CAMBRIA

ENVIRONMENTAL PROTECTION

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November 13, 2000

Larry Seto
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: **Site Investigation Work Plan**
Former Shell Service Station
1230 14th Street
Oakland, California
Incident #97088250
Cambria Project #242-0233

Dear Mr. Seto:

Cambria Environmental Technology, Inc. (Cambria) is submitting this *Site Investigation Work Plan* on behalf of Equiva Services LLC (Equiva) to notify the Alameda County Health Care Services Agency (ACHCSA) of a soil vapor extraction (SVE) test performed in October 2000 and to propose soil borings at the site. A site summary and the proposed scope of work are presented below. The purpose of the SVE test and the proposed soil borings and investigation is to assess the residual benzene in groundwater beneath the site as well as assess the site for closure.

## SITE SUMMARY

*Site Location:* The site is former Shell service station located at the northeast corner of the intersection at $14^{th}$ Street and Union street in Oakland, California (Figure 1). The site is surrounded by mixed residential and commercial properties. The gasoline service station ceased operation in 1993.

## SCOPE OF WORK

To evaluate the residual benzene concentrations in soil and groundwater, Cambria proposes a two-phase investigation. The initial phase of the investigation consisted of conducting an SVE test at the site. Details of the SVE test are presented below. The second phase of this investigation will consist of advancing five soil borings to groundwater.

Oakland, CA
San Ramon, CA
Sonoma, CA

**Cambria Environmental Technology, Inc.**

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**Vapor Extraction Test Protocol:**

***Air Discharge Permit:*** Prior to system installation, Cambria notified the Bay Area Air Quality Management District.

***System Installation:*** Primary equipment used during the pilot test consisted of a VR-Systems Internal Combustion Engine (ICE) model V-3. Emissions from the test were combusted within the ICE. The system was equipped with 55-gallon knockout drums to contain any groundwater entering the vapor stream. Flow-rate data was collected during the test using a pitot-tube, magnehelic-type, deferential pressure gauge and a digital anemometer. Vacuum was measured with a standard magnehelic gauge. A portable photo-ionization detector (PID) was used to monitor soil vapor concentrations.

***Startup and Optimization:*** On October 16, 2000, initial startup testing was performed on existing vapor extraction wells VW/AS-1, VW/AS-3, VW/MW-2 and existing monitoring well MW-1. Each individual well was tested to determine maximum concentrations and flow rates. Vacuum was applied to an individual well at a low air flow rate. After 15 minutes, influent concentrations were monitored with a PID and the flow rate and applied vacuum were recorded. The flow rate was increased for another 15 minutes and new system parameters were recorded. This process continued at each individual well until the maximum rate of the equipment was reached, or to a point where groundwater entered the vapor stream. After a well's maximum flow rate was achieved, PID readings were collected every 15 minutes for a period of approximately two hours. After a period of approximately two hours, at maximum flow, a vapor sample was collected in a one-liter tedlar bag for laboratory analysis.

***System Operation:*** Following individual well testing, the system was configured to extract vapors from the most optimal vapor points based on the individual well data. This configuration was based on well with the highest vapor concentrations. System parameters including flow, vacuum, and PID readings were recorded and an initial influent vapor sample was collected. The system was operated at the optimal configuration for the remainder of the testing period. At the conclusion of the testing period, a final system influent sample was collected for laboratory analysis.

***Chemical Analysis:*** Vapor samples were analyzed by a State-certified analytical laboratory as follows:

- TPHg by modified EPA Method 8015,
- BTEX and MTBE by EPA Method 8020, and
- Samples with reported concentrations of MTBE will be reanalyzed using EPA Method 8260.

Results of these lab analyses will be presented in the forthcoming investigation report.

### Proposed Soil Borings:

***Utility Location:*** Cambria will notify Underground Service Alert (USA) of our drilling activities. USA will identify utilities in the site vicinity.

***Site Health and Safety Plan:*** We will prepare a comprehensive site safety plan to protect site workers. The plan will be kept on site during field activities and signed by each site worker.

***Permits:*** Cambria will obtain the required permits for soil borings from the Alameda County Public Works Agency.

***Geoprobe Borings:*** Assuming the absence of overhead and subsurface obstructions, Cambria will advance five soil borings at the approximate locations shown on Figure 2. We will collect soil samples in all of the borings at five-foot intervals until groundwater is encountered. Groundwater samples will also be collected from each boring. [redacted]. Upon completion of the sampling, the borings will be grouted to the surface with neat Portland cement. Selected soil and groundwater samples will be transported to a State-certified analytical laboratory for chemical analysis. Our standard field procedure for soil borings is presented as Attachment A.

***Chemical Analysis:*** Soil and groundwater samples will be analyzed by a State-certified analytical laboratory as follows:

- TPHg by modified EPA Method 8015;
- BTEX and MTBE by EPA Method 8020; and
- Samples with reported concentrations of MTBE will be reanalyzed using EPA Method 8260.

Select soil samples well be analyzed for:

- Fraction organic carbon by EPA Method 415.1;
- Percent moisture by EPA Method 160.3; and
- Bulk density and total porosity by API RP-40.

### Report Preparation:

Upon receipt of the analytical results, we will prepare a report that, at a minimum, will contain:

- A summary of the site background and history;
- SVE test operation and sampling methods;
- Descriptions of the soil borings and sampling methods;
- Boring logs;
- Tabulated soil, groundwater, and vapor analytical results;
- Analytical reports and chain-of-custody forms;
- SVE test analysis;
- A discussion of the hydrocarbon distribution in soil, soil vapor, groundwater; and
- Conclusions and recommendations.

## SCHEDULE

The SVE test was conducted on October 16, 2000. The geoprobe investigation is scheduled for December 2000.

**CLOSING**

We appreciate this opportunity to work with you on this project. Please call Darren Croteau at (510) 420-3331 if you have any questions or comments.

Sincerely,
**Cambria Environmental Technology, Inc.**

for

Darren Croteau
Project Geologist

Stephan A. Bork, C.E.G., C.HG.
Associate Hydrogeologist

REGISTERED GEOLOGIST
STEPHAN A. BORK
No. E - 2058
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

Figure: 1 - Proposed Soil Boring Locations

Attachment: A - Standard Field Procedures for soil borings

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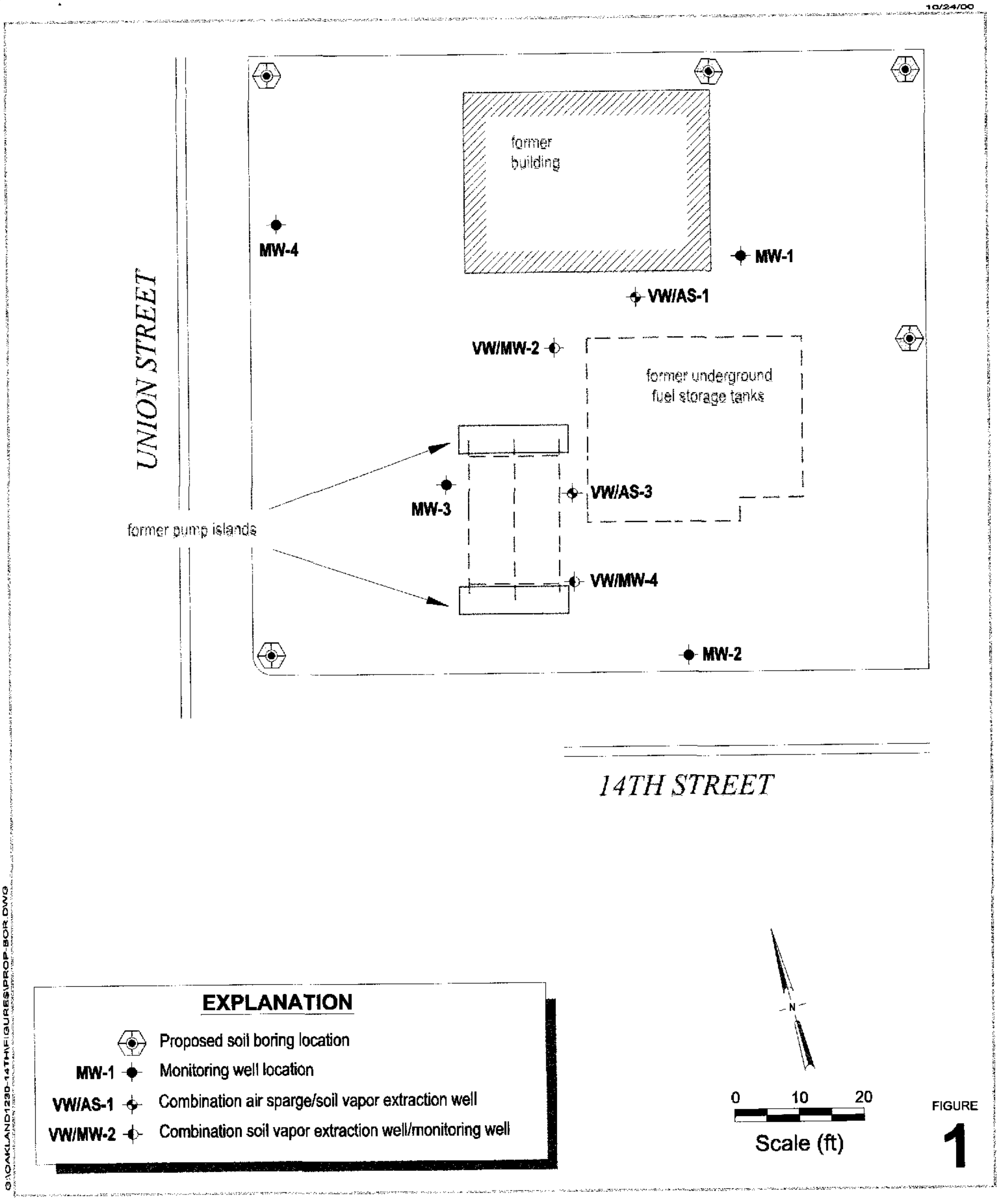


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**Proposed Soil Boring Locations Map**

## 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. 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 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 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 4°C, 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 licenced waste haulers and disposed in secure, licenced 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 licenced 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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