CAMBRIA

#530

February 4, 1999

Barney Chan
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, 2nd Floor
Alameda, CA 94502-6577

99 FEB -8 PM 1:12

Re: **Letter Response and Work Plan**
Shell-branded Service Station
285 Hegenberger Rd.
Oakland, California
Incident # 98995749
Cambria Project # 240-0734-005

Dear Mr. Chan:

Cambria Environmental Technology (Cambria), on behalf of Equiva Services LLC (Equiva), has prepared this response to the Alameda County Health Care Services Agency (ACHCSA) letter to Shell Oil Products Company (Shell) dated December 3, 1998. Following is a discussion of specific items raised in the letter and our proposed scope of work for additional off-site investigation, vapor extraction testing, and enhancing dissolved oxygen in groundwater.

RESPONSE TO LETTER ITEMS

1) To clarify the preferential pathway issue, borings could be advanced along the utilities to collect groundwater samples. Cambria will evaluate the migration of petroleum hydrocarbons and MTBE in conduit trenches towards the open channel located southwest of the site. One soil boring will be completed to the south of the site near the storm drain manhole (SB-1, Figure 1). Additionally, one soil boring will be completed within the sanitary sewer trench southwest of the site near the open water channel (SB-2, Figure 1). Following is a summary of the specific scope of work proposed.

SB-1, Storm Drain Trench: Proposed soil boring SB-1 will be completed near the manhole south of the site within Hegenberger Road. Cambria will attempt to complete the boring within the backfill material surrounding the storm drain conduit. This will be accomplished by hand auger the first 5 to 10 feet below ground surface (bgs) to confirm the boring is located within the storm drain backfill material. The remainder of the boring will be completed with a geoprobe direct-push rig to a total depth of 15 feet. Soil samples will be collected from the boring at 5 foot intervals or at lithologic changes. One grab ground water sample will be collected from the boring utilizing a

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direct-push hydropunch. Cambria's Standard Field Procedures for geoprobe investigations are included as Attachment A.

SB-2, Sanitary Sewer Trench: Cambria will coordinate with the City of Oakland Public Works and a private locator if necessary to determine the center line of the sewer pipe located south west of the site near the open channel. Cambria will hand auger the first 5 to 10 feet below ground surface (bgs) to confirm the boring is located within the sewer trench backfill material. The remainder of the boring depth will be completed with a geoprobe direct-push rig to a total depth of 15 feet. Soil samples will be collected from the boring at 5 foot intervals or at lithologic changes. One grab ground water sample will be collected from the boring utilizing a direct-push hydropunch.

Chemical Analysis: Soil and ground water samples will be analyzed for total petroleum hydrocarbons as gasoline (TPHg) and total petroleum hydrocarbons as diesel (TPHd) by modified EPA Method 8015, benzene, toluene, ethyl-benzene, and xylenes (BTEX) and methyl tert-butyl ether (MTBE) by EPA Method 8020. The highest MTBE detected in soil and ground water samples will be confirmed by EPA Method 8260.

Investigation Report: Cambria will prepare an investigation report that will present the results of soil and groundwater chemical analysis and our conclusions and recommendations.

2) A Tier 2 RBCA could be performed after the collection of soil vapor samples. An ecological risk assessment may also be necessary. Due to elevated concentrations of petroleum hydrocarbons and MTBE in ground water, Cambria is not proposing risk based analysis at this time. Additionaly, an ecological risk assessment is not warranted at this time. Results of the preferential pathway investigation proposed above will help to determine if the nearby open water channel has been impacted by petroleum hydrocarbons and MTBE, thus prompting an ecological risk assessment.

3) The status of the vapor extraction system will be investigated. A vapor extraction test could be performed to determine the effectiveness of restarting the system. A soil vapor extraction (SVE) system was operated at the site from August, 1993 through February, 1995 by the former consultant, Pacific Environmental Group (PEG). A February 9, 1995 letter from PEG states the SVE system was shut down due to low influent concentrations and high ground water conditions. Site reconnaissance conducted by Cambria in January, 1999 confirmed the SVE system was removed from the site. The vapor extraction piping network to individual vapor extraction wells appeared to be left in place.

Cambria proposes conducting a five day soil vapor extraction pilot test (VET) to evaluate current vadose zone vapor concentrations and determine the effectiveness of restarting a SVE system. Cambria proposes conducting the VET in late summer of 1999, when ground water levels are the lowest. Following is the scope of work for the proposed VET.

Vapor Extraction Test Protocol

Air Discharge Permit: Prior to system installation, Cambria will obtain approval from the Bay Area Air Quality Management District (BAAQMD) to conduct a 5-day pilot test.

System Installation: Primary equipment used during the pilot test will consist of a positive displacement vacuum blower powered by a 5-horsepower electric motor. Emissions from the test will be controlled with granular activated carbon (GAC) consisting of two 55-gallon drums placed in series. The system will be equipped with an 80-gallon knock out tank to contain any ground water that may enter the vapor stream. Flow rate data will be collected during the test using a pitot tube magnehelic type deferential pressure gauge and a digital anemometer. Vacuum will be measured with a standard magnehelic gauge. A portable photo-ionization detector (PID) will be used to monitor soil vapor concentrations. need to monitor for MTBE also. (meet Eric)

Startup and Optimization: Initial startup testing will be performed on existing vapor extraction wells VEW-1, VEW-2, VEW-3 and VEW-4 (Figure 1). Each individual vapor extraction well will be tested to determine maximum concentrations and flow rates. Vacuum will be applied to an individual well at a low air flow rate. After 15 minutes, influent concentrations will be monitored with a PID, and the flow rate and applied vacuum will be recorded. The flow rate will be increased for another 15 minutes and new system parameters will be recorded. This process will continue at an individual well until the maximum rate of the equipment is reached, or to a point where ground water enters the vapor stream. After a well's maximum flow rate has been achieved, PID readings will be collected every 15 minutes for a period of two hours. After a period of two hours at maximum flow, a vapor sample will be collected in a one liter tedlar bag for laboratory analysis.

System Operation: Following individual well testing, the system will be configured to extract vapors from the most optimal vapor points based on the individual well data. System parameters including flow, vacuum, and PID readings will be recorded and an initial influent vapor sample will be collected. The system will be operated at the optimal configuration for the remainder of the five day testing period. Daily visits will be conducted to collect system data and monitor the system operation. At the conclusion of the five day testing period, a final system influent sample will be collected for laboratory analysis. TPHg, BTEX + MTBE Analysis

VET Reporting: Cambria will prepare a VET report which will present VET data, and our conclusions and recommendations for the viability of restarting a SVE system at this site.

4) If active remediation is necessary, one-time or infrequent extraction from monitoring wells would be considered. Cambria is not proposing ground water extraction from monitoring wells at this time. The results of the preferential pathway investigation and the VET will be evaluated prior to determining if active source removal is necessary.

5) Instead of the addition of ORC, air sparging would also be considered to oxygenate ground water. To oxygenate ground water and thus enhance biodegradation in ground water beneath the site, Cambria proposes installing and operating a biosparge system. Biosparging involves injecting ambient air into ground water in site wells at low flow rates (1-2 cfm). The low flow air injection supplies oxygen to ground water and stimulates naturally-occurring hydrocarbon degradation. Biosparging uses low flow air injection rate to avoid stripping hydrocarbon vapors from ground water, thereby minimizing the potential for hydrocarbon vapor migration. Biosparging can typically elevate dissolved oxygen (DO) concentrations up to 10 mg/l, which is well over the amount of DO necessary for aerobic biodegradation of hydrocarbons. Cambria recommends implementing the following plan.

– This assumes SVE will not occur from these wells.

Wellhead Modification: Cambria will modify wells VEW-1, VEW-2, VEW-3, and VEW-4 to incorporate biosparging. These wells will be manifolded through existing conduit to an existing storage container, where the remediation equipment will be installed.

System Installation and Startup: Cambria will install a low flow air compressor that will inject filtered air through diffusers into wells VEW-1, VEW-2, VEW-3 and VEW-4. We will perform initial startup testing of the system and adjust the system pressure in each well to allow an approximate air flow of 1-2 cfm per well.

DO Monitoring: Cambria will use the following protocol for monitoring DO at this site:

- Prior to biosparging startup, Cambria will measure baseline pre-purge DO concentrations in all site wells for correlation with existing hydrocarbon quarterly monitoring data.
- Cambria will monitor pre-purge DO concentrations in remediation wells VEW-1 through VEW-4 on a monthly basis for a period of six months after biosparging startup.
- Cambria will continue to monitor pre-purge DO concentrations in all other site wells on a quarterly basis to correlate DO and hydrocarbon concentrations.

Schedule: Upon written approval of our proposed scope of work, Cambria will begin permitting for the investigation.

CLOSING

We appreciate your continued assistance with this project. Please call Darryk Ataide at (510) 420-3339 if you have any questions or comments.

Sincerely,
Cambria Environmental Technology, Inc.

Darryk Ataide
Environmental Scientist

Diane Lundquist, P.E.
Principal Engineer

Attachments: A - Standard Field Procedures for Geoprobe®

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

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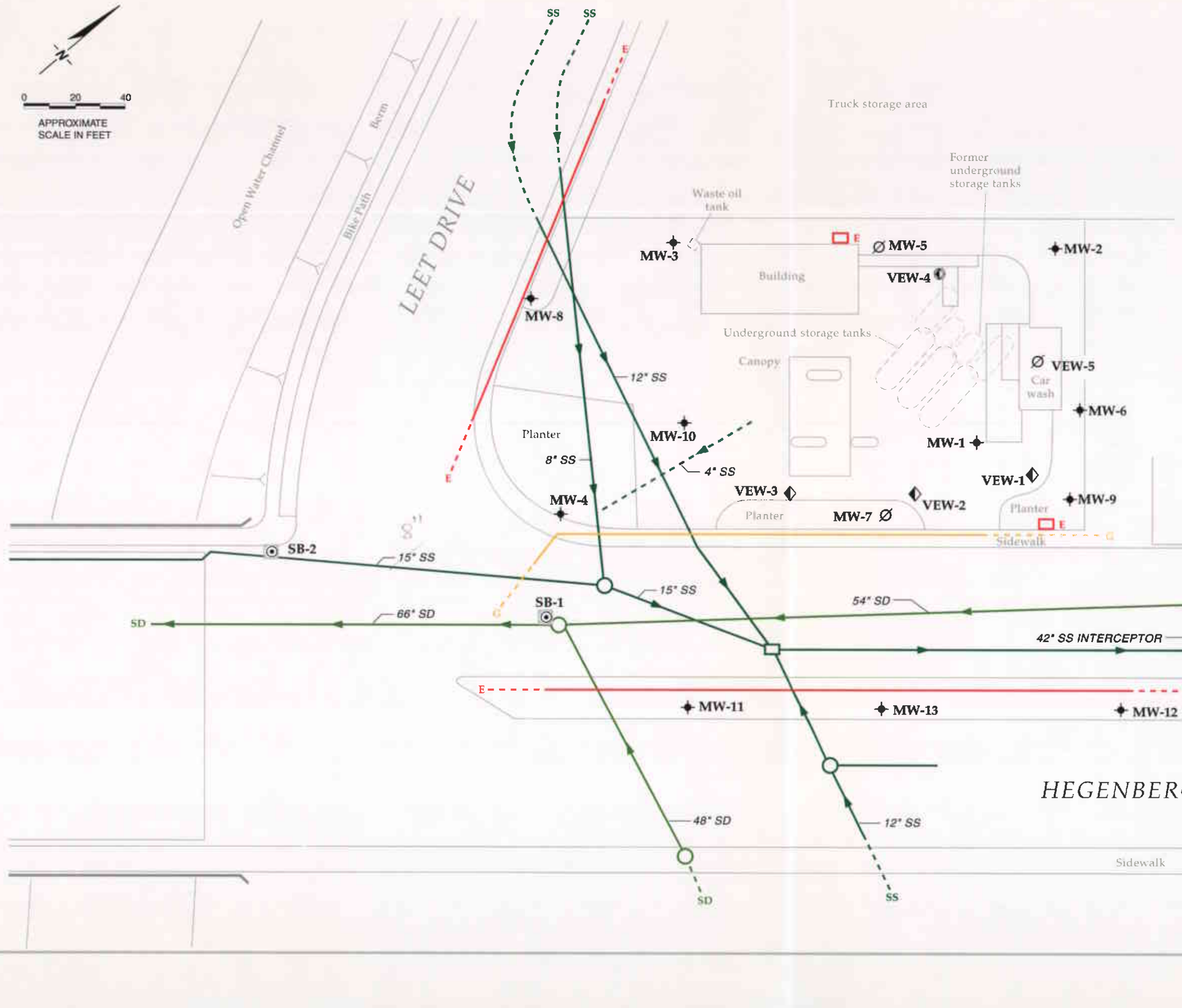
Proposed Boring Locations



EXPLANATION

- Proposed Boring Location
- MW-1 Ground water monitoring well
- VEW-1 Soil vapor extraction well
- VEW-4 Dual completion air sparging/soil vapor extraction well
- VEW-5 Abandoned well
- Sanitary Sewer Line
- Storm Drain
- Electrical Line
- Gas Line
- Location Inferred
- Manhole
- Utility Box

Basemap from Pacific Environmental Group, Inc.

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Shell-branded Service Station
285 Hegenberger Road
Oakland, California
WIC #204-5508-5504

FIGURE
1

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Attachment A

Standard Field Procedures for Geoprobe®

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STANDARD FIELD PROCEDURES FOR GEOPROBE® SAMPLING

This document describes Cambria Environmental Technology's standard field methods for GeoProbe® soil and ground water sampling. 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 separate-phase hydrocarbon saturation percentage,
- Observed odor and/or discoloration,
- Other significant observations (i.e., cementation, presence of marker horizons, mineralogy), and
- Estimated permeability.

Soil Sampling

GeoProbe® soil samples are collected from borings driven using hydraulic push technologies. A minimum of one and one half ft of the soil column is collected for every five ft of drilled depth. Additional soil samples can be collected near the water table and at lithologic changes. Samples are collected using samplers lined with polyethylene or brass tubes driven into undisturbed sediments at the bottom of the borehole. 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 steam-cleaned or washed 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

After a soil sample has been collected, soil from the remaining tubing is placed inside a sealed plastic bag and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable GasTech® or photoionization detector measures volatile hydrocarbon vapor concentrations in the bag's headspace, extracting the vapor through a slit in the plastic bag. The measurements are used along with the field observations, odors, stratigraphy and ground water depth to select soil samples for analysis.

Grab Ground Water Sampling

Ground water samples are collected from the open borehole using bailers, advancing disposable Tygon® tubing into the borehole and extracting ground water using a diaphragm pump, or using a hydro-punch style sampler with a bailer or tubing. 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 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 quality assurance/quality control (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.