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ENVIRONMENTAL PROTECTION

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January 9, 1997

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

Re: **Investigation Work Plan**
Shell Service Station
540 Hegenberger Road
Oakland, California
StId# 3646
WIC# 204-5508-5900

Dear Mr. Chan:

On behalf of Shell Oil Products Company (Shell), Cambria Environmental Technology, Inc. (Cambria) is submitting this work plan for a subsurface investigation at the site referenced above in response to your November 7, 1996 letter. Our objective is to investigate the extent of hydrocarbons in soil and ground water in the vicinity of the underground storage tanks and dispenser islands. A site summary and our proposed scope of work for this investigation are presented below.

SITE HISTORY

The site is an active service station with three gasoline underground storage tanks (USTs) and one diesel UST in operation. In August 1996, a flex connection beneath the northwest gasoline pump island was repaired. After the repair, Cambria collected a soil sample from the native soil below the piping trench (Sample D-1, Figure 1) and analyzed it for total petroleum hydrocarbons as gasoline (TPHg), methyl-tert-butyl-ether (MTBE), and benzene, toluene, ethylbenzene, and xylenes (BTEX). Analytical results are summarized in Table 1 below.

CAMBRIA
ENVIRONMENTAL
TECHNOLOGY, INC.
1144 65TH STREET,
SUITE B
OAKLAND,
CA 94608
PH: (510) 420-0700
FAX: (510) 420-9170

Table 1. Hydrocarbon Concentrations in Soil Concentrations in parts per million (ppm)						
Sample ID	TPHg	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes
D-1	3,400	720	17	280	84	450

PROPOSED SCOPE OF WORK

To investigate the extent of hydrocarbons in soil and ground water beneath the site, we propose drilling ten Geoprobe soil borings in and around potential hydrocarbon source areas (Figure 1). Soil and ground water samples will be analyzed for TPHg, BTEX, and MTBE. Because of the site's proximity to the San Francisco Bay, we will also analyze the ground water samples for total dissolved solids (TDS).

Our scope of work for this investigation includes the following tasks:

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

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

Permits: We will obtain any necessary permits for the installation of the borings from the Alameda County Health Care Services Agency and/or other agencies.

Soil Borings: Cambria will drill ten Geoprobe soil borings, collecting soil samples at five foot intervals, at lithologic changes, and from just above the water table. To define the vertical extent of hydrocarbons in soil, the borings will be drilled until no hydrocarbons are detected using field screening methods. We will select soil samples for chemical analysis based on observations of hydrocarbon staining and odor and on the results of field screening with a volatile vapor analyzer. Because ground water is shallow, we anticipate analyzing only one or two soil samples per boring. We will also collect ground water samples from at least five of the borings using dedicated bailers to assess whether hydrocarbons have impacted ground water. Our standard field procedures are presented as Attachment A.

Chemical Analysis: Both the soil and ground water samples will be analyzed for TPHg by modified EPA Method 8015 and for BTEX and MTBE by EPA Method 8020. In addition, ground water samples will be analyzed for total dissolved solids (TDS) by EPA Method 160.2.

Reporting: After we receive the analytic results, 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 soil sampling methods;
- Boring logs;
- Tabulated soil and ground water analytic results;
- Analytic reports and chain-of-custody forms;
- Soil and water disposal methods; and,
- A discussion of the hydrocarbon distribution in soil and ground water.

SCHEDULE

Upon receiving written approval of our work plan from the County, Cambria will obtain any necessary permits and commence drilling. We will submit our investigation report about four to six weeks after completing the field work.

Please call if you have any questions or comments.

Sincerely,
Cambria Environmental Technology, Inc.

N. Scott MacLeod
Principal Geologist

Attachments: A - Standard Field Procedures

cc: Mr. R. Jeff Granberry, Shell Oil Products Company, P.O. Box 4023, Concord, CA 94524-4023

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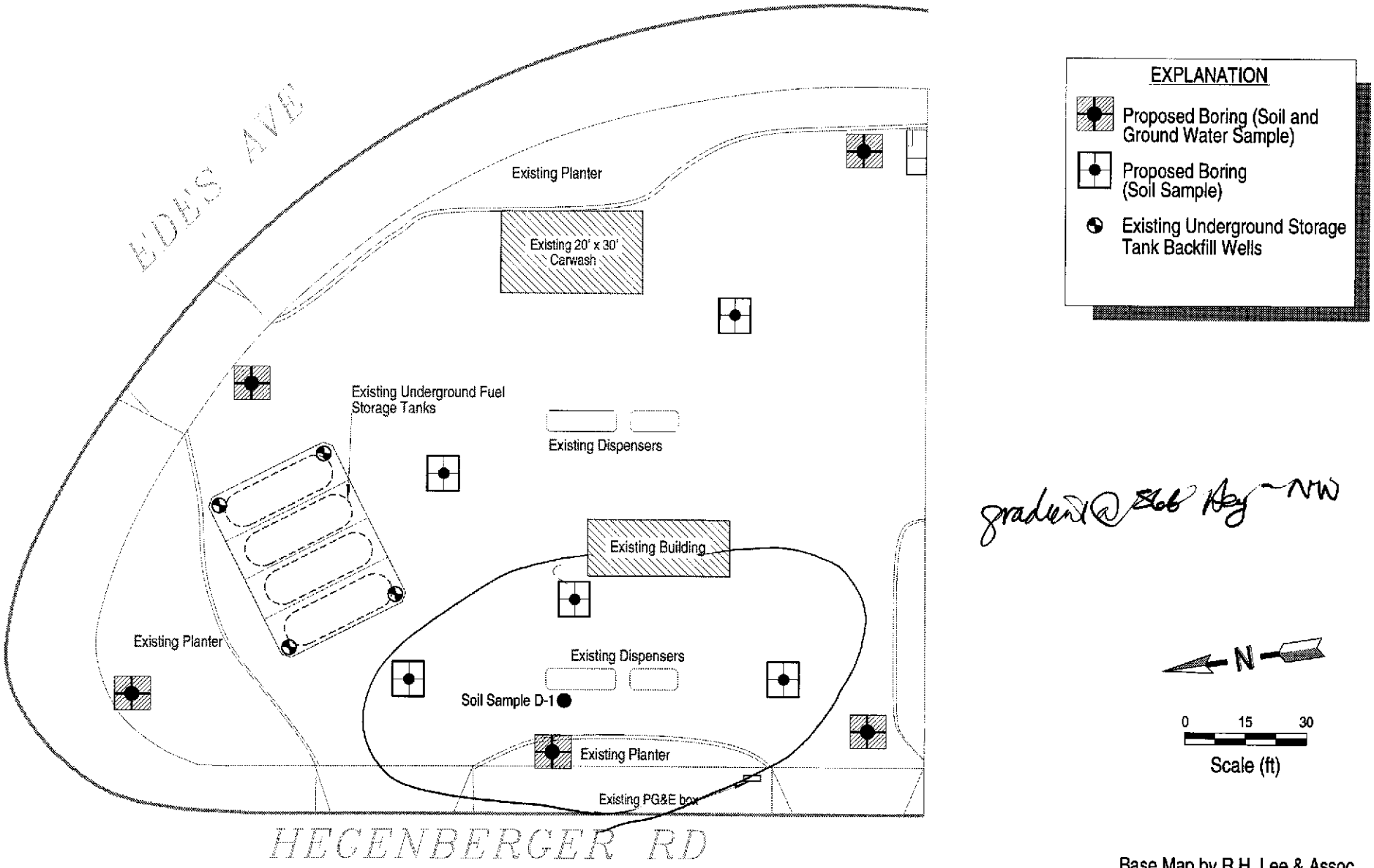

Base Map by R.H. Lee & Assoc.

CAMBRIA
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Shell Service Station
540 Hegenberger Road
Oakland, California

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Proposed Geoprobe Boring Locations

FIGURE
1

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Attachment A

Standard Field Procedures for GeoProbe

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 product 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 drilled using 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 samplers lined with polyethylene tubes driven into undisturbed sediments at 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. 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 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® detector measures volatile hydrocarbon vapor concentrations in the bag's headspace, extracting the vapor through a slit in the plastic bag. GasTech® measurements are used along with the field observations, odors, stratigraphy and ground water depth to select soil samples for analysis.

Water Sampling

Ground water samples are collected from the open borehole using bailers or by advancing disposable Tygon® tubing into the borehole and extracting ground water using a diaphragm pump. 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 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. 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 rinseates 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. Upon receipt of analytic results, 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.