CAMBRIA

ENVIRONMENTAL PROTECTION
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November 25, 1997

via facsimile and U.S. Mail
(510) 337-9335

Mr. Larry Seto
Senior Hazardous Materials Specialist
Alameda County Health Services Agency
1131 Harbor Bay Parkway, Room #250
Alameda, California 94502-6577

Re: **Investigation Work Plan**
Former Shell Service Station
2160 Otis Drive
Alameda, California
WIC #204-0072-0502
Cambria Project #24-627

Dear Mr. Seto:

Cambria Environmental Technology, Inc. (Cambria) has prepared this investigation work plan regarding the above-referenced property on behalf of Shell Oil Products Company (Shell). The purpose of this subsurface investigation at the site is to evaluate the areas noted in an Alameda County Department of Environmental Health (ACDEH) November 13, 1997 letter. The site is subject to a real estate transaction and expedited review and approval of the scope of work described herein is requested.

BACKGROUND

This former Shell Service Station is located on Otis Drive, between Willow and Park Streets, in Alameda, California. The site is located approximately 3,000 feet east of San Francisco Bay. No further action status was granted by the ACDEH on November 14, 1995 based on the results of more than five years of ground water monitoring. Shell discontinued operation of this service station in September 1997 with the demolition of the station and removal of the USTs. Shell is leasing the property and no further action status from your office has been requested prior to returning the site to the property owners.

On August 1, 1997, nine Geoprobe® borings were sampled in order to pre-characterize the soil in the vicinity of the gasoline and waste oil tanks. Cambria's September 5, 1997 correspondence, which was submitted via facsimile to the ACDEH and as an attachment to our October 3, 1997 report, presented the analytic results of this preliminary investigation.

CAMBRIA
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TECHNOLOGY, INC.
1144 65TH STREET,
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On September 4, 1997, Paradiso Mechanical of San Leandro, California (Paradiso) removed three 10,000-gallon fiberglass gasoline tanks and one 550-gallon fiberglass waste oil tank, as well as associated gasoline product piping, vent piping, and dispensers, using a backhoe. Before removal, the tanks and piping were triple rinsed by Crosby and Overton of Oakland, California, and the rinsate was hauled to the Shell refinery in Martinez, California for disposal. The site is underlain by sandy silt and silty sand of moderate to high estimated permeability to the total depth explored of 20 feet. A 6-inch clayey silt interval of low to moderate estimated permeability was typically encountered at approximately 11 feet below ground surface. Approximately 1 ft of ground water entered the gasoline tank excavation, which was approximately 13 ft deep, and the waste oil tank excavation, which was approximately 6 ft deep. During the ground water monitoring between 1989 and 1995, the depth to ground water at this site varied between 3 and 5 ft with a flow direction of north-northeast. Ground water samples previously collected from former wells MW-1 and MW-2 contained over 6,500 milligrams per liter (mg/L) of total dissolved solids, which exceeds state guidelines for use as a drinking water source.

Cambria collected six soil samples from near the ends of the former gasoline tanks by driving a brass tube into soil collected by the backhoe. One water sample was collected from the gasoline tank excavation using a disposable bailer. Cambria collected one soil sample from near the former waste oil tank. One water sample was collected from the waste oil tank excavation using a disposable bailer. Cambria collected six soil samples from beneath the former dispensers and product piping and one soil sample from beneath each of two former hoists and the former oil/water separator.

The tank removals and sampling activities were documented in Cambria's October 3, 1997 *Tank Removal and Sampling Report.* Sample locations are shown on Figure 1 and analytic results are summarized on the table below and more completely on the attached tables.

Maximum Soil and Ground Water Analytical Results Summary
September 4, 1997 Tank and Dispenser Removal

Location	Matrix	TPPH	TEPH	TRPH	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Lead	Other Metals
Former Gasoline Tanks	Ground Water, µg/L	8,300	---	---	ND	45	ND	1,300	8,300	0.018	---
	Soil, mg/kg	ND	---	---	0.11	ND	0.0081	0.0089	0.49	ND	---
Former Dispensers	Soil, mg/kg	270	---	---	1.7	9.3	2.4	22	0.32	ND	---
Former Waste Oil Tank	Ground Water, µg/L	ND	12,000	150	ND	ND	ND	0.81	8.5	ND	< MCLs
	Soil, mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	Low

Notes:
Concentrations listed are the maximum concentrations detected in each location.
--- = Not Analyzed
ND = Not Detected
<MCLs = Less than California primary maximum contaminant levels (22 CCR 64444)
mg/kg = milligrams per kilogram
ug/L = micrograms per liter
TPPH = Total purgeable petroleum hydrocarbons
TEPH = Total extractable petroleum hydrocarbons
TRPH = Total recoverable petroleum hydrocarbons
MTBE = Methyl tert-butyl ether

PROPOSED SCOPE OF WORK

As requested in your November 13, 1997 letter, Cambria will conduct the following soil and ground water sampling. This investigation will consist of sampling soil and ground water at five locations using a Geoprobe® direct-push rig. Our subsurface investigation includes the following tasks:

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

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: We will obtain permits for the installation of the borings from Alameda County Department of Public Works.

Soil Borings: Assuming the absence of overhead and subsurface obstructions, Cambria will advance five soil borings at the locations shown on Figure 1. Two soil borings will be installed in the dispenser area near where sample D-4 was collected. These two borings will be installed to approximately 10 ft depth to delineate the residual hydrocarbons in this area. The other three borings will be installed downgradient of the former gasoline tank pit, waste oil tank pit, and dispenser area. These three borings will be installed approximately 5 ft into the ground water table. We will collect soil samples at five foot intervals, at lithologic changes when possible, and from just above the water table, and we will collect one grab ground water sample from each boring. Upon completion of the soil and ground water sampling, each boring will be sealed with cement grout to match the existing ground surface. We will select soil samples for chemical analysis based on observations of staining and odor and on the results of field screening with an organic vapor analyzer. Our standard field procedures are presented as Attachment A.

Chemical Analysis: Selected soil and ground water samples collected from the dispenser area and the former gasoline tank pit will be analyzed for TPPH by modified EPA Method 8015 and for BTEX and MTBE by EPA Method 8020. Detections of MTBE by EPA Method 8020 will be confirmed by EPA Method 8260.

Selected soil and ground water samples from downgradient of the former used-oil tank pit will be analyzed for TPPH and TEPH by modified EPA Method 8015, BTEX and MTBE by EPA Method 8020,

and TRPH by Standard Method 5520 E&F. Detections of MTBE by EPA Method 8020 will be confirmed by EPA Method 8260.

Reporting: After we receive the analytic results, we will prepare a 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 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.

SCOPE OF WORK APPROVAL

Based on the typically low concentrations of petroleum hydrocarbons in soil and because the ground water is not a drinking water source, Cambria anticipates requesting no further action status following review of the results of this investigation. Please inform us of any additional requirements for no further action status. In order to expedite this investigation, please indicate your approval of this work plan by signing the authorization block below. We would appreciate it if you could fax your approval to Cambria at (510) 420-9170 upon signing.

SCHEDULE

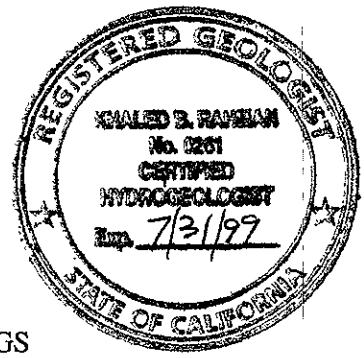
Upon receiving written approval of this work plan from the ACDEH, Cambria will obtain any necessary permits and schedule drilling. We plan to submit our investigation report one to two weeks after completing the field work.

CLOSING

We appreciate your continued assistance with this project. If you have any questions or comments, please do not hesitate to call Paul Waite at (510) 420-3305 or me at (510) 420-3320.

Sincerely,
Cambria Environmental Technology, Inc.

Khaled B. Rahman, R.G., C.H.G.
Senior Geologist



Attachment A - STANDARD FIELD PROCEDURES FOR SOIL BORINGS

Authorization to Proceed with Subsurface Investigation
Former Shell Service Station
2160 Otis Drive, Alameda, California

Approved by [name] Alameda County Dept. of Environmental Health	Signature	Date

cc: A.E. (Alex) Perez, Shell Oil Products Company, P.O. Box 8080, Martinez, California 94553; Fax (510) 335-5029

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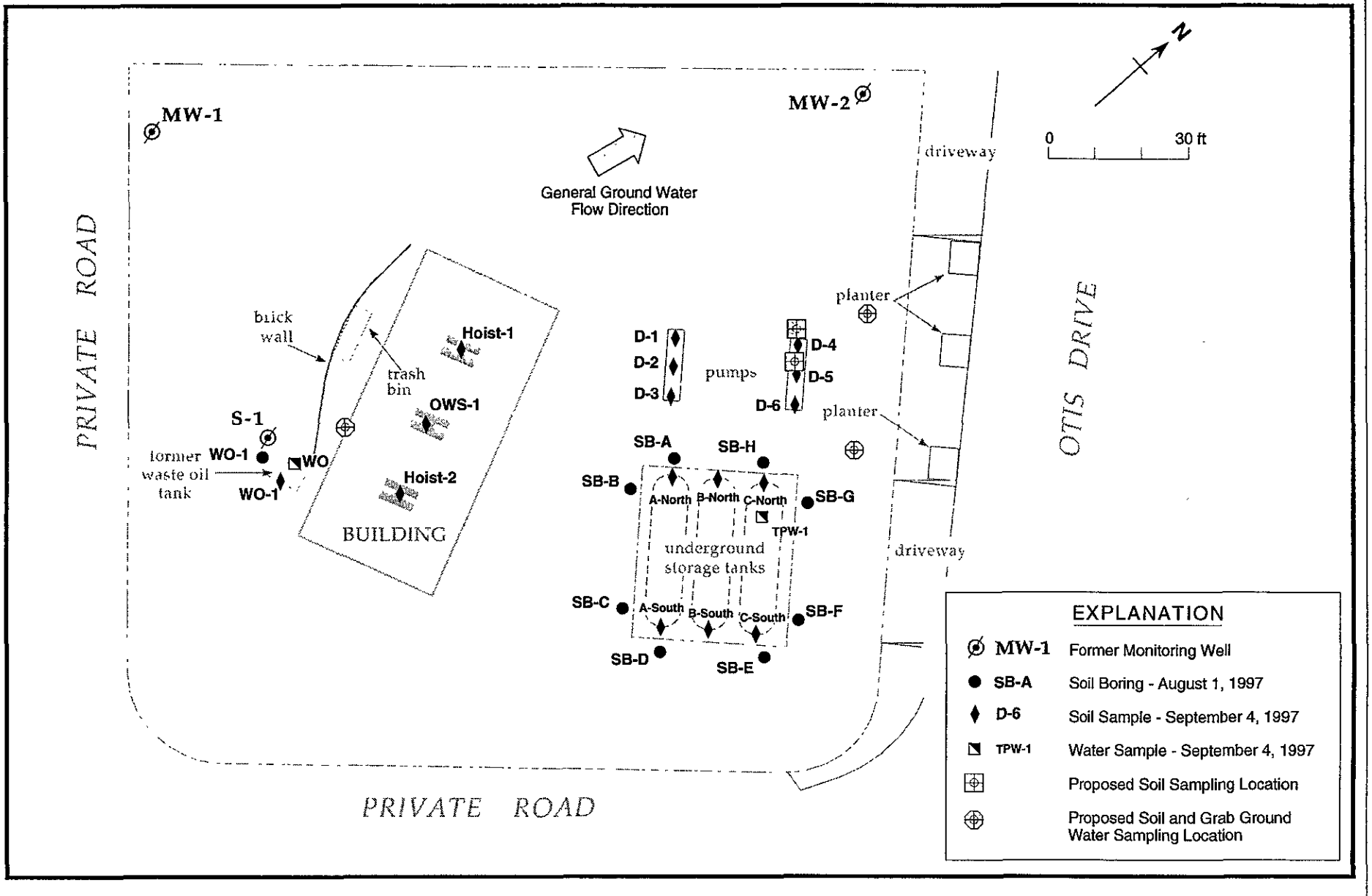

Figure 1. Previous and Proposed Sample Locations - Shell Service Station WIC #204-0072-0502, 2160 Otis Drive, Alameda, California

Table 1. Soil Analytic Data - Gasoline Components - Shell Service Station WIC# 204-0072-0502, 2160 Otis Street, Alameda, California

Sample ID	Sample Location	Date Sampled	TPPH (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	MTBE (mg/kg)
D-1	Dispensers	9/4/97	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
D-2	Dispensers	9/4/97	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
D-3	Dispensers	9/4/97	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
D-4	Dispensers	9/4/97	270	1.7	9.3	2.4	22	<1.2
D-5	Dispensers	9/4/97	5.5	0.011	<0.010	0.010	0.035	0.32
D-6	Dispensers	9/4/97	1.3	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
A-North	Gasoline Tank Pit	9/4/97	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
B-North	Gasoline Tank Pit	9/4/97	<1.0	0.11	<0.0050	0.0081	0.0089	<0.025
C-North	Gasoline Tank Pit	9/4/97	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	0.49
A-South	Gasoline Tank Pit	9/4/97	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
B-South	Gasoline Tank Pit	9/4/97	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
C-South	Gasoline Tank Pit	9/4/97	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	0.056
Hoist-1	Hoist	9/4/97	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
Hoist-2	Hoist	9/4/97	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
OWS-1	Oil/Water Separator	9/4/97	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025
WO-1	Waste Oil Tank Pit	9/4/97	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025

mg/kg = milligrams per kilogram
TPPH = Total purgable petroleum hydrocarbons (gasoline) by modified EPA Method 8015
MTBE = Methyl tert-butyl Ether by EPA Method 8020
Benzene, toluene, ethylbenzene, and xylenes by EPA Method 8020
<n = Below detection limit of n mg/kg

Table 2. Soil Analytic Data - Other Components - Shell Service Station WIC# 204-0072-0502, 2160 Otis Street, Alameda, California

Sample ID	Sample Location	Date Sampled	TEPH (mg/kg)	TRPH (mg/kg)	VOCs (mg/kg)	SVOCs (mg/kg)
Hoist-1	Hoist	9/4/97	<1.0	---	---	---
Hoist-2	Hoist	9/4/97	<1.0	---	---	---
OWS-1	Oil/Water Separator	9/4/97	<1.0	<50	ND	ND
WO-1	Waste Oil Tank Pit	9/4/97	<1.0	<50	ND	ND

mg/kg = milligrams per kilogram

TEPH = Total extractable petroleum hydrocarbons (diesel) by modified EPA Method 8015

TRPH = Total recoverable petroleum hydrocarbons (oil and grease) by Standard Method 5520 E&F

VOCs = Volatile Organic Compounds by EPA Method 8010

SVOCs = Semi-Volatile Organic Compounds by EPA Method 8270

ND = Not detected. Detection limits vary by compound, see laboratory report for specifics.

<n = Below detection limit of n mg/kg

--- = Not Analyzed

Table 3. Soil Analytic Data - Total Metals - Shell Service Station WIC# 204-0072-0502, 2160 Otis Street, Alameda, California

Sample ID	Sample Location	Date Sampled	Cadmium (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)	Nickel (mg/kg)	Zinc (mg/kg)
D-1	Dispensers	9/4/97	---	---	<5.0	---	---
D-2	Dispensers	9/4/97	---	---	<5.0	---	---
D-3	Dispensers	9/4/97	---	---	<5.0	---	---
D-4	Dispensers	9/4/97	---	---	<5.0	---	---
D-5	Dispensers	9/4/97	---	---	<5.0	---	---
D-6	Dispensers	9/4/97	---	---	<5.0	---	---
A-North	Gasoline Tank Pit	9/4/97	---	---	<5.0	---	---
B-North	Gasoline Tank Pit	9/4/97	---	---	<5.0	---	---
C-North	Gasoline Tank Pit	9/4/97	---	---	<5.0	---	---
A-South	Gasoline Tank Pit	9/4/97	---	---	<5.0	---	---
B-South	Gasoline Tank Pit	9/4/97	---	---	<5.0	---	---
C-South	Gasoline Tank Pit	9/4/97	---	---	<5.0	---	---
OWS-1	Oil/Water Separator	9/4/97	<0.50	20	<5.0	16	15
WO-1	Waste Oil Tank Pit	9/4/97	<0.50	19	<5.0	14	13

mg/kg = milligrams per kilogram
ND = Not detected. Detection limits vary by compound, see laboratory report for specifics.
<n = Below detection limit of n mg/kg
--- = Not Analyzed

Table 4. Ground Water Analytic Data - Gasoline Components - Shell Service Station WIC# 204-0072-0502, 2160 Otis Street, Alameda, California

Sample ID	Sample Location	Date Sampled	TPPH (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	MTBE (µg/L)
TPW-1	Gasoline Tank Pit	9/4/97	8,300	<20	45	<20	1,300	8,300
WO	Waste Oil Tank Pit	9/4/97	<50	<0.50	<0.50	<0.50	0.81	8.5

µg/L = Micrograms per liter

TPPH = Total purgable petroleum hydrocarbons (gasoline) by modified EPA Method 8015

MTBE = Methyl tert-butyl ether by EPA Method 8020

Benzene, toluene, ethylbenzene, and xylenes by EPA Method 8020

<n = Below detection limit of n µg/L

ND = Not detected. Detection limits vary by compound, see laboratory report for specifics.

Table 5. Ground Water Analytic Data - Other Components - Shell Service Station WIC# 204-0072-0502, 2160 Otis Street, Alameda, California

Sample ID	Sample Location	Date Sampled	TEPH (µg/L)	TRPH (µg/L)	VOCs (µg/L)	SVOCs (µg/L)
WO	Waste Oil Tank Pit	9/4/97	12,000	150	a	ND

TEPH = Total extractable petroleum hydrocarbons (diesel) by modified EPA Method 8015

TRPH = Total recoverable petroleum hydrocarbons (oil and grease) by Standard Method 5520 E&F

VOCs = Volatile Organic Compounds by EPA Method 8010

SVOCs = Semi-Volatile Organic Compounds by EPA Method 8270

µg/L = Micrograms per liter

<n = Below detection limit of n µg/L

ND = Not detected. Detection limits vary by compound, see laboratory report for specifics.

a = 3.7 µg/L chloroform and 77 µg/L methylene chloride detected

Table 6. Ground Water Analytic Data - Total Metals - Shell Service Station WIC# 204-0072-0502, 2160 Otis Street, Alameda, California

Sample ID	Sample Location	Date Sampled	Cadmium (mg/L)	Chromium (mg/L)	Lead (mg/L)	Nickel (mg/L)	Zinc (mg/L)
TPW-1	Gasoline Tank Pit	9/4/97	---	---	0.018	---	---
WO	Waste Oil Tank Pit	9/4/97	<0.010	0.042	<0.10	0.068	0.15

mg/L = Milligrams per liter
<n = Below detection limit of n mg/L
--- = Not Analyzed

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ATTACHMENT A

STANDARD FIELD PROCEDURES FOR SOIL BORINGS

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.