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August 26, 2004

Mr. Barney Chan
Alameda County Health Care Services
Department of Environmental Health
1131 Harbor Bay Parkway Suite 250
Alameda, California 94502-6577

Re: **Soil Vapor Assessment Workplan**
Chevron Service Station #9-0076
4265 Foothill Boulevard
Oakland, California

Dear Mr. Chan:

On behalf of Chevron Environmental Management Company (ChevronTexaco), Cambria Environmental Technology, Inc. (Cambria) submits this soil vapor assessment workplan for the referenced site (Figure 1). The purpose of this investigation is to collect a horizontal and vertical profile of soil vapors to evaluate potential hydrocarbon vapor inhalation risks to residents of the adjacent properties. The acquired vapor data will be compared to conservative Environmental Screening Levels (ESLs) defined by the Regional Water Quality Control Board-San Francisco Bay Region (RWQCB-SFBR) guidelines, as noted in the *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater Interim Final,* dated July 2003. If concentrations are above ESLs, a quantitative risk evaluation will be prepared using site-specific data. The site background and our proposed scope of work are presented below.

SITE DESCRIPTION

The site is an operating Chevron service station located at the northwest corner of High Street and Foothill Boulevard in Oakland, California (Figure 1). It is located on the East Bay Plain, approximately 0.75 mile northeast of the Brooklyn Basin Tidal Canal of the Oakland Estuary. The site is relatively flat at an elevation of approximately 35 feet above mean sea level. The nearest surface water body is the tidal canal mentioned above. Shallow groundwater beneath the site flows to the southwest. The surrounding land use is characterized by commercial and residential developments. A Union 76 station (former BP) is located to the northeast across Foothill Boulevard and a former Shell station is located across High Street to the southeast. Both adjacent stations have ongoing environmental monitoring programs. Chevron purchased the subject property, developed it into a service station, and began operations in 1966. The station and all site facilities were reconstructed in 1987 into its current configuration. Product lines were upgraded in 1997.

Cambria Environmental Technology, Inc.

5900 Hollis Street
Suite A
Emeryville, CA 94608
Tel (510) 420-0700
Fax (510) 420-9170

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Current site facilities consist of three fuel underground storage tanks (USTs), a kiosk, and five dispenser islands beneath a common canopy. Three 10,000-gallon double-walled fiberglass gasoline USTs are located in a common excavation directly southwest of the kiosk. Former USTs were located in the same excavation. A former used-oil UST was located southwest of the kiosk and adjacent to the gasoline UST complex. The used-oil UST was removed and was not replaced.

SITE HISTORY

May 1987 Tank Removal and Replacement: In May 1987, Blaine Tech Services removed three steel fuel USTs and one fiberglass used-oil UST. An unknown volume of excavated backfill material was aerated and reused onsite. Additional impacted soil was disposed of at a Chevron-approved non-hazardous landfill. Three 10,000-gallon double-walled fiberglass USTs were installed in the same excavation in June 1987. Soil samples collected beneath the former fuel USTs contained maximum concentrations of total petroleum hydrocarbons as gasoline (TPHg) and benzene at 21 milligrams per kilogram (mg/kg) and 0.57 mg/kg, respectively. Soil samples collected beneath the former used-oil UST contained maximum concentrations of total oil and grease (TOG) and benzene at 100 mg/kg and 5.0 mg/kg, respectively. Details are available in Blaine Tech's June 4, 1987 *Sampling Report.*

July 1987 Excavation: On July 8, 1987, during excavation work to install a sign along Foothill Boulevard, petroleum hydrocarbon odors and a small amount of water with a product sheen were reported in the 11-foot deep pit. Details are available in Blaine Tech's June 4, 1987 *Sampling Report.*

August 1987 Well Installation: In August 1987, Pacific Environmental Group, Inc. (PEG) advanced one boring, C-A, and drilled and installed four 3-inch diameter groundwater monitoring wells C-1 through C-4. No hydrocarbons were detected in soil collected from C-1. Maximum concentrations of TPHg and benzene in soil were detected in boring C-A at 3,600 mg/kg and 33 mg/kg, respectively. Maximum concentrations from all borings were detected from the first interval of soil samples collected between 8.5 to 10.5 feet below grade (fbg). Initial groundwater samples contained maximum concentrations of TPHg and benzene at 22,000 micrograms per liter (µg/l) and 800 µg/l, respectively, in C-1 located near C-A. C-2 was reported to contain non-aqueous phase liquid (NAPL) at a measured thickness of >2.0 feet and was not sampled. Details are available in PEG's September 23, 1987 *Soil and Groundwater Investigation* report.

July/August 1990 Monitoring Well Installation: In July and August 1990, Weiss Associates (Weiss) drilled and installed 2-inch diameter wells C-5 through C-7. Well C-8 was subsequently installed in November 1990. C-5 was installed onsite and the remaining wells offsite. No hydrocarbons were detected in soil collected from C-8. Maximum concentrations of TPHg and benzene in soil were detected at 54 mg/kg and 0.5 mg/kg in onsite boring C-5 at approximately 11 fbg. The first

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groundwater sampling event including all wells indicated that only offsite wells C-6 and C-7 contained dissolved-phase hydrocarbons. The maximum concentrations of TPHg and benzene from offsite wells were 7,200 µg/l and 2,100 µg/l, respectively, in C-6. Weiss also conducted a well survey within a one-half mile radius of the site. The well survey identified 40 wells in the search area. Of these, two were cathodic protection wells, one irrigation, one industrial, and the remaining were monitoring wells. The irrigation well was reported <0.75 miles upgradient of the site. No domestic or municipal water supply wells were identified within the search area. Based on depth to water measurements, Weiss suggested that groundwater beneath the site may be perched. Depth to water in onsite well C-4 and offsite well C-6 differed by approximately 14 feet in 1990. Details are available in Weiss's December 18, 1990 *Subsurface Investigation* report.

November 1991 Groundwater Extraction: In an attempt to achieve hydraulic control of dissolved hydrocarbons, Weiss began operating a groundwater treatment system extracting groundwater from C-2 in November 1991. The system operated until October of 1993 and extracted approximately 11,200-gallons of impacted groundwater. System operations were terminated due to noise complaints from the neighbors and low flow rates. Details were obtained from Weiss's July 30, 1993 *Monthly Monitoring Report.*

July 1996 Well Installation: PEG installed 2-inch diameter well C-9 on July10, 1996, downgradient of C-7 in the Albertson's supermarket parking lot. No benzene, toluene, ethylebenzene or xylenes (BTEX) were detected in any soil sample. TPHg was detected at 1.2 and 1.1 mg/kg in soil collected at 10 and 20 fbg, respectively. These TPHg concentrations were reported as unidentified hydrocarbons <C8. No hydrocarbons or methyl tertiary butyl ether (MTBE) were detected in groundwater in C-9, during the first round of sampling. Details are available in PEG's October 2, 1996 *Off-Site Monitoring Well Installation Report.*

July 1997 Product Line Upgrades: In July 1997, Gettler-Ryan (G-R) collected soil samples during partial product piping replacement in conjunction with dispenser and UST containment upgrades. Soil was excavated beneath the dispensers to accommodate new containment requirements and beneath the product piping. Five soil samples were collected, PL1 through PL5, at approximately 4 fbg. Hydrocarbons were detected in all samples. Maximum concentrations of TPHg, benzene, and MTBE were 210, 0.64 and 10 mg/kg, respectively. Approximately 46 tons of soil were excavated and disposed of offsite. Details are available in G-R's September 24, 1997, *Soil Sampling During Product Dispenser Upgrade and Partial Product Line Replacement* report.

1998-2000 Site Conceptual Model and Risk-Based Corrective Action (RBCA) Plan: In May 1998, Delta Environmental Consultants, Inc. (Delta) completed a RBCA evaluation using analytic results from soil and groundwater assessment activities. This was followed by a site conceptual model (SCM) and proposed RBCA plan. The SCM indicated that the primary potential exposure receptors are

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current and future residents of properties near the intersection of High and Bond Streets and, possibly, workers and customers in the Albertson's parking lot. The only complete exposure pathway is hydrocarbon volatilization from groundwater to outdoor and indoor air. Secondary potential exposure pathways are hydrocarbon volatilization from soil or direct dermal contact. A Tier 2 RBCA analysis was performed and showed that onsite and offsite representative concentrations exceeded the site-specific target levels (SSTLs) for benzene. Delta concluded the adjacent residence with a basement may be at risk for benzene inhalation and recommended that site specific soil vapor samples be collected to evaluate current soil vapor levels. Natural attenuation in soil and groundwater is occurring at this site. Delta also recommended continued use of oxygen release compound (ORC) to enhance bioremediation and continued over-purging of C-1 through C-4. Details are available in Delta's July 28, 2000 *Site Conceptual Model and Risk-Based Corrective Action Plan.*

SITE CONDITIONS

Soil Lithology: The site is underlain primarily by alluvial deposits consisting of clayey sand, coarse sand, silty clays and gravel to the total depth explored of 59 fbg.

Groundwater: Historically, depth to groundwater has ranged from approximately 7 fbg to 30 fbg. Groundwater typically flows to the southwest.

Hydrocarbon Concentrations in Groundwater: Separate-phase hydrocarbons (SPH) were observed on the water table in onsite well C-2 located down-gradient of the dispenser islands and UST complex during various quarterly monitoring events from August 1989 to December 1996. Historical maximum concentrations of TPHg, benzene, and MTBE in groundwater were 1,000,000 (C-2, 6/98), 30,000 (C-2, 4/89) and 4,600 μg/l (C-4, 9/97), respectively. Results of the Second Quarter 2004 event show maximum concentrations of TPHg, benzene, and MTBE in C-1 at 2,300, 840 and 1,100 μg/l, respectively. Although concentration trends over time appear to decrease steadily, concentrations have exhibited significant fluctuations that appear to be a result of fluctuating groundwater elevations.

PROPOSED SCOPE OF WORK

To evaluate potential hydrocarbon vapor inhalation risks to residents of adjacent properties associated with volatilized hydrocarbons from soil and groundwater beneath the site, Cambria proposes to advance 3 borings (VP-1 through VP-3) along the southern property boundary to approximately 12 fbg and install three discrete vapor sampling points in each at depths of 6.5, 9 and 11.5 fbg. The proposed locations of these borings are shown on Figure 2. To complete the scope of work, Cambria proposes to perform the following tasks:

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

Permits: Cambria will obtain boring permits from the Alameda County Public Works Agency prior to the beginning of field operations. This agency will be notified a minimum of 72 hour prior to drilling activities.

Underground Utility Location: Cambria will contact Underground Service Alert (USA) prior to drilling to identify locations of utilities in the proposed work area and review Chevron site plans. Cambria will contact the current owner to obtain any new site plans and information of any new or modified utilities.

Utility Clearance: As per Chevron safety requirements, each boring location will be cleared to 8 fbg using an air-knife assisted vacuum truck prior to advancing soil borings in an attempt to locate unknown utilities.

Soil Borings and Sampling Technique: Cambria proposes to advance borings VP-1 through VP-3 and install three permanent discrete soil vapor probes in each as illustrated on Figure 3. It is estimated that the total depth of borings will not exceed 12 fbg. Proposed boring locations are presented on Figure 2. Soil samples will be collected using a hand-auger above 8 fbg, and using a split-spoon sampler at depths greater than 8 fbg. Borings will be continuously logged. Actual locations will be based on site and utility constraints and determined in the field. Cambria's standard field procedures for soil borings are presented as Attachment A.

Vapor Probe Construction and Vapor Sampling: Vapor probes will be constructed of 1-inch diameter Schedule 40 slotted PVC. Each probe will be capped and a fitting placed on the upper end connecting polyethylene tubing from the probe to the surface. Each probe will be placed at the desired depth and surrounded by a sand pack. Each probe will be isolated from the others by a bentonite grout mixture. Vapor points will be finished at the surface using a traditional well vault. Collection of soil vapor samples will be conducted at least 48 hours after the placement of the probes. Samples from soil vapor points VP-1 through VP-3 will be collected using 30-minute flow meters and 6-liter Summa™ canisters connected to the sampling tubing at each vapor point. A battery powered air pump with attached vacuum-chamber and Tedlar™ bag will be used to purge an appropriate volume from the sampling point tubing. After purging, the valve between the purge pump and Summa™ canister will be closed and the Summa™ canister valve will be opened. The vacuum of the Summa™

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canister will be used to draw the soil vapor through the flow controller until a negative pressure of approximately 5-inches of Hg is observed on the vacuum gauge. After sampling, the Summa™ canisters will be packaged and sent to the Air Toxics laboratory under chain-of-custody for analysis. Standard Field Procedures for Soil and Soil Vapor Sampling are presented as Attachment B.

Vapor Chemical Analysis: Vapor samples will be analyzed for the following analytes:

- TPHg, BTEX, and MTBE by EPA Method TO-14,
- O_2 and CO_2 by ASTM 1946 (GC/TCD).

Soil Chemical Analysis: Select soil samples from the vapor point borings will be analyzed for the following analytes:

- TPHg by EPA Method 8015 modified,
- BTEX and oxygenates MTBE, tertiary butyl alcohol (TBA), tertiary amyl methyl ether (TAME), ethyl tertiary butyl ether (ETBE), di isopropyl ether (DIPE), and lead scavengers 1,2 dichloroethane (1,2-DCA) and ethylene dibromide (EDB) by EPA Method 8260B, and
- Physical parameters including moisture content, bulk density, porosity, organic carbon and effective permeability in soil samples collected below 8 fbg. Samples collected from above 8 fbg will be disturbed and any measurement of physical parameter will be meaningless.

Soil Disposal: Soil cuttings will be temporarily stockpiled onsite, placed on and covered with visqueen. Cuttings will be sampled, profiled and transported to an appropriate ChevronTexaco-approved disposal facility.

Reporting: After the analytic results are received, we will prepare a subsurface investigation report that, at a minimum, will contain:

- A summary of the site background and history,
- Descriptions of the drilling and sampling methods,
- Boring logs,
- Tabulated soil and vapor analytic results,
- A figure illustrating the boring/sampling locations,
- Analytic reports and chain-of-custody forms,

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- Soil disposal methods, and
- A discussion of the findings.

Results of vapor analyses will be provided to Chevron's risk assessment specialist for evaluation. The evaluation of risk will be summarized in a separate document and submitted under separate cover.

SCHEDULE

Cambria will schedule this investigation following receipt of written approval of this workplan. Once approved, Cambria will obtain the necessary boring permits. We will submit our investigation report approximately four to six weeks after receiving the analytic data.

CLOSING

Please contact Mr. Robert Foss at (510) 420-3348 if you have any questions or comments.

Sincerely,
Cambria Environmental Technology, Inc.

Dorothy Jmaloes For:

Sarah Owen
Senior Staff Geologist

Robert Foss

Robert Foss, R.G. #7445
Associate Geologist

REGISTERED GEOLOGIST
ROBERT C. FOSS
exp 02/06
No. 7445
STATE OF CALIFORNIA

Figures: 1 - Vicinity Map
2 - Site Plan with Proposed Vapor Point Locations
3 - Soil Vapor Point

Attachments: A – Standard Field Procedures of Soil Borings
B – Standard Field Procedures for Soil Vapor Sampling

cc: Karen Streich, ChevronTexaco, P.O. Box 6012, San Ramon, California 94583

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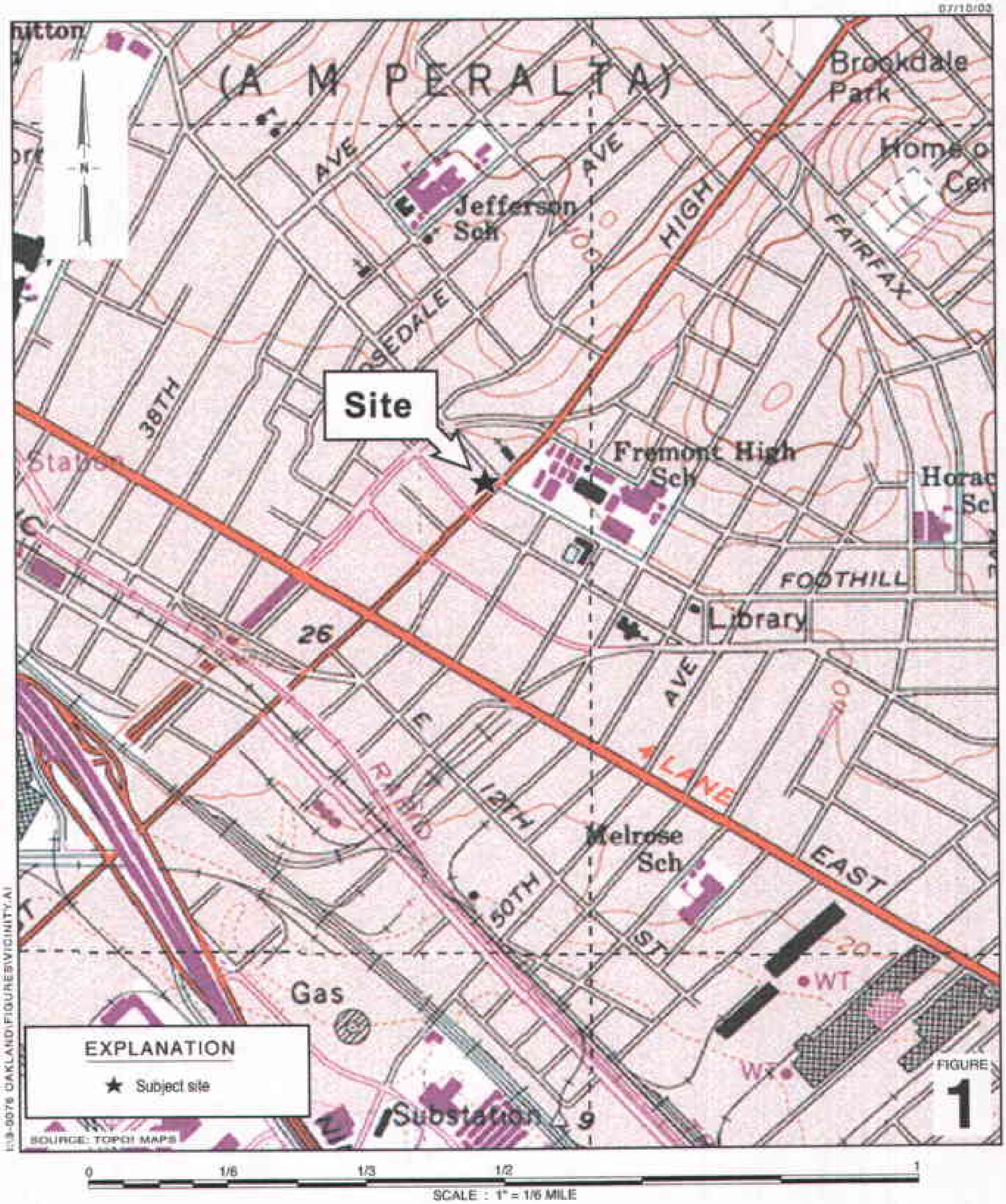

Chevron Service Station 9-0076

4265 Foothill Boulevard

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Vicinity Map

FIGURE 2

Vapor Probe Location Map

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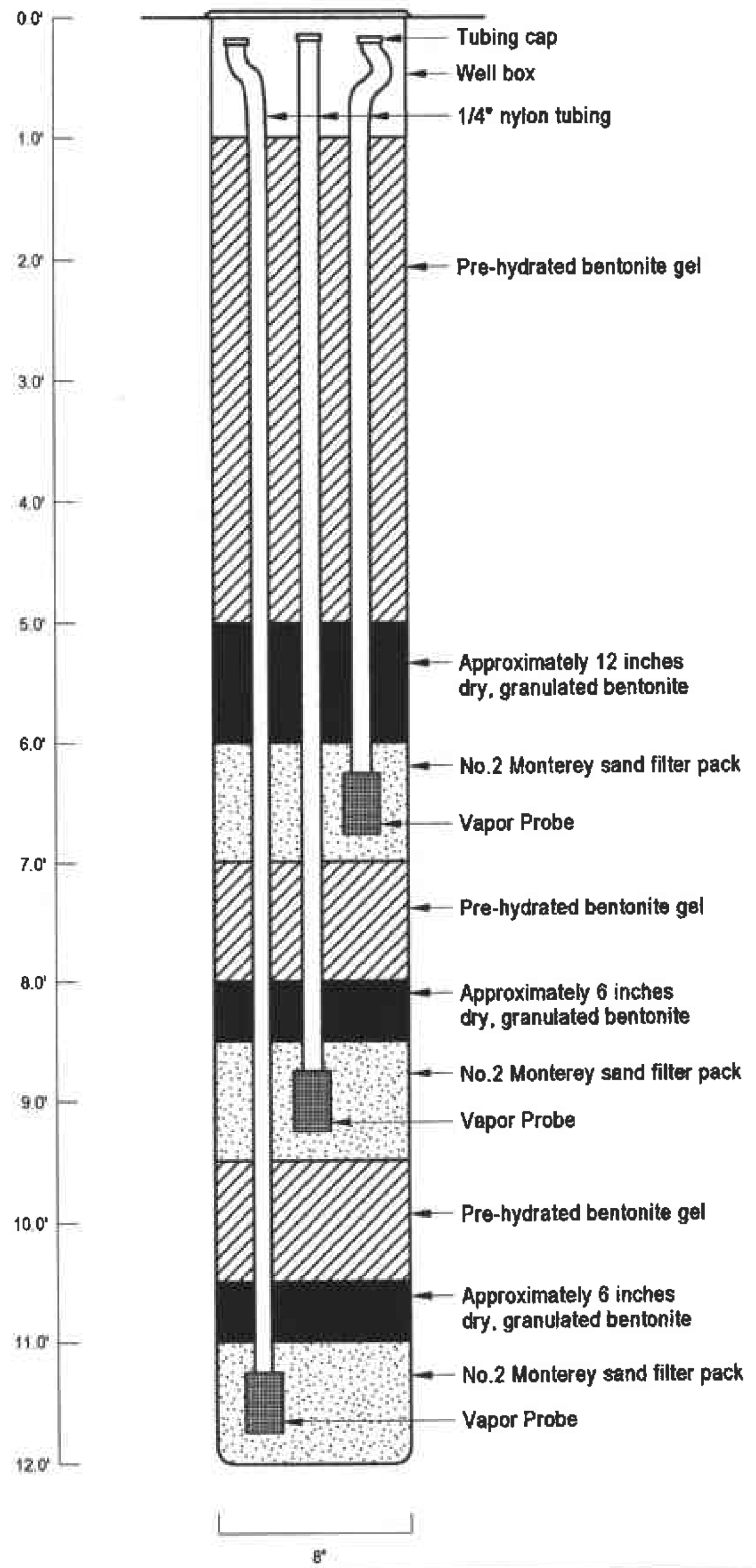

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FIGURE
3

Chevron Service Station 9-0076

4265 Foothill Boulevard

Oakland, California

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Soil Vapor Probe Construction

ATTACHMENT A

Standard Field Procedures for Soil Borings

STANDARD FIELD PROCEDURES FOR SOIL BORINGS

This document describes Cambria Environmental Technology's standard field methods for drilling and sampling soil borings. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor odor or staining, estimate ground water depth and quality and to submit samples for chemical analysis.

Soil Classification/Logging

All soil samples are classified according to the Unified Soil Classification System by a trained geologist or engineer working under the supervision of a California Registered Geologist (RG) or a Certified Engineering Geologist (CEG). The following soil properties are noted for each soil sample:

- Principal and secondary grain size category (i.e. sand, silt, clay or gravel)
- Approximate percentage of each grain size category,
- Color,
- Approximate water or product saturation percentage,
- Observed odor and/or discoloration,
- Other significant observations (i.e. cementation, presence of marker horizons, mineralogy), and
- Estimated permeability.

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or hydraulic push technologies. Prior to drilling, the first 8 ft of the boring are cleared using an air or water knife and vacuum extraction. This minimizes the potential for impacting utilities.

At least one and one half ft of the soil column is collected for every five ft of drilled depth. 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 beyond the bottom of the borehole. The vertical location of each soil sample is determined by measuring the distance from the middle of the soil sample tube to the end of the drive rod used to advance the split barrel sampler. All sample depths use the ground surface immediately adjacent to the boring as a datum. The horizontal location of each boring is measured in the field from an onsite permanent reference using a measuring wheel or tape measure.

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 Storage, Handling and Transport

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 4oC 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 photoionization detector (PID) measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. PID measurements are used along with the field observations, odors, stratigraphy and ground water 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 ground water 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 4oC, and transported under chain-of-custody to the laboratory.

Duplicates and Blanks

Blind duplicate water samples are collected usually collected only for monitoring well sampling programs, at a rate of one blind sample for every 10 wells sampled. Laboratory-supplied trip blanks accompany samples collected for all sampling programs to check for cross-contamination caused by sample handling and transport. These trip blanks are analyzed if the internal laboratory QA/QC blanks contain the suspected field contaminants. An equipment blank may also 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.

Waste Handling and Disposal

Soil cuttings from drilling activities are usually stockpiled onsite on top of and covered by plastic sheeting. At least four individual soil samples are collected from the stockpiles for later compositing at the analytic laboratory. The composite sample is analyzed for the same constituents analyzed in the borehole samples. Soil cuttings are transported by licensed waste haulers and disposed in secure, licensed facilities based on the composite analytic results.

Ground water removed during sampling and/or rinsate generated during decontamination procedures are 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. Disposal of the water is based on the analytic results for the well samples. 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.

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ATTACHMENT B

Standard Field Procedures for Soil Vapor Sampling

Cambria

STANDARD FIELD PROCEDURES SOIL VAPOR SAMPLING

This document describes Cambria Environmental Technology's standard field methods for soil vapor sampling. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Objectives

Soil vapor samples are collected and analyzed to assess whether vapor-phase subsurface contaminants pose a threat to human health or the environment.

Direct Push Method for Soil Vapor Sampling

The direct push method for soil vapor sampling uses a hollow vapor probe, which is pushed into the ground, rather than augured, and the stratigraphy forms a vapor seal between the surface and subsurface environments ensuring that the surface and subsurface gases do not mix. Once the desired soil vapor sampling depth has been reached, the field technician installs disposable polyethylene tubing with a threaded adapter that screw into the bottom of the rods. The screw adapter ensures that the vapor sample comes directly from the bottom of the drill rods and does not mix with other vapor from inside the rod or from the ground surface. In addition, hydrated bentonite is placed around the sampling rod and the annulus of the boring to prevent ambient air from entering the boring. The operator then pulls up on the rods and exposes the desired stratigraphy by leaving an expendable drive point at the maximum depth. The required volume of soil vapor is then purged through the polyethylene tubing using a standard vacuum pump. The soil vapor can be sampled for direct injection into a field gas chromatograph, pumped into inert tedlar bags using a "bell jar" sampling device, or allowed to enter a Summa vacuum canister. Once collected, the vapor sample is transported under chain-of-custody to a state-certified laboratory. The ground surface immediately adjacent to the boring is used as a datum to measure sample depth. The horizontal location of each boring is measured in the field relative to a permanent on-site reference using a measuring wheel or tape measure. Drilling and sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent. Once the sampling is completed, the borings are filled to the ground surface with neat cement.

Shallow Soil Vapor Point Method for Soil Vapor Sampling

The shallow soil vapor point method for soil vapor sampling utilizes a hand augur to advance a boring for the installation of a soil vapor sampling point. Once the boring is hand augered to the final depth, a half a foot of number 2/16 filter sand is placed at the base of the boring (Figure A). One, ¼-inch inner-diameter Teflon™ tube of known length is placed into the boring. The tube is fitted with a stainless steel screen and barbed brass fitting to prevent sand from clogging the tube and is capped at the top with another barbed brass fitting. Another half a foot of number 2/16 filter sand is placed above the bottom of the tubing creating a one foot zone of filter sand with the end of the tubing in the middle. A 2-inch layer of unhydrated bentonite chips is placed on top of the filter pack. Next pre-hydrated bentonite gel is then poured into the hole to approximately 0.5 fbg. Another 2-inch layer of unhydrated bentonite chips is placed on top of the bentonite gel. The tube is coiled and placed within a wellbox finished flush to the surface. Soil vapor samples will be collected no sooner than one week after installation of the soil-vapor points to allow adequate time for representative soil vapors to accumulate. Soil vapor sample collection will not be scheduled until after a minimum of three consecutive precipitation-free days and irrigation onsite has ceased. Figure B shows the soil vapor sampling apparatus. A measured volume of air will be purged from the tubing using a hand-held purge pump and a tedlar bag. Immediately after purging, soil-vapor samples will be collected over an approximate 30-minute period using 6-liter Summa canisters and capillary air-flow controllers. The soil-vapor points will be preserved until they are no longer needed for risk evaluation purposes. At that time, they will be destroyed by extracting the tubing, hand augering to remove the sand and bentonite, and backfilling the boring with neat cement. The boring will be patched with asphalt or concrete, as appropriate.

Vapor Sample Storage, Handling, and Transport

Samples are stored out of direct sunlight in coolers or boxes and transported under chain-of-custody to a state-certified analytic laboratory.