CAMBRIA

ENVIRONMENTAL PROTECTION

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February 25, 1999

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

# 3646

Re: **Subsurface Investigation Work Plan**
Shell-branded Service Station
540 Hegenberger Road
Oakland, California
Incident #98995752
SAP #135694
Cambria Project #240-0414

Dear Mr. Chan:

In response to the Alameda County Health Care Services Agency (ACHCSA) January 4, 1999 correspondence, Cambria Environmental Technology, Inc. (Cambria) is submitting this *Subsurface Investigation Work Plan* on behalf of Equilon Enterprises LLC. The site background, summary of previous investigations, and Cambria's proposed scope of work are presented below.

## BACKGROUND

***Site Description:*** The site is located at the intersection of Hegenberger Road and Edes Avenue, in a commercially-zoned area in Oakland, California. Highway 880 runs near the southern boundary of the site. The site is an active Shell-branded service station with three gasoline underground storage tanks (USTs) and one diesel UST.

***August 1996 Piping Repair:*** On August 8, 1996, Cambria collected a soil sample beneath the piping at Dispenser 1, located on the northwest dispenser island, which was being repaired (Figure 1). The hydrocarbon concentrations were 3,400 milligrams per kilogram (mg/kg) total petroleum hydrocarbons as gasoline (TPHg), 17 mg/kg benzene, and 720 mg/kg methyl tert-butyl ether (MTBE) in this sample.

***1998 Station Upgrade:*** In January and February 1998, Paradiso Mechanical of San Leandro, California (Paradiso) added secondary containment underneath the existing dispensers and submersible turbine pumps and Cambria collected soil samples. The highest TPHg and benzene concentrations were detected in soil samples collected from beneath the northwest dispenser island, at 340 mg/kg and 3.7 mg/kg, respectively. During the line tightness test on February 6, 1998, Paradiso discovered a leak in the piping between the USTs and the northwest

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dispenser island, which was repaired on the same day. No separate-phase hydrocarbons were observed during Cambria's February 7, 1998 site visit. Based on Cambria's February 6, 1998 telephone conversation with Barney Chan of the ACHCSA, additional sampling in the area of the repaired piping was not required due to the planned soil and ground water investigation at the site.

***1998 Soil Borings:*** On March 6, 1998, Cambria installed five soil borings on site. The highest hydrocarbon concentrations were detected in the area of the northwest dispenser island at 3,400 mg/kg TPHg, 39 mg/kg benzene, and 170 mg/kg MTBE in soil at 6.0 feet below ground surface (ft bgs); and 200,000 micrograms per liter (µg/L) TPHg, 11,000 µg/L benzene, and 1,300,000 µg/L MTBE in ground water.

***Ground Water Depth:*** Depth to ground water on site ranges from approximately 6 to 12 ft bgs.

***Lithology:*** The site subsurface consists primarily of silty clay and clayey silt of very low estimated permeability, interbedded with sandy silty clay, silty sand, and silty gravelly sand of low to moderate estimated permeability to the maximum depth explored of 25 ft bgs. Foreign objects, such as pieces of glass and cinders, found in previous borings suggest that approximately the first 6 ft of soil beneath the site is comprised of mainly fill material.

## PROPOSED SCOPE OF WORK

Following guidelines in the San Francisco Regional Water Quality Control Board's (SFRWQCB) MTBE Road Map to Compliance, we propose the following tasks. We propose advancing one off site soil boring and converting it into a monitoring well (Figure 1) to define the lateral and vertical extent of hydrocarbons in soil and ground water. A soil sample will be collected for chemical and physical property analysis from the boring from the unsaturated zone every five feet. This will likely consist of only one sampling interval due to shallow ground water conditions.

S/B on site

Results of this investigation will determine the lateral extent of MTBE in ground water and should provide adequate site characterization.

***Well Survey and File Review:*** Cambria will conduct a sensitive receptor survey to begin assessing whether the site poses a current or future threat to public health, ecosystem or water resources. We will review ground water monitoring and remediation files for adjacent sites, including the Arco Service Station to the northeast of the site. We will conduct the well survey and file review before fieldwork begins and revise our monitoring well location based on the results, if necessary.

***Evaluation of Preferential Pathways:*** An investigation of underground conduits will be conducted to evaluate preferential migration pathways as recommended in the SFRWQCB MTBE Road Map to Compliance. As part of this investigation, we will contact Underground Services Alert (USA) and the local Department of Public Works to determine where underground utilities and sewer lines are located. The conduit survey will be conducted before fieldwork begins. Modifications to well locations will be made based on conduit survey results, if needed.

***Continued Ground Water Monitoring:*** Ground water will be monitored for at least two years to evaluate plume stability, in accordance with SFRWQCB's recommendations. Continued ground water monitoring will provide data to prepare a model of plume stability. Quarterly monitoring at the site began during the 3rd quarter 1998.

***Risk Management Plan:*** After the proposed work is completed, Cambria will evaluate data to develop a site conceptual model. We will then evaluate fate and transport of MTBE in soil and ground water, if needed.

Upon ACHCSA approval of this work plan, Cambria will complete the following tasks:

***Sensitive Receptor Survey and Evaluation of Preferential Pathways:*** Cambria will conduct the well survey, file review and preferential pathway investigation.

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

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

***Permits:*** We will obtain necessary permits for installation of the proposed monitoring well.

***Soil Borings and Sampling Activities:*** Using a hollow-stem auger rig, Cambria will advance one soil boring and complete this boring as ground water monitoring well. Our standard field procedures for soil boring and monitoring well installation are presented as Attachment A. During field activities, we will collect soil samples at five-foot depth intervals or at lithologic changes. We will select soil samples for chemical analysis based on observations of staining and odor or on the results of field screening with a volatile vapor analyzer.

***Laboratory Analyses:*** Selected soil samples from the boring will be analyzed for:

- TPHg by EPA Method 8015
- BTEX and MTBE by EPA Method 8020
- The highest MTBE detections in soil and ground water will be confirmed using EPA Method 8260.
- Physical properties including TOC, moisture content and bulk density.

***Subsurface Investigation Report:*** After the analytical results are received, Cambria will prepare a report that, at a minimum, will contain:

- A summary of the site background and history
- Descriptions of drilling and sampling activities
- Boring logs
- Tabulated analytical results
- A figure presenting boring and well locations
- Analytical reports and chain-of-custody forms
- A discussion of the hydrocarbon distribution
- Well survey and sensitive receptor findings
- Conduit study and preferential pathway findings.

## CLOSING

Please call Darryk Ataide at (510) 420-3339 if you have any questions or comments. Thank you for your assistance.

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

Darryk Ataide
Environmental Scientist


Diane M. Lundquist, P.E.
Principal Engineer

Attachment: A - Standard Field Procedures for Monitoring Well Installations

cc: Karen Petryna, Equiva Services LLC, P.O. Box 6249, Carson, CA 90749-6249

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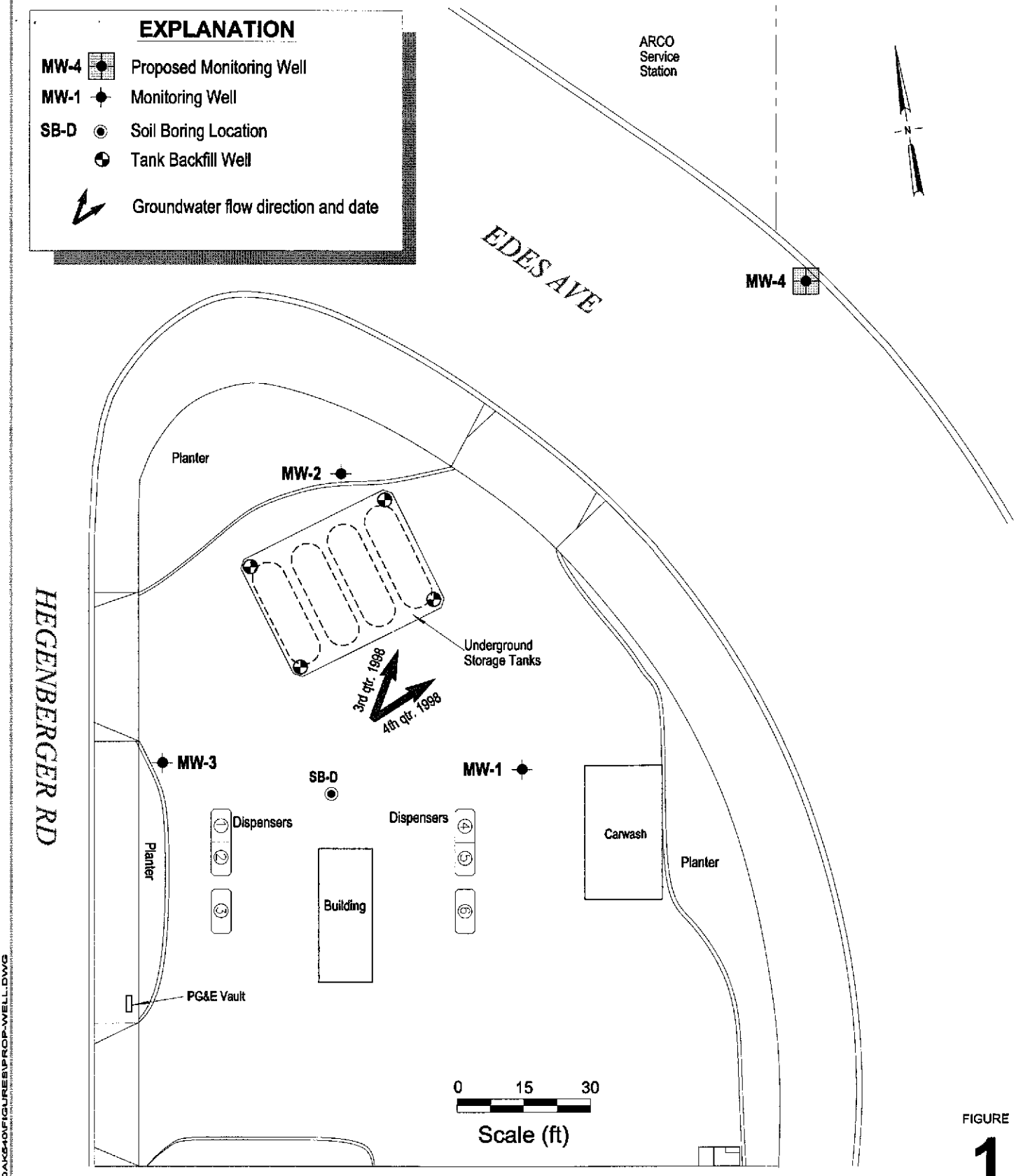


FIGURE
**1**

Base Map by R.H. Lee & Assoc.

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**Shell-branded Service Station**
540 Hegenberger Road
Oakland, California
Incident #98995752

CAMBRIA

**Proposed Monitoring Well Location**

February 22, 1999

# ATTACHMENT A

Standard Field Procedures for Monitoring Well Installations

# STANDARD FIELD PROCEDURES FOR MONITORING WELL INSTALLATION

This document presents standard field methods for drilling and sampling soil borings and installing, developing and sampling ground water 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 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. 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

Ground water monitoring wells are installed to monitor ground water quality and determine the ground water elevation, flow direction and gradient. Well depths and screen lengths are based on ground water depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 ft below and 5 ft 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 ft 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 ft above the well screen. A two ft 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 ground water surging and extraction. Surging agitates the ground water and dislodges fine sediments from the sand pack. After about ten minutes of surging, ground water 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 ground water are extracted and the sediment volume in the ground water 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.

## Ground Water Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of ground water are purged prior to sampling. Purging continues until ground water pH, conductivity, and temperature have stabilized. Ground water 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.

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