tanks, 1-4000 gal. tank & 1-110 gal. tank & other equipment deemed salvageable by Shell engineer to be removed & returned to Shell depot at 315 Derby, Oakland.

This note accounts for the four USTs shown as existing and which are noted ""Remove existing tanks" on the July 1, 1957 Shell plan.

Comment 3) Please provide at least two cross-sectional diagrams (north-south, east-west) indicating soil concentrations and soil type.

Cross sections A-A' and B-B' are presented as Figure 3. The sample depths and concentrations of total petroleum hydrocarbons as gasoline (TPHg), total petroleum hydrocarbons as diesel (TPHd), total recoverable petroleum hydrocarbons (TRPH), and benzene are also shown on the cross-sections. Copies of all soil boring logs are presented as Attachment C.

Comment 4) Examine the need to better characterize the site given the number and locations of the existing samples. Note how the number and location of samples compare to the number and locations of samples normally taken during tank removals.

As shown on Figure 2, soil and groundwater samples have been collected as follows, and their locations are referenced to the "existing" and "proposed" structures shown on the 1957 modernization plan:

January 1996 Soil and Groundwater Investigation (ALLCAL)

SB-1: Located within "proposed" UST complex
4 soil samples were collected at 6.0 feet (ft), 11.0 ft, 16.0 ft, 21.0 ft below ground
1 grab groundwater sample from water table (approx. 23 ft to 26.5 ft)

SB-2: Located within "existing" UST complex
4 soil samples were collected at 6.0 ft, 11.0 ft, 16.0 ft, 21.0 ft below ground
1 grab groundwater sample from water table (approx. 23 ft to 26.5 ft)

SB-3: Located near proposed "sump containing fuel lines and a selective manifold"
Location is less than 5 ft from the former, center "proposed" UST.
4 soil samples were collected at 6.0 ft, 11.0 ft, 16.0 ft, 21.0 ft below ground.
No grab groundwater sample collected.

SB-4: Located within "proposed" and "existing" locations for dispenser island adjacent to Fruitvale Avenue
4 Soil samples were collected at 6.0 ft, 11.0 ft, 16.0 ft, 19.0 ft below ground
No grab groundwater sample collected.

SB-5: Located within 10 ft of "proposed" location for dispenser island adjacent to Foothill Blvd, and midway between "former" and "proposed" UST complexes
4 soil samples were collected at 6.0 ft, 11.0 ft, 16.0 ft, 21.0 ft below ground.
No grab groundwater sample collected.

March 1999 Soil and Groundwater Investigation (Cambria)

SB-A: Located within 5 ft of waste oil tank
3 soil samples were collected at 10.0, 15.5, and 22.5 ft below ground
A groundwater grab sample from water table 16.8 ft to 25.0 ft below ground.

SB-B: Located at edge of property to determine easterly extent of chemicals of concern (COCs)
3 soil samples were collected at 6.0, 16.0 and 20.5 ft below ground
A groundwater grab sample from water table 17.2 ft to 25.0 ft below ground.

SB-C: Located at edge of property to determine southern extent of COCs
3 soil samples were collected at 5.5, 15.5 and 20.5 ft below ground
A groundwater grab sample from water table 16.4 ft to 25.0 ft below ground.

Cambria believes that the amount of soil and groundwater sampling which has been conducted at the site is sufficient to adequately characterize soil and groundwater conditions and to evaluate environmental risks at the site. The available records indicate that soil and groundwater samples were well located to characterize the suspected potential source areas and areas of greatest potential chemical impact. Also, soil samples were collected from the property perimeter in the presumed downgradient direction, based upon topographic slope at the site and the reported groundwater flow directions at nearby Shell sites. The soil samples from the property perimeter identified the lateral extent of chemical impact.

No gradient info.

As in any site assessment, additional sampling and analysis would increase the confidence in the characterization. However, Cambria believes that additional sampling results are unlikely to change either the previous investigation's conclusions, the results of a risk-based corrective action (RBCA) analysis, human health risk assessment, or the recommended course of action.

The standard guidance document for initial soil and groundwater sampling UST removals has been the *Tri-Regional Board Staff Recommendations for Preliminary Investigation and Evaluation of Underground Storage Tank Sites* (Central Valley Regional Water Quality Control Board, 10 August 1990). As stated in the document, "these recommendations are for the initial investigation of underground tank leak incidents and routine tank removals." However, the investigations at the site were not conducted during tank removal, so a direct comparison to the guidance is not entirely relevant. Per Table #1 of that document, the recommended number of samples in the case where water is not present in the tank pit (as would have been the case during UST removal at the site), would be:

- One soil sample per tank (up to 1,000 gallons) located at fill or pump end, and
- Two soil samples per tank (tanks between 1,000 and 10,000 gallons) at each end of tank.

This guidance recommends that the samples be collected after removing a maximum of two ft of native soil and that areas of obvious contamination be sampled. The guidance also recommends that if sample results contain greater than 100 mg/kg (ppm) of total petroleum hydrocarbons, then a soil and groundwater investigation is required.

Records indicate that the pre-1957 site had four tanks, one less than 1,000 gallons and three greater than or equal to 1,000 gallons. Following the guidance, seven soil samples would have been required. The post-1957 configuration indicates four tanks, all greater than or equal to 1,000

gallons. Following the guidance, eight soil samples would have been required. For both sets of tanks, following the guidance, a total of 16 samples would have been required.

At the site, eight soil borings have been installed, and a total of 29 soil samples and five grab groundwater samples have been analyzed. The locations of the some soil borings do differ somewhat from those that would have been required had sampling been conducted during tank removal. Borings SB-1, SB-2 and SB-A were installed directly in the tank locations, and boring SB-3 was installed immediately adjacent to one tank location. Fifteen soil samples and three grab groundwater samples were collected from these borings.

As a result of the depth discrete soil sampling in the UST areas as well as in other locations, Cambria believes that the pre-1957 UST area and post-1957 UST area have been adequately characterized by the soil samples collected, and, as a whole, the site has been better characterized than if only tank removal samples were collected.

The 1996 soil and groundwater sampling results did indicate the need for a soil and groundwater investigation, and Cambria proposed and conducted an initial soil and groundwater investigation in 1999.

While in any site assessment there can be no guarantee that soil samples have been collected in the areas of greatest chemical impact, available records indicate that the soil borings were well placed to identify chemical impact of any significant lateral extent. Likewise, grab groundwater samples collected from each of the borings are close to, or surrounding, each of the known potential source areas indicated by the Shell Oil Company plot plan. As we have stated in previous correspondence, we believe the site has been adequately characterized to evaluate chemical impacts to soil and groundwater and to evaluate potential risks to human health and the environment.

Comment 5) Explain how an "old" petroleum release could exhibit the relatively high soil and groundwater concentrations reported. Is there still a source for the TPH being found?

Cambria believes that the low concentrations of BTEX compounds relative to total petroleum hydrocarbon (TPH) concentrations in soil and groundwater are explained as the result of natural degradation processes. Cambria also believes the TPH concentrations detected are not indicative of a current or ongoing release from a still-existing source.

The latest possible age of hydrocarbon releases at the site are indicated by property ownership records. Chain-of-title records indicate that Shell Oil Company leased the site on October 20, 1966 and quitclaimed the property on April 20, 1984. Therefore, any petroleum releases related to the UST system would have occurred prior to that date.

The first known environmental investigation and sampling was conducted in 1996. At that time, the analytical results of soil and groundwater samples showed relatively low concentrations of the aromatic BTEX compounds were present. In soil, less than 1 ppm of any BTEX constituent was detected. In groundwater, the maximum single BTEX constituent concentration was 52 ppb of xylenes.

It is an established fact that the more volatile, aromatic compounds in gasoline, such as the BTEX compounds, naturally degrade in soil and groundwater more rapidly than other gasoline constituents. The natural degradation may be attributable to volatilization, biodegradation, dilution, dispersion or adsorption. When the aggregate of these natural processes are considered as a remedial approach, it is also known as "natural attenuation". The United States Environmental Protection Agency (EPA) has researched and published numerous reports documenting natural degradation processes, and their use as remedial technologies. The following EPA documents and website provide additional information and references to natural attenuation and degradation processes which document the processes which lead to the condition of low BTEX concentrations relative to TPH concentrations:

- A Citizen's Guide to Monitored Natural Attenuation (EPA 542-F-01-004) April 2001
- A Citizen's Guide to Monitored Natural Attenuation (EPA 542-F-96-015) October 1996
- Monitored Natural Attenuation of Petroleum Hydrocarbons (EPA 600-f-98-021) May 1999
- Chapter IX, *Natural Attenuation*, How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites, A Guide for Corrective Action Plan Reviewers (EPA 510-B-95-007) May 1995
- www.clu-in.org

Also, studies conducted by Lawrence Livermore National Laboratory for the State Water Resources Control Board's (SWRCB) UST Program, *(California Leaking Underground Fuel Tank (LUFT) Historical Case Analyses*, November 1995) discussed natural attenuation and passive bioremediation of petroleum hydrocarbons (not including MTBE or other oxygenate compounds) as being a primary reason why impacts to the environment due to fuel USTs were not as severe as expected. These findings were echoed in the December 8, 1995 letter from Walt Pettit, executive director of the SWRCB, to the regional boards and local oversight agency directors which recommends closure of low risk soil cases, and use of monitoring to determine plume stability in low risk groundwater cases.

As shown on the attached cross-sections, large portions of the shallow sediments beneath the site are composed primarily of clay. It is not uncommon for fuel hydrocarbons to persist in soil and groundwater for extended periods in fine-grained, low permeability saturated and unsaturated

sediments, as compared to coarser-grained, higher permeability soils. Commonly, the organic content of clayey soils also increases the absorption of organic compounds to the soil matrix.

Groundwater velocity is directly related to soil permeability. With a very low groundwater velocity, the transport of dissolved hydrocarbons in groundwater occurs at a slow rate. In addition, the transport of dissolved oxygen and nutrients from outside the hydrocarbon-impacted area is slow, which results in lower rates of natural biodegradation of hydrocarbons inside the hydrocarbon-impacted area. In addition, high organic content, and low permeability, which all serve to slow the hydrocarbon attenuation rate, also serve to reduce potential for exposure and consequently, the potential health risk to surficial occupants when compared to a setting with coarser-grained sediments.

Cambria believes that the natural factors discussed above explain the existing concentrations of petroleum hydrocarbons in soil and groundwater when no existing source is known to be present.

Comment 6) Evaluate the risk of TPHg, TPHd and TRPH using the SF RWQCB RBSLs.

Since the site is located in Oakland, Cambria believes that SF RWQCB guidance recommends use of the "Oakland RBSLs". As stated by the SF RWQCB on their website,

> The City of Oakland has developed a Risk-Based Corrective Action Program specifically for use in Oakland. This program can be used separately or in conjunction with the subject RBSL document for sites overseen by the RWQCB in Oakland"

Therefore, Cambria believes that use of the Oakland risk-based screening levels (RBSLs) and methodology to evaluate risks at the site is appropriate. The results presented in Cambria's *Risk-Based Corrective Action Report,* (May 16, 2001) which used the Oakland Tier 1 RBSLs are summarized in Tables A and B below.

Cambria evaluated the exposure pathways in the *RBCA Report* as follows:

> Based on the results of the area well survey and conduit study, it is highly unlikely that drinking water wells will be impacted by hydrocarbons originating from the site. Therefore, ingestion of groundwater is not considered a complete exposure pathway. Similarly, no surface water bodies are likely to be affected by impacted site-soils and Oakland's "Water for Recreation" pathway is not considered complete.
>
> The exposure pathways considered complete for this analysis include the following:
>
> 1) Ingestion, dermal exposure to, and inhalation of particulates from, impacted surficial soil;
> 2) Inhalation of outdoor and indoor air vapors from subsurface soil; and
> 3) Inhalation of outdoor and indoor air vapors from groundwater.

Cambria believes that this selection of exposure pathways for evaluation was correct.

Cambria recognizes that the Oakland RBSLs do not include RBSLs for hydrocarbon mixtures such as TPHg, TPHd or TRPH. In response to your request, Cambria has compared the maximum detected concentrations of TPHg, TPHd and TRPH to the SF RWQCB Tier 1 RBSLs for TPH (gasoline), TPH (middle distillates) and TPH (residual fuels) contained in the RBSL Lookup Tables B and D for surface and subsurface soils and groundwater, for commercial/industrial land uses, where groundwater is NOT a current or potential source of drinking water. (*Application of Risk-Based Screening Levels and Decision Making to Sites with Impacted Soil and Groundwater, Interim Final, Volumes I and II,* SF RWQCB, December 2001). Cambria did not use averaged or 95% upper confidence limit concentrations for this evaluation. The SF RWQCB RBSL tables do not contain values identified as TPHd or TRPH, however, the text discusses the use of the TPH (middle distillates) and TPH (residual fuels) values as being appropriate for TPHd and TRPH. The results of this comparison are presented in Table C and D below. Following the tabulated comparison, further evaluation is presented.

Table A. – Evaluation of Potential COCs in Soil using Oakland RBSLs

Potential COC	Highest Detected Concentration mg/kg	Oakland Tier 1 RBSL mg/kg	RBSL Exceeded?
Benzene	0.057	0.069	No
Toluene	0.41	9000	No
Ethylbenzene	0.73	5,100	No
Xylenes	4.9	54,000	No
Tetrachloroethene	0.046	0.3	No
Phenol	3.6	31,000	No
Chromium	49	74,000	No
Lead	410	581.5*	No
Nickel	82	1,500	No
Zinc	87	22,000	No

* PRG (preliminary remediation goal) based on DTSC's Lead Risk Assessment Spreadsheet. Assumes 1) no crops will be planted and harvested onsite, 2) there will be no respirable dust originating from lead impacted soil and 3) no deliberate ingestion of lead-impacted soil will occur.

Table B. - Evaluation of Potential COCs in Groundwater using Oakland RBSLs

Potential COC	Highest Detected Concentration mg/L	Oakland Tier 1 RBSL mg/L	RBSL Exceeded?
Benzene	0.013	0.11	No
Toluene	0.025	210	No
Ethylbenzene	0.025	>Sol	No
Xylenes	52	>Sol	No
Bis (2-ethylhexyl)phthalate	0.035	>Sol	No
Butyl benzylphthalate	13	None estimated	No
1,2-Dichloroethene	0.041	35	No
2-Methylnaphthalene	0.046	>Sol	No
Naphthalene	0.068	>Sol	No
Pyrene	0.014	>Sol	No
Tetrachloroethene	0.015	0.20	No
Trichloroethene	0.0047	0.69	No
Chromium	0.035	None estimated	No
Lead	0.014*	NA**	NA
Nickel	0.25	None estimated	No
Zinc	0.17	None estimated	No

* This analytical result is likely erroneous due to the apparent lack of filtration of suspended solid particles from water prior to sample preservation and analysis.

** An RBSL or PRG is not appropriate since groundwater ingestion is not considered a complete exposure pathway and the sample results are likely erroneous.

Table C. – Evaluation of TPHg, TPHd and TRPH in Soil using SF RWQCB RBSLs

Potential COC	Highest Detected Concentration mg/kg	SF RWQCB Tier 1 RBSL (Tables B and D) (commercial/ industrial land use) mg/kg	RBSL Exceeded?
TPHg (TPPH)	830 (sample SB-2-21.0-21.5)	400	Yes
TPHd (TEPH)	1,500 (sample SB-A 10.0 ft)	500 (middle distillates)	Yes
TRPH	11,100 (sample SB-A 10.0 ft)	1,000 (residual fuels)	Yes

Table D. – Evaluation of TPHg, TPHd and TRPH in Groundwater using SF RWQCB RBSLs

Potential COC	Highest Detected Concentration ug/L	SF RWQCB Tier 1 RBSL (Tables B and D) (Drinking Water Resource NOT Threatened) ug/L	RBSL Exceeded?
TPHg (TPPH)	5,100 (sample SBB-W)	500	Yes
TPHd (TEPH)	~~28,000~~ 40,000 (sample ~~SBB-W~~ WSB2)	640 (middle distillates)	Yes
TRPH	23,000 (sample SBB-W)	640 (residual fuels)	Yes

Soil RWQCB RBSL Comparison Results: The highest detected concentrations of the hydrocarbon mixtures TPHg, TPHd and TRPH in soil exceed the SF RWQCB RBSL concentrations. However, the SF RWQCB soil RBSL concentrations are driven by the "groundwater protection by soil leaching" component, presented in Tables B-2, D-2 and G of Volume II of the guidance document. Footnotes on Tables B-2 and D-2 indicate that the soil leaching criteria for non-drinking water resource were "protective of discharge of impacted groundwater to surface water and subsequent impact to aquatic life." Since groundwater at the site is not likely to discharge to surface water or to impact aquatic life, this is not a complete exposure pathway, and Cambria believes using these values for soil leaching criteria is not applicable to the site.

A footnote in Table G of Volume II of the guidance document states "Target groundwater concentration and corresponding soil levels for TPH based on criteria in Board Order 99-045 for San Francisco Airport (RWQCBSF, 1999)". The criteria in Board Order 99-045 were explicitly developed for protection of aquatic life at the margins of San Francisco Bay. Therefore, Cambria believes that use of these criteria is not applicable to the site.

The other component for the RBSL for TPH mixtures presented by the SF RWQCB in the RBSL guidance for surface soil (Table B-2) and subsurface soils (Table D-2) is the "Human Health - Direct Exposure" criteria. The corresponding concentration values for the "commercial/industrial category" were based upon the use of pyrene as a human health surrogate for TPH mixtures, and were 11,000 mg/kg for surface soils less than or equal to 3 meters below ground surface, and 16,000 mg/kg for subsurface soils greater than 3 meters below ground surface. Three soil samples (SBA-10.0', SBA-15.5' and SBA-22.5') were analyzed for semi-volatile organic compounds, including pyrene. Pyrene was not detected in any soil sample at a maximum detection limit of 2.5 mg/kg as reported in Cambria's August 5, 1999 *Site Investigation Report,* which corresponds to less than 1/4400th of the criteria concentration. Since pyrene was not detected at concentrations significantly below the criteria level, use of the criteria based on the surrogate chemical appears to be grossly over-conservative and not applicable to the subject site.

Based on this detailed evaluation of the site's maximum soil concentrations relative to the criteria used to develop the SF RWQCB's RBSLs, Cambria concludes that the hydrocarbon mixtures TPHg, TPHd and TRPH present in site soils do not present a significant risk for the site's commercial/industrial land use.

Since all known chemical of concern which were detected in site soils, other than the hydrocarbon mixtures TPHg, TPHd and TRPH, were previously evaluated for the appropriate exposure pathways using the Oakland Tier 1 RBSLs, and no Oakland RBSLs were exceeded,

Cambria believes that the soil concentrations present at the site do not pose a significant risk to human health or the environment.

Groundwater RWQCB RBSL Comparison Results: The highest detected concentrations of the hydrocarbon mixtures TPHg, TPHd and TRPH in groundwater exceed the SF RWQCB RBSL concentrations. However, the SF RWQCB groundwater RBSL concentrations are driven by the "aquatic life protection" component, presented in Tables F-2 and F-4b of Volume II of the RBSL guidance. The TPH "aquatic life protection" component concentration is based upon a freshwater criterion for continuous concentrations. This criterion for TPH was based upon a compilation of eco-toxicity studies conducted for the Presidio of San Francisco and adopted by the SF RWQCB in Board Order No. 96-060. Since groundwater at the site is not believed to discharge to surface water or to likely impact aquatic life, Cambria believes these values for aquatic life protection are not applicable to the site.

Another component considered in the RWQCB RBSLs for hydrocarbon mixtures is a "ceiling value" based upon preventing nuisance odors or sheens on surface water. The ceiling value component concentration for all TPH mixtures is 5,000 µg/L. As groundwater is found approximately 17 feet below ground at the site, Cambria believes that the potential for nuisance odors at the site is negligible. Since Cambria determined that surface water is unlikely to be impacted by the on-site groundwater concentrations, Cambria believes the potential for creating a sheen on surface waster due to site groundwater is negligible. Therefore, Cambria believes this component of the RBSL for groundwater is also not applicable to the site.

Based on this detailed evaluation of the site's maximum groundwater concentrations relative to the criteria used to develop the SF RWQCB's RBSLs, Cambria concludes that the hydrocarbon mixtures TPHg, TPHd and TRPH present in site groundwater do not present a significant risk for the site's commercial/industrial land use.

Since all known COCs which were detected in site groundwater, other than the hydrocarbon mixtures TPHg, TPHd and TRPH, were previously evaluated for the appropriate exposure pathways using the Oakland Tier 1 RBSLs, and no Oakland RBSLs were exceeded, Cambria believes that the groundwater concentrations present at the site do not pose a significant risk to human health or the environment.

Comment 7) Is there enough data, particularly, shallow soil data to perform a HHRA? Is there any PNA data in soil?

A human health risk assessment (HHRA) could be conducted with the available data, although at considerable expense, and due to the limited data currently available, with very limited statistical confidence. Depending on the methodology used, statistical evaluation of the limited data for use

in an HHRA would likely increase the assumed exposure point concentration, and would cause the calculated risks to be greater than those associated with the maximum known chemical concentrations.

Due to the complexity of hydrocarbon mixtures such as gasoline and diesel fuels, the ASTM RBCA analysis method has generally been accepted for use at fuel UST sites by the RWQCB, the City of Oakland, and many local UST oversight agencies in California. In addition, the RWQCB RBSLs and Oakland RBSLs lookup tables provide "shortcuts" to determining whether fuel UST sites present unacceptable risks. Cambria has evaluated the potential exposure pathways, and soil and groundwater concentrations relative to both the Oakland RBSLs and SF RWQCB RBSLs. Based on these analyses, Cambria believes that the risks posed to human health and the environment by site soils and groundwater are not significant.

Cambria believes an HHRA performed with the currently available data would not yield useful results. Cambria does not believe performing an HHRA for this site even with additional data would be warranted or cost-effective, when risk analyses, using regulatory-accepted methodologies, indicate the site poses low risk.

Three soil samples from boring SB-A were analyzed for semi-volatile organic compounds by EPA Method 8270. The EPA Method 8270 reported analyte list includes some polynuclear aromatic hydrocarbons (PNAs or PAHs). However, no PNAs were detected at the detection limits used. The results were reported in Appendix C of Cambria's August 5, 1999 *Site Investigation Report.*

Comment 8) Please evaluate the need for a deed restriction if site closure were to be considered.

Based upon the analyses discussed in this report, Cambria does not believe the site poses significant risk for anticipated site uses as commercial/industrial property. Therefore, Cambria does not believe a deed restriction or other institutional control is warranted. Although the risks to construction workers are considered in the Oakland and RWQCB RBSLs, full disclosure of the known environmental conditions to the current property owner, city and county agencies and the local UST oversight program is recommended to ensure that any future invasive subsurface development work at the site is appropriately planned.

If site closure were granted on the condition that site land use remained commercial/industrial, then a deed restriction or other institutional control may be appropriate. However, the City of Oakland has developed a Permit Tracking System through its Central Permit Counter and the City of Oakland Fire Department, Hazardous Materials Management Program. Cambria believes that

using this established, local institutional control process would be most appropriate if it is determined that an institutional control is necessary.

CONCLUSION AND RECOMMENDATIONS

As discussed above, Cambria believes that this site does meet the conditions of a "low risk soil and groundwater case," and is thus eligible for case closure. If the additional information provided herein satisfies the ACHCSA's criteria for consideration, Cambria requests case closure.

ACHCSA has previously recommended that permanent groundwater monitoring wells be installed. While Cambria believes that the information provided by these wells will corroborate the existing data, if installation and sampling of permanent monitor wells will provide ACHCSA additional data which will hasten the site closure process, Cambria recommends that wells be installed as discussed in the Contingency Work Plan section below.

At this time, Cambria believes that the site's soil and groundwater conditions have been adequately characterized, and that potential risks have been properly and conservatively evaluated according to applicable regulatory guidance and accepted methodologies. However, if ACHCSA finds the analyses or investigations conducted to date to be deficient in support of case closure, Cambria respectfully requests the ACHCSA please clearly indicate to Cambria what deficiencies exist and what steps are needed to make progress towards case closure.

CONTINGENCY WORK PLAN PROPOSED SCOPE OF WORK

To monitor hydrocarbon concentrations in groundwater and groundwater elevations beneath the site, we propose installing three 2-inch diameter monitoring wells on-site in the vicinity of the former waste oil UST and adjacent to the property boundaries along Foothill Boulevard and Fruitvale Avenue, adjacent to previous soil boring locations SB-A, SB-B and SB-C (Figure 2)

Our scope of work for this investigation would include the following tasks:

Utility Location: Cambria will notify Underground Service Alert (USA) at least 48 hours in advance of our drilling activities. USA will have the utilities in the site vicinity identified.

Site Health and Safety Plan: Cambria will prepare a site safety plan to protect site workers. The plan will be kept on site at all times and signed by all site workers.

Permits: Cambria will obtain the necessary permits for the installation of the borings from the Alameda County Public Works Agency. Cambria will also obtain site access from the property owner and coordinate activities with the owner and any tenants.

Monitoring Well Installation: Three 4-inch diameter groundwater monitoring wells will be installed on-site using a drill rig equipped with hollow-stem augers. We will collect soil samples for lithologic logging and chemical analysis at a minimum of 5-ft intervals and from just above the water table. All soil samples collected will be submitted for chemical analysis. Soils will be visually screened for observations of staining and odor and by headspace analysis with a volatile vapor analyzer. Wells will be installed with approximately 10 ft of 0.010" slotted PVC screen below the water table and 5 ft above the water table. Based on March 1999 water levels, the depth to water is anticipated to be approximately 17 ft.

The wells will be developed using a combination of groundwater surging and extraction. Following development, the wells will be scheduled for groundwater sampling and monitoring. Following receipt and evaluation of the initial sampling results, quarterly groundwater monitoring may be recommended for the site. The well top-of-casing elevations will be surveyed relative to mean sea level. Our standard field procedures for monitoring well installations are presented as Attachment D.

Chemical Analysis: Soil samples will be analyzed for TPHd by modified EPA Method 8015, TPHg, BTEX and MTBE by EPA Method 8260. Groundwater samples collected during scheduled monitoring events will be analyzed for TPHd, TPHg, BTEX and MTBE.

Reporting: After we receive the analytical results, we will prepare an investigation report that, at a minimum, will contain:

- A summary of the site background and history;
- Descriptions of the drilling, soil sampling, and well installation methods;
- Boring logs;
- Tabulated analytical results;
- Analytical reports and chain-of-custody forms;
- Soil and water disposal methods; and
- A discussion of the hydrocarbon distribution in the subsurface.

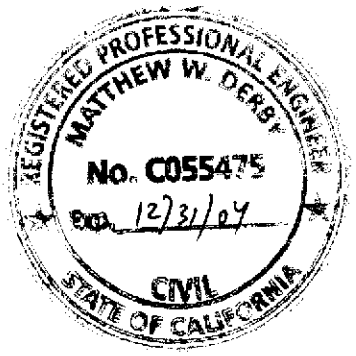
SCHEDULE

Upon receiving written approval of this work plan from the ACHSA, Cambria will apply for the necessary permits and schedule drilling. We will provide you with 72-hour notice prior to field activities. We anticipate submitting our investigation report four to six weeks after completing the fieldwork.

CLOSING

Cambria looks forward to working with you towards case closure on this project. Please call Matt Derby at (510) 420-3332 to discuss any questions and concerns you may have.

Sincerely,
Cambria Environmental Technology, Inc.



Matthew W. Derby, P.E.
Senior Project Engineer

Figures:
1 - Site Vicinity/Area Well Survey Map
2 - Boring Location and Proposed Monitoring Well Location Map
3 - Geologic Cross Sections A-A' and B-B'

Attachments:
A - Summary Tables of Soil and Groundwater Analytical Results
B - Copy of 1957 Plot Plan
C - Copies of Boring Logs
D - Standard Field Procedures for Monitoring Well Installation

Cc: Ms. Karen Petryna, Shell Oil Products US, P.O. Box 7869, Burbank, CA 91501-7869
Ms. Lotus Monroe, 11810 Alba Road, Ben Lomond, CA 95005
Mr. Fidel P & Mrs. Dolores G Casillas, 2094 Harrington Ave., Oakland, CA 94601

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09/23/02

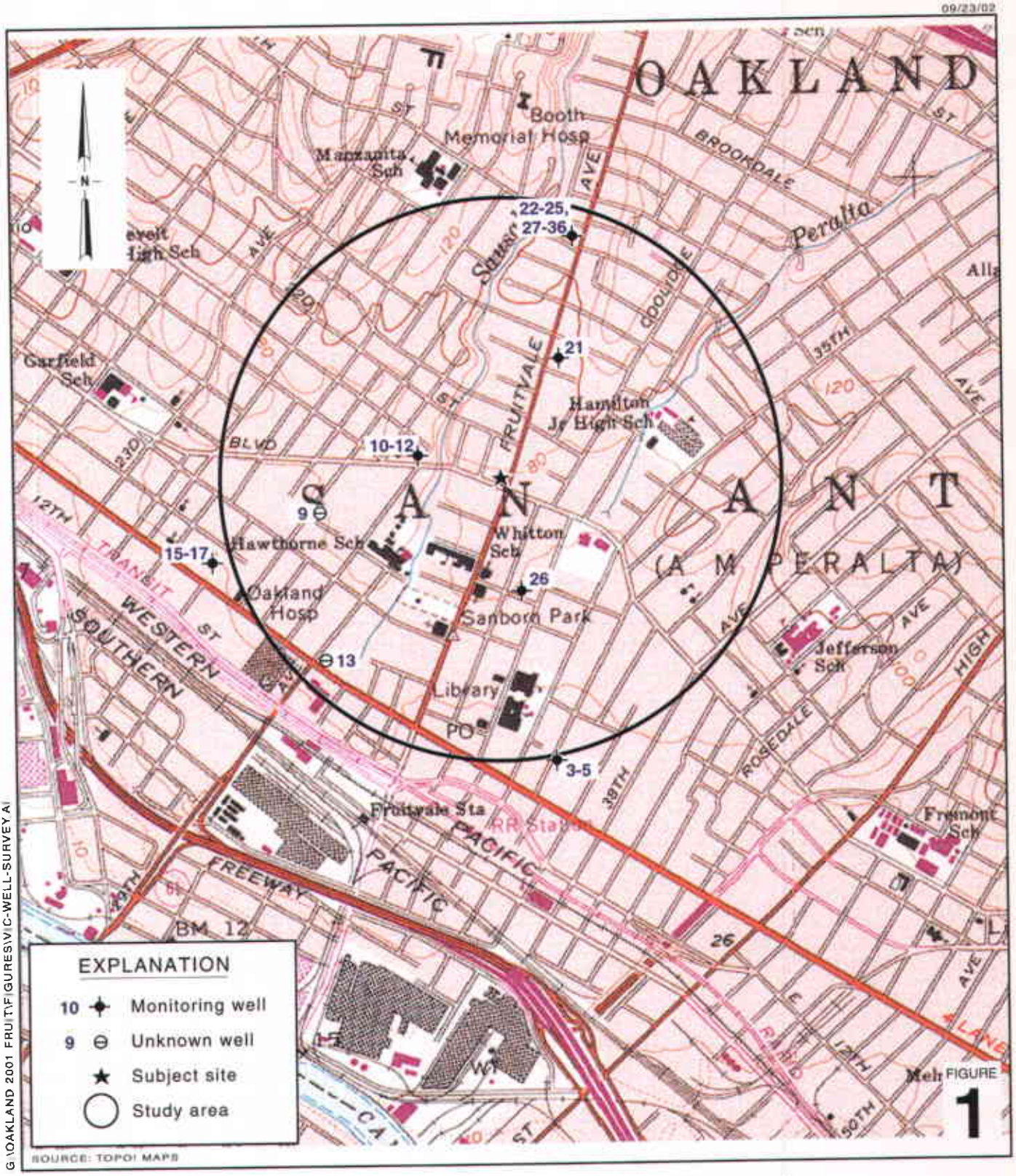

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FIGURE 1

0 1/8 1/4 1/2 1

SCALE : 1" = 1/4 MILE

Shell-branded Service Station
2001 Fruitvale Avenue
Oakland, California
Incident #97109122

CAMBRIA

Site Vicinity/Area Well Survey Map

(1/2 Mile Radius)

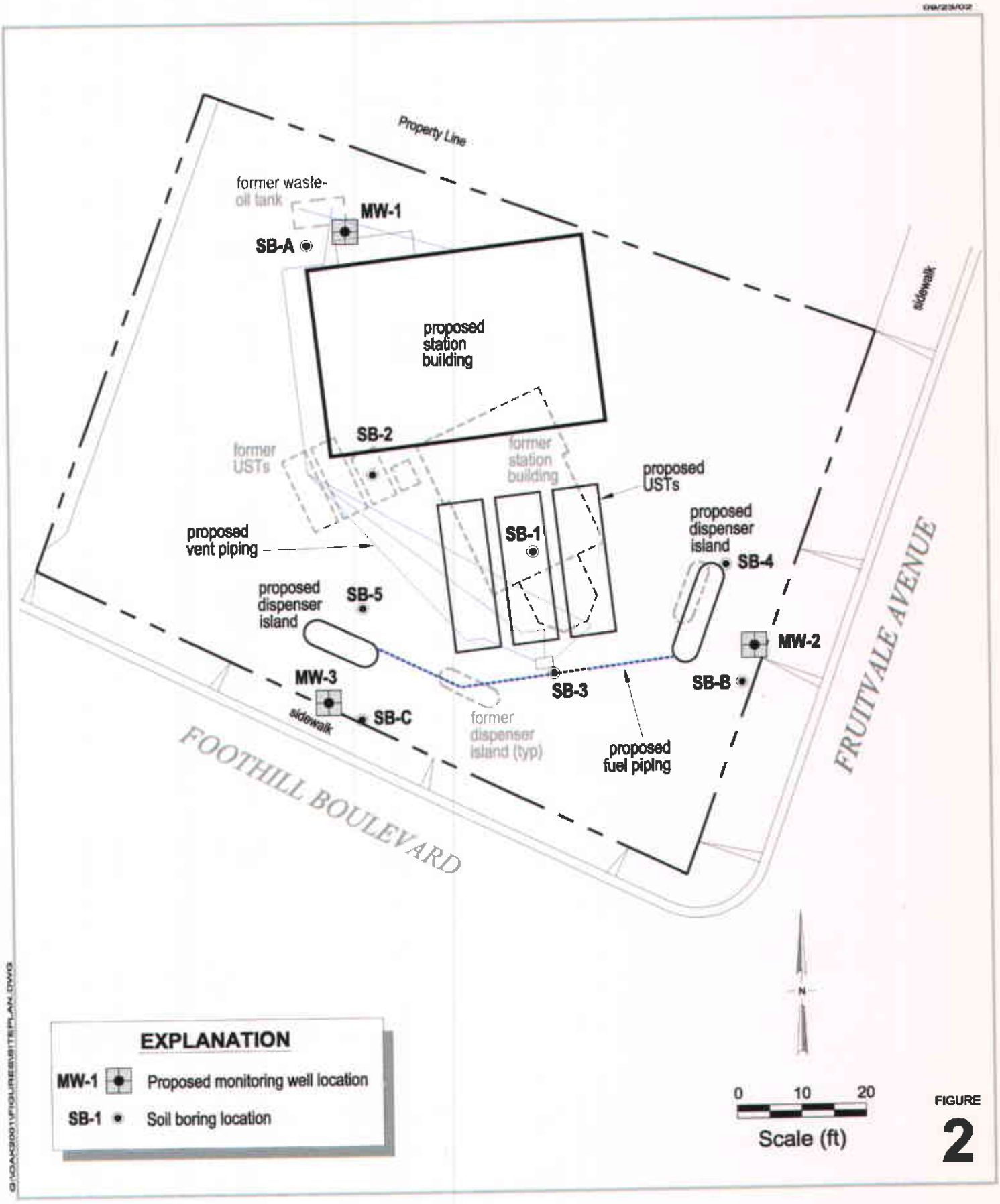


FIGURE
2

Former Shell Service Station
2001 Fruitvale Avenue
Oakland, California
Incident #97109122

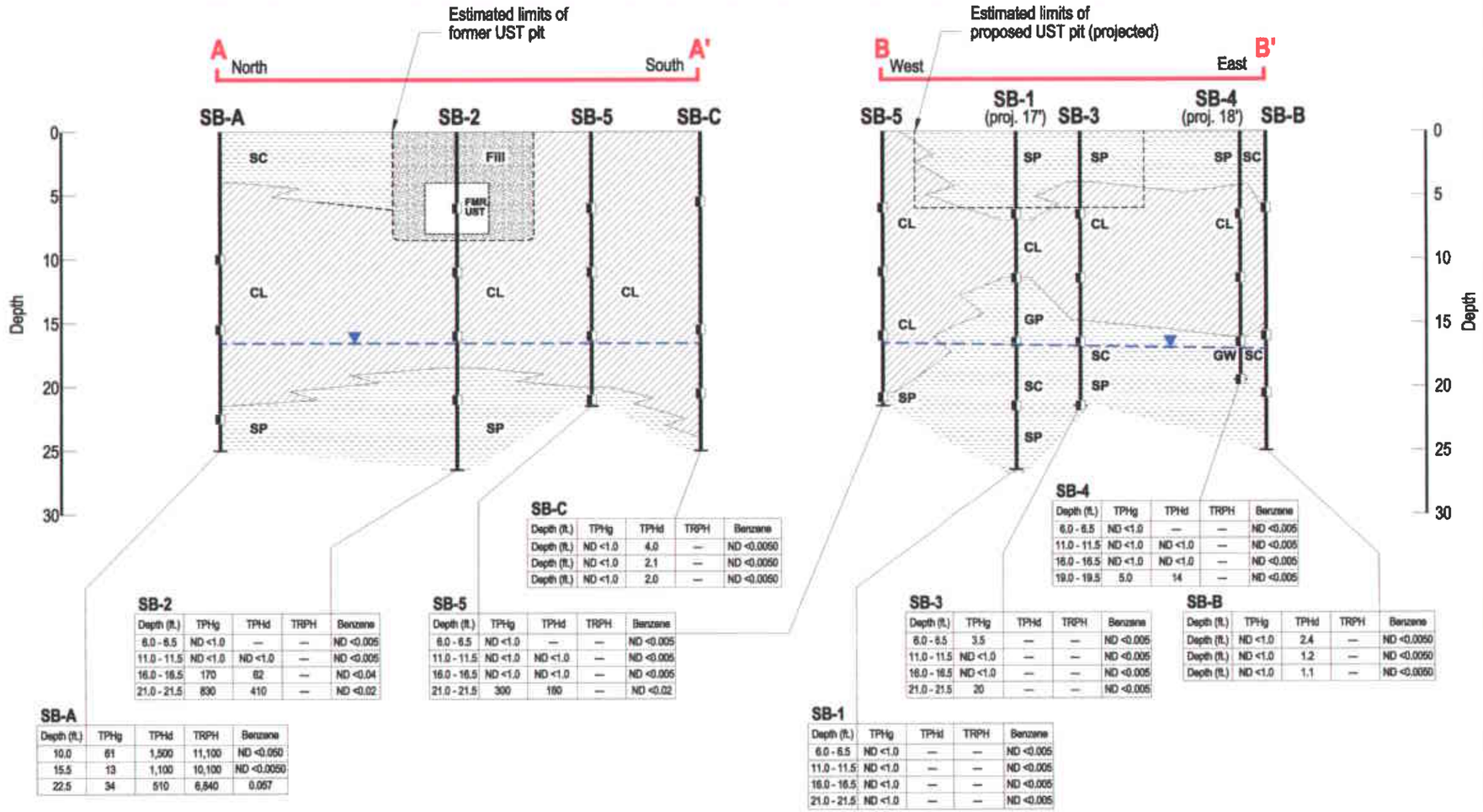
CAMBRIA

Proposed Monitoring Well and Soil Boring Locations

Former Shell Service Station

2001 Fruitvale Avenue
Oakland, California

Geologic Cross Sections
A - A' and B - B'



SB-C

Depth (ft.)	TPHg	TPHd	TRPH	Benzene
Depth (ft.)	ND <1.0	4.0	—	ND <0.0050
Depth (ft.)	ND <1.0	2.1	—	ND <0.0050
Depth (ft.)	ND <1.0	2.0	—	ND <0.0050

SB-4

Depth (ft.)	TPHg	TPHd	TRPH	Benzene
6.0 - 6.5	ND <1.0	—	—	ND <0.005
11.0 - 11.5	ND <1.0	ND <1.0	—	ND <0.005
16.0 - 16.5	ND <1.0	ND <1.0	—	ND <0.005
19.0 - 19.5	5.0	14	—	ND <0.005

SB-2

Depth (ft.)	TPHg	TPHd	TRPH	Benzene
6.0 - 6.5	ND <1.0	—	—	ND <0.005
11.0 - 11.5	ND <1.0	ND <1.0	—	ND <0.005
16.0 - 16.5	170	62	—	ND <0.04
21.0 - 21.5	830	410	—	ND <0.02

SB-5

Depth (ft.)	TPHg	TPHd	TRPH	Benzene
6.0 - 6.5	ND <1.0	—	—	ND <0.005
11.0 - 11.5	ND <1.0	ND <1.0	—	ND <0.005
16.0 - 16.5	ND <1.0	ND <1.0	—	ND <0.005
21.0 - 21.5	300	160	—	ND <0.02

SB-3

Depth (ft.)	TPHg	TPHd	TRPH	Benzene
6.0 - 6.5	3.5	—	—	ND <0.005
11.0 - 11.5	ND <1.0	—	—	ND <0.005
16.0 - 16.5	ND <1.0	—	—	ND <0.005
21.0 - 21.5	20	—	—	ND <0.005

SB-B

Depth (ft.)	TPHg	TPHd	TRPH	Benzene
Depth (ft.)	ND <1.0	2.4	—	ND <0.0050
Depth (ft.)	ND <1.0	1.2	—	ND <0.0050
Depth (ft.)	ND <1.0	1.1	—	ND <0.0050

SB-A

Depth (ft.)	TPHg	TPHd	TRPH	Benzene
10.0	61	1,500	11,100	ND <0.050
15.5	13	1,100	10,100	ND <0.0050
22.5	34	510	6,840	0.057

SB-1

Depth (ft.)	TPHg	TPHd	TRPH	Benzene
6.0 - 6.5	ND <1.0	—	—	ND <0.005
11.0 - 11.5	ND <1.0	—	—	ND <0.005
16.0 - 16.5	ND <1.0	—	—	ND <0.005
21.0 - 21.5	ND <1.0	—	—	ND <0.005

EXPLANATION

= Primarily Clay
= Primarily Sand and Gravel
= Fill (Tank Pit)

CL = Clay
GP = Poorly Graded Gravel
GW = Well Graded Gravel
SC = Clayey Sand
SP = Poorly Graded Sand

SB-1 Boring ID
Soil Boring
Bottom of boring

Soil sample location
Depth of Groundwater on 03/31/99
Groundwater Table

10
Scale (ft)
0
20

CAMBRIA

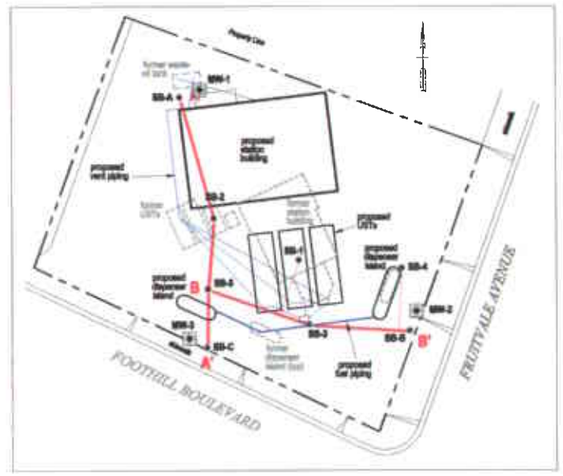


FIGURE 3

09/24/02

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ATTACHMENT A

Summary Tables of Soil and Groundwater Analytical Results

TABLE 2

SOIL ANALYTICAL DATA
Former Shell Service Station
2001 Fruitvale Avenue
Oakland, California
SAP Code 117941
Incident #97109122

Sample Depth (ft)	Date Sampled	TPPH (mg/kg)	TEPH (mg/kg)	TRPH (mg/kg)	B (mg/kg)	T (mg/kg)	E (mg/kg)	X (mg/kg)	MTBE (mg/kg)	Soil Type Soil Class)	Comments
SBA											
10.0	31-Mar-99	61	1500	11100	<0.050	<0.050	<0.050	0.21	<0.25	CL	Chromium-49 ppm, Lead-370 ppm, Nickel-82 ppm, Zinc-87 ppm. HVOCs ND except Tetrachloroethene-0.046 ppm. SVOCs ND except Phenol-3.6 ppm.
15.5	31-Mar-99	13	1100	10100	<0.0050	<0.0050	0.019	0.19	<0.025	CL	Chromium-37 ppm, Lead-410 ppm, Nickel-55 ppm, Zinc-70 ppm. HVOCs and SVOCs ND.
22.5	31-Mar-99	34	510	6840	0.057	0.41	0.16	0.45	0.26	SP	Chromium-17 ppm, Lead-14 ppm, Nickel-34 ppm, Zinc-29 ppm. HVOCs and SVOCs ND.
SBB											
6.0	31-Mar-99	<1.0	2.4	NA	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	SC	
16.0	31-Mar-99	<1.0	1.2	NA	<0.0050	<0.0050	<0.0050	<0.0050	0.042	SC	
20.5	31-Mar-99	<1.0	1.1	NA	<0.0050	<0.0050	<0.0050	<0.0050	0.026	CL	
SBC											
5.5	31-Mar-99	<1.0	4.0	NA	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	CL	
15.5	31-Mar-99	<1.0	2.1	NA	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	CL	
20.5	31-Mar-99	<1.0	2.0	NA	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	CL	

TABLE 2

SOIL ANALYTICAL DATA
Former Shell Service Station
2001 Fruitvale Avenue
Oakland, California
SAP Code 117941
Incident #97109122

Sample Depth (ft)	Date Sampled	TPPH (mg/kg)	TEPH (mg/kg)	TRPH (mg/kg)	B (mg/kg)	T (mg/kg)	E (mg/kg)	X (mg/kg)	MTBE (mg/kg)	Soil Type Soil Class)	Comments

Abbreviations and Notes:

NA = Not analyzed.

<x = Not detected at method detection limit of x.

TPPH = Total purgeable petroleum hydrocarbons carbon range C6 to C12 by EPA Method 8015 (Modified).

TEPH = Total extractable petroleum hydrocarbons by EPA Method 8015 (Modified).

TRPH = Total recoverable petroleum hydrocarbons by EPA Method 418.1.

BTEX = Benzene, toluene, ethylbenzene, and xylenes by EPA Method 8020.

MTBE = Methyl tertiary butyl ether by EPA Method 8020.

Cadmium, chromium, lead, nickel, and zinc by EPA Method 6010A.

HVOCs = Halogenated volatile organics by EPA Method 8010.

SVOCs = Semivolatile organics by EPA Method 8270.

TABLE 3

GROUNDWATER ANALYTICAL DATA
Former Shell Service Station
2001 Fruitvale Avenue
Oakland, California
SAP Code 117941
Incident #97109122

Sample	Date Sampled	TPPH (ug/L)	TRPH (ug/L)	TEPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE by 8020 (ug/L)	MTBE by 8260A (ug/L)	Comments
SBA-W											
	31-Mar-99	1100	23000	28000	13	<2.5	5.1	52	<12	<2.00	Chromium-35 ppb, Lead-710 ppb, Nickel-250 ppb, Zinc-170 ppb. HVOCs ND except cis-1,2-Dichloroethene-4.1 ppb, Tetrachloroethene-15 ppb, Trichloroethene-4.7 ppb. SVOCs ND except Bis(2-ethylhexyl)phthalate-35 ppb, Butyl benzyl phthalate-13 ppb, 2-Methylnaphthalene-46 ppb, Naphthalene-68 ppb, Pyrene-14 ppb.
SBB-W											
	31-Mar-99	5100	NA	3300	8.8	15	25	24	<25	<2.00	
SBC-W											
	31-Mar-99	2500	NA	890	1.3	25	5.8	19	8.5	<2.00	

Abbreviations:

NA = Not analyzed.

<x = Not detected at method detection limit of x.

TPPH = Total purgeable petroleum hydrocarbons carbon range C6 to C12 by EPA Method 8015 (Modified).

TPPH = Total extractable petroleum hydrocarbons by EPA Method 8015 (Modified).

TPPH = Total recoverable petroleum hydrocarbons by EPA Method 418.1.

BTEX = Benzene, toluene, ethylbenzene, and xylenes by EPA Method 8020.

MTBE = Methyl tertiary butyl ether.

Cadmium, chromium, lead, nickel, and zinc by EPA Method 200.7.

HVOCS = Halogenated volatile organics by EPA Method 8010.

SVOCS = Semivolatile organics by EPA Method 8270.

McCAMPBELL ANALYTICAL INC. 110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

ALLCAL Property Services	Client Project ID: # 1031396; 2001 Fruitvale Ave., Oakland	Date Sampled: 01/03/96
27973 High Country Drive		Date Received: 01/04/96
Hayward, CA 94542-2530	Client Contact: John Mrakovich	Date Extracted: 01/04-01/10/96
	Client P.O:	Date Analyzed: 01/04-01/10/96

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)+	Benzene	Toluene	Ethylben-zene	Xylenes	% Rec. Surrogate
60073	SB-1-6.0-6.5	S	ND	ND	ND	ND	ND	107
60074	SB-1-11.0-11.5	S	ND	ND	ND	ND	ND	109
60075	SB-1-16.0-16.5	S	ND	ND	ND	ND	ND	110
60076	SB-1-21.0-21.5	S	ND	ND	ND	ND	ND	107
60077	WSB 1	W	1300,a,i	2.5	1.7	4.7	6.6	113
60078	SB-2-6.0-6.5	S	ND	ND	ND	ND	ND	111
60079	SB-2-11.0-11.5	S	ND	ND	ND	ND	0.009	107
60080	SB-2-16.0-16.5	S	170,e	ND< 0.04	ND< 0.04	ND< 0.04	0.19	110
60081	SB-2-21.0-21.5	S	830,e	ND< 0.02	0.11	0.47	4.9	102
60082	WSB 2	W	3400,e,j,i,h	9.6	3.9	ND	14	97
60083	SB-3-6.0-6.5	S	3.5,j	ND	ND	ND	0.010	104
60084	SB-3-11.0-11.5	S	ND	ND	ND	ND	ND	111
60085	SB-3-16.0-16.5	S	ND	ND	ND	ND	ND	111
60086	SB-3-21.0-21.5	S	20,j	ND	0.005	ND	0.057	94
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, soil samples in mg/kg, and all TCLP extracts in mg/L

cluttered chromatogram; sample peak coelutes with surrogate peak

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (Stoddard solvent?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~ 5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC. 110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

ALLCAL Property Services 27973 High Country Drive Hayward, CA 94542-2530	Client Project ID: # 1031396; 2001 Fruitvale Ave., Oakland	Date Sampled: 01/03/96
		Date Received: 01/04/96
	Client Contact: John Mrakovich	Date Extracted: 01/04/96
	Client P.O:	Date Analyzed: 01/04-01/06/96

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)+	Benzene	Toluene	Ethylbenzene	Xylenes	% Rec. Surrogate
60087	SB-4-6.0-6.5	S	ND	ND	ND	ND	ND	105
60088	SB-4-11.0-11.5	S	ND	ND	ND	ND	0.011	106
60089	SB-4-16.0-16.5	S	ND	ND	ND	ND	ND	104
60090	SB-4-19.0-19.5	S	5.0,g	ND	ND	ND	0.014	104
60091	SB-5-6.0-6.5	S	ND	ND	ND	ND	ND	101
60092	SB-5-11.0-11.5	S	ND	ND	ND	ND	ND	111
60093	SB-5-16.0-16.5	S	ND	ND	ND	ND	ND	105
60094	SB-5-21.0-21.5	S	300,j	ND< 0.02	0.12	0.73	0.95	95
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, soil samples in mg/kg, and all TCLP extracts in mg/L

cluttered chromatogram; sample peak coelutes with surrogate peak

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~ 5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC. | 110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

ALLCAL Property Services 27973 High Country Drive Hayward, CA 94542-2530	Client Project ID: # 1031396; 2001 Fruitvale Ave., Oakland	Date Sampled: 01/03/96
		Date Received: 01/04/96
	Client Contact: John Mrakovich	Date Extracted: 01/04-01/05/96
	Client P.O:	Date Analyzed: 01/04-01/05/96

Diesel Range (C10-C23) Extractable Hydrocarbons as Diesel *

EPA methods modified 3015, and 3550 or 3510; California RWQCB (SF Bay Region) method GCFID(3550) or GCFID(3510)

Lab ID	Client ID	Matrix	TPH(d)+	% Recovery Surrogate
60079	SB-2-11.0-11.5	S	ND	97
60080	SB-2-16.0-16.5	S	62,e,g	100
60081	SB-2-21.0-21.5	S	410,e,g	114#
60082	WSB 2	W	40,000,e,h,i	108
60088	SB-4-11.0-11.5	S	ND	98
60089	SB-4-16.0-16.5	S	ND	103
60090	SB-4-19.0-19.5	S	14,d/b	102
60092	SB-5-11.0-11.5	S	ND	102
60093	SB-5-16.0-16.5	S	ND	102
60094	SB-5-21.0-21.5	S	160,d,b	102
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	
		S	1.0 mg/kg	

* water samples are reported in ug/L, soil samples in mg/kg, and all TCLP and STLC extracts in mg/L

cluttered chromatogram resulting in coelured surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

+ The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified diesel is significant; b) diesel range compounds are significant; no recognizable pattern; c) aged diesel? is significant); d) gasoline range compounds are significant; e) medium boiling point pattern that does not match diesel (Stoddard solvent?); f) one to a few isolated peaks present; g) oil range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~ 5 vol. % sediment.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC. | 110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

ALLCAL Property Services 27973 High Country Drive Hayward, CA 94542-2550	Client Project ID: # 1031396; 2001 Fruitvale Ave., Oakland	Date Sampled: 01/03/96
		Date Received: 01/04/96
	Client Contact: John Mrakovich	Date Extracted: 01/05/96
	Client P.O:	Date Analyzed: 01/05/96

Lead*

EPA analytical methods 6010/200.7, 239.2+

Lab ID	Client ID	Matrix	Extraction°	Lead*	% Recovery Surrogate
60076	SB-1-21.0-21.5	S	TTLC	8.7	96
60077	WSB 1	W	TTLC	0.20,i	NA
60081	SB-2-21.0-21.5	S	TTLC	7.9	97
60082	WSB 2	W	TTLC	0.19,i	NA
60086	SB-3-21.0-21.5	S	TTLC	3.0	102
60090	SB-4-19.0-19.5	S	TTLC	8.3	100
60094	SB-5-21.0-21.5	S	TTLC	3.2	97

Reporting Limit unless otherwise stated; ND means not detected above the reporting limit	S	TTLC	3.0 mg/kg
	W	TTLC	0.005 mg/L
	—	STLC,TCLP	0.2 mg/L

* soil samples are reported in mg/kg, and water samples and all STLC & TCLP extracts in mg/L

+ Lead is analyzed using EPA method 6010 (ICP)for soils, STLC & TCLP extracts and method 239.2 (AA Furnace) for water samples

o EPA extraction methods 1311(TCLP), 3010/3020(water,TTLC), 3040(organic matrices,TTLC), 3050(solids,TTLC); STLC from CA Title 22

surrogate diluted out of range; N/A means surrogate not applicable to this analysis

i) liquid sample that contains greater than ~ 2 vol. % sediment; this sediment is extracted with the liquid, in accordance with EPA methodologies and can significantly effect reported metal concentrations.

DHS Certification No. 1644

Edward Hamilton, Lab Director

ATTACHMENT B

Copy of 1957 Plot Plan

ATTACHMENT C

Copies of Boring Logs

LOG OF EXPLORATORY BORING

PROJECT NUMBER 103
PROJECT NAME 2001 FRUITVALE AVE. OAKLAND, CA
BY J.V.M. DATE 1/3/96

BORING NO. SB-1
PAGE
SURFACE ELEV.

Recovery (ft/ft)	OVA (ppm)	Penetration (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SP	AGGREGATE BASE, GRAVELLY SAND (SP), dark grey to black, medium to coarse-grained, damp, no odor.
1.5/ 1.5	28	18		5		SP	SAND (SP), brown, medium to fine-grained, clayey, green staining, damp, gasoline odor.
1.5/ 1.5	26	26		10		CL	CLAY (CL), red-brown, sandy, gravelly, dry, no odor.
						GP	GRAVEL (GP), grey, medium to coarse-grained, minor clay, dry, slight odor.
1.5/ 1.5	16	28		15			
						SC	CLAYEY, GRAVELLY SAND (SC), red-brown, mottled with green stains at 20-21 feet, damp, no odor.
1.5/ 1.5	14	20		20			SAND (SP), brown, fine-grained, damp, no odor.
						SP	Driller reports water @ 23 feet.
1.5/ 1.5	-	14		25		SP	SAND (SP), brown, medium to coarse-grained, gravelly, saturated, no odor.
							Collected "grab" groundwater sample.
							Boring terminated at 26.5 feet.

REMARKS

Boring drilled with continuous-flight, hollow-stem, 7-inch O.D. augers. Samples collected in a 2-inch I.D. California sampler. Boring sealed to ground surface with neat cement.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 103
PROJECT NAME 2001 FRUITVALE AVE. OAKLAND, CA
BY J.V.M. DATE 1/3/96

BORING NO. SB-2
PAGE
SURFACE ELEV.

Recovery (ft/ft)	OVA (ppm)	Penetration (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						GP	AGGREGATE BASE, GRAVEL (GP), red-brown, sandy, clayey, dry, no odor.
						SP	
1.5/ 1.5	5	8		5		SP	SAND (SP), dark red-brown, gravelly, minor clay, damp, no odor.
							SAND (SP), dark red-brown to black, fine-grained, damp, no odor.
1.5/ 1.5	88	27		10		CL	CLAY (CL), red-brown, sandy, gravelly, damp, no odor.
							Driller reports gravel lens @ 13.5-14.0 feet.
1.5/	140	20		15		CL	CLAY(CL), green, damp, gasoline odor.
							GRAVELLY SAND (SP), green, medium to coarse-grained, very damp, gasoline odor.
1.5/ 1.5	630	26		20		SP	
							SAND (SP), mottled brown and grey, clayey, fine-grained, saturated, gasoline odor.
1.5/ 1.5	-	44		25		SP	Collected "grab" groundwater sample.
							Boring terminated at 26.5 feet.

REMARKS

Boring drilled with continuous-flight, hollow-stem, 7-inch O.D. augers. Samples collected in a 2-inch I.D. California sampler. Boring sealed to ground surface with neat cement.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 103
PROJECT NAME 2001 FRUITVALE AVE. OAKLAND, CA
BY J.V.M. DATE 1/3/96

BORING NO. SB-3
PAGE
SURFACE ELEV.

Recovery (ft/ft)	OVA (ppm)	Penetration (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SP	SAND (SP), brown, medium to fine-grained, concrete fragments, damp, slight gasoline odor.
.75/ 1.5	–	24		5		CL	GRAVELLY CLAY (CL), mottled red-brown and black, sandy, dry, no odor.
1.5/ 1.5	6	20		10		CL	CLAY (CL), red-brown, sandy, gravelly, damp, no odor.
							CLAYEY SAND (SC), brown, gravelly, organics, damp, no odor.
1.5/ 1.5	19	21		15		SC	GRAVELLY SAND (SP), mottled brown and yellow, clayey, damp, no odor.
						SP	Strong gasoline odor in cuttings @ 18.5 feet.
1.5/	98	49		20		SP	GRAVELLY SAND (SP), green, medium to coarse-grained, very damp, strong gasoline odor.
							Boring terminated at 21.5 feet.

REMARKS

Boring drilled with continuous-flight, hollow-stem, 7-inch O.D. augers. Samples collected in a 2-inch I.D. California sampler.

Boring sealed to ground surface with neat cement.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 103
PROJECT NAME 2001 FRUITVALE AVE. OAKLAND, CA
BY J.V.M. DATE 1/3/96

BORING NO. SB-4
PAGE
SURFACE ELEV.

Recovery (ft/ft)	OVA (ppm)	Penetration (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
						SP	AGGREGATE BASE, GRAVELLY SAND (SP), dark grey, damp, no odor.
1.5/ 1.5	13	31		5		CL	SAND (SP), brown, gravelly, clayey, damp, no odor.
							SANDY CLAY (CL), dark grey, damp, no odor.
1.5/ 1.5	12	25		10		CL	SANDY GRAVELLY CLAY (CL), dark olive-brown, damp, no odor.
							Dark red-brown @ 10.0 to 11.5 feet.
1.5/ 1.5	18	20		15			Yellow-brown @ 15.0 to 16.5 feet.
						GW	SANDY GRAVEL (GW), mottled green, brown, and yellow, medium to coarse-grained, damp, no odor.
1.5/ 1.5	22	55		20			Boring terminated at 19.5 feet due to difficult drilling in gravel.

REMARKS

Boring drilled with continuous-flight, hollow-stem, 7-inch O.D. augers. Samples collected in a 2-inch I.D. California sampler.

Boring sealed to ground surface with neat cement.

LOG OF EXPLORATORY BORING

PROJECT NUMBER 103
PROJECT NAME 2001 FRUITVALE AVE. OAKLAND, CA
BY J.V.M. DATE 1/3/96

BORING NO. SB-5
PAGE
SURFACE ELEV.

Recovery (ft/ft)	OVA (ppm)	Penetration (blws/ft)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOGRAPHIC COLUMN	DESCRIPTION
							AGGREGATE BASE, GRAVELLY SAND (SP), dark brown, medium-grained, damp, no odor.
1.5/ 1.5	13	36		5			GRAVELLY CLAY (CL), dark red-brown, sandy, damp, no odor.
						CL	SANDY CLAY (CL), brown, damp, no odor.
1.5/ 1.5	13	24		10			Driller reports water @ 21.5 feet.
							GRAVELLY SAND (SP), green, large gravel fragments, sandy, wet, strong gasoline odor.
1.5/ 1.5	23	11		15			Boring terminated at 21.5 feet.
						CL	
1.5/ 1.5	400	20		20		SP	

REMARKS

Boring drilled with continuous-flight, hollow-stem, 7-inch O.D. augers. Samples collected in a 2-inch I.D. California sampler. Boring sealed to ground surface with neat cement.

Field Exploratory Boring Log SBA

PID (ppm)	Blows/ 6"	Sample Number	Well Construction	Depth (ft)	Soil Group (USCS)	Materials Description
	Sampled using pneumatic hammer; blow counts not available.					Clayey Sand (SC) Brown; loose; damp; 15% clay, 5% silt, 65% sand, 15% gravel.
83.5		SBA 5.5 SBA 6.0		5		Clay (CL) Grayish brown; stiff; dry; 55% clay, 20% silt, 25% sand; low plasticity.
		SBA 10.0 SBA 10.5		10		@ 10': as above, dry.
96.8						
305		SBA 15.5 SBA 16.0		15		@ 15': as above, dry; 40% clay, 5% silt, 30% sand, 25% gravel.
387		SBA 20.5 SBA 21.0		20		@ 20': as above, very stiff; dry; 40% clay, 15% silt, 30% sand, 15% gravel.
		SBA 22.5 SBA 23.0				Sand (SP) Gray; loose; wet; 5% clay, 80% sand, 15% gravel.
1999+		SBA 24.5 SBA 25.0		25		Total Depth of Boring = 25.0 feet
				30		

BORING
SBA

Former Shell Service Station
2001 Fruitvale
Oakland, California

Borehole Diameter:	2 inches
Logged by:	T. Buggle
Driller:	Gregg
Date Started:	31-Mar-99
Date Completed:	31-Mar-99

CAMBRIA
241-1296

Field Exploratory Boring Log SBB

PID (ppm)	Blows/ 6"	Sample Number	Well Construction	Depth (ft)	Soil Group (USCS)	Materials Description
	Sampled using pneumatic hammer; blow counts not available.					Clayey Sand (SC) Brown; loose; dry; 15% clay, 80% sand, 5% gravel.
18		SBB 5.5 SBB 6.0		5		@ 5': as above, medium dense; dry; 25% clay, 60% sand, 15% gravel.
12.3		SBB 10.5 SBB 11.0		10		Clay (CL) Brown; stiff; dry; 55% clay, 5% silt, 20% sand, 20% gravel; low plasticity.
17.4		SBB 15.5 SBB 16.0		15		Clayey Sand (SC) Brown; medium dense; dry; 35% clay, 10% silt, 55% sand.
						@ 19': as above, grayish brown; damp; 40% clay, 35% sand, 25% gravel.
21.2		SBB 20.5 SBB 21.0		20		@ 22': as above, gray; loose; wet; 25% clay, 75% sand.
		SBB 23.5				
1675		SBB 24.5 SBB 25.0		25		@ 24': as above, medium dense; wet; 20% clay, 60% sand, 20% gravel. Total Depth of Boring = 25.0 feet
				30		

BORING
SBB

Former Shell Service Station
2001 Fruitvale
Oakland, California

Borehole Diameter:	2 inches
Logged by:	T. Buggle
Driller:	Gregg
Date Started:	31-Mar-99
Date Completed:	31-Mar-99

CAMBRIA

241-1296

Field Exploratory Boring Log SBC

PID (ppm)	Blows/ 6"	Sample Number	Well Construction	Depth (ft)	Soil Group (USCS)	Materials Description
	Sampled using pneumatic hammer; blow counts not available.					Clay (CL) Brown; soft; damp; 50% clay, 5% silt, 40% sand, 5% gravel; low plasticity.
39		SBC 5.5 SBC 6.0		5		@ 5': as above, stiff; dry; 65% clay, 30% silt, 5% sand.
43		SBC 10.5 SBC 11.0		10		@ 10': as above, dark brown; dry; 60% clay, 20% silt, 15% sand, 5% gravel.
33		SBC 15.5 SBC 16.0		15		@ 15': as above, brown; soft; dry; 60% clay, 5% silt, 35% sand.
16		SBC 20.5 SBC 21.0		20		@ 20': as above, grayish brown; medium stiff; damp; 50% clay, 35% sand, 15% gravel.
		SBC 22.5				
160		SBC 24.5 SBC 25.0		25		Sand (SP) Light gray; loose; wet; 10% clay, 90% sand.
				30		Total Depth of Boring = 25.0 feet

BORING
SBC

Former Shell Service Station
2001 Fruitvale
Oakland, California

Borehole Diameter:	2 inches
Logged by:	T. Buggle
Driller:	Gregg
Date Started:	31-Mar-99
Date Completed:	31-Mar-99

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241-1296

ATTACHMENT D

Standard Field Procedures for Monitoring Well Installation

CAMBRIA

STANDARD FIELD PROCEDURES FOR MONITORING WELL INSTALLATION

This document presents standard field methods for drilling and sampling soil borings and installing, developing and sampling groundwater monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

SOIL BORINGS

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and to collect samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of a California Registered Geologist (RG).

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or direct-push technologies such as the Geoprobe®. Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. Additional soil samples are collected near the water table and at lithologic changes. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments at the bottom of the borehole.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Analysis

Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4° C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable volatile vapor analyzer measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. Volatile vapor analyzer measurements are used along with the field observations, odors, stratigraphy and groundwater depth to select soil samples for analysis.

Water Sampling

Water samples, if they are collected from the boring, are either collected using a driven Hydropunch® type sampler or are collected from the open borehole using bailers. The groundwater samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Well Construction and Surveying

Groundwater monitoring wells are installed to monitor groundwater quality and determine the groundwater elevation, flow direction and gradient. Well depths and screen lengths are based on groundwater depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 fee below and 5 feet above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three feet thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two feet above the well screen. A two feet thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of Portland type I,II cement.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security.

The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

Well Development

Wells are generally developed using a combination of groundwater surging and extraction. Surging agitates the groundwater and dislodges fine sediments from the sand pack. After about ten minutes of surging, groundwater is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of groundwater are extracted and the sediment volume in the groundwater is negligible. This process usually occurs prior to installing the sanitary surface seal to ensure sand pack stabilization. If development occurs after surface seal installation, then development occurs 24 to 72 hours after seal installation to ensure that the Portland cement has set up correctly.

All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

Groundwater Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of groundwater are purged prior to sampling. Purging continues until groundwater pH, conductivity, and temperature have stabilized. Groundwater samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

Waste Handling and Disposal

Soil cuttings from drilling activities are usually stockpiled onsite and covered by plastic sheeting. At least three individual soil samples are collected from the stockpiles and composited at the analytic laboratory. The composite sample is analyzed for the same constituents analyzed in the borehole samples in addition to any analytes required by the receiving disposal facility. Soil cuttings are transported by licensed waste haulers and disposed in secure, licensed facilities based on the composite analytic results.

Groundwater removed during development and sampling is typically stored onsite in sealed 55-gallon drums. Each drum is labeled with the drum number, date of generation, suspected contents, generator identification and consultant contact. Upon receipt of analytic results, the water is either pumped out using a vacuum truck for transport to a licensed waste treatment/disposal facility or the individual drums are picked up and transported to the waste facility where the drum contents are removed and appropriately disposed.