**Denis L. Brown**

**Shell Oil Products US**
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May 1, 2006

Jerry Wickham
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577



Re: Subsurface Investigation Work Plan
Former Shell Service Station/Current 24-7 Quick Mart Service Station
8930 Bancroft Avenue
Oakland, California
SAP Code 135678
Incident No. 98995742

Dear Mr. Wickham:

Attached for your review and comment is a copy of the *Subsurface Investigation Work Plan* for the above referenced site. Upon information and belief, I declare, under penalty of perjury, that the information contained in the attached document is true and correct.

If you have any questions or concerns, please call me at (707) 865-0251.

Sincerely,

Denis L. Brown
Sr. Environmental Engineer

CAMBRIA

May 1, 2006

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



Re: **Subsurface Investigation Work Plan**
Former Shell Service Station
8930 Bancroft Avenue
Oakland, California
SAP Code 135678
Incident # 98995742
Cambria Project #248-1408-009
RO0000404

Dear Mr. Wickham:

Cambria Environmental Technology, Inc. (Cambria) prepared this work plan on behalf of Equilon Enterprises LLC dba Shell Oil Products US (Shell) and in response to Alameda County Health Care Services Agency's (ACHCSA's) February 16, 2006 letter. The purpose of the proposed investigation is to further assess the extent of hydrocarbon impact to groundwater downgradient of existing monitoring well MW-5. The scope of work presented in this work plan complies with ACHCSA and Regional Water Quality Control Board guidelines.

## SITE LOCATION AND DESCRIPTION

This former Shell service station is located at the north corner of the Bancroft Avenue and 90th Avenue intersection in a mixed commercial and residential area of Oakland, California (Figure 1). A review of historic aerial photographs and Sanborn maps by Cambria in 1999 indicated that the site was first developed as a gasoline service station in 1960. Currently, a 24-7 Quick Mart occupies the site.

## PREVIOUS WORK

***1983 Well Installation:*** In May 1983, Gettler Ryan, Inc. of Dublin, California installed groundwater monitoring wells MW-1 through MW-6 (Figure 2). The well installations were in response to reported gasoline-saturated soils discovered by an independent drilling contractor.

**Cambria Environmental Technology, Inc.**

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The wells were completed between 18 and 19 feet below grade (fbg) and constructed of 3-inch-diameter schedule 40 PVC. No soil or groundwater analytical samples were collected during the well installations. A report detailing the well installations is not available for review at the time of this writing.

***1998 Well Sampling:*** In December 1998, Blaine Tech Services, Inc. (Blaine) developed and sampled the six monitoring wells. Based on hydrocarbon and methyl tertiary-butyl ether (MTBE) detections in the groundwater samples, Cambria filed a December 23, 1998 Underground Storage Tank Unauthorized Release (Leak)/Contaminant Site Report (Form 5) on Shell's behalf.

***1999 Phase I Environmental Site Assessment:*** In April 1999, Cambria conducted a limited Phase I environmental assessment and sensitive receptor survey to identify recognized environmental conditions at the site and to identify wells and surface water bodies within a ½-mile radius of the subject property. A review of historical city directories did not identify any facilities within a ¼-mile radius which have a reasonable potential to impact soil or groundwater quality beneath the subject property. The well survey identified 30 wells of various types within ½-mile of the site. The only identified surface water within the ½-mile radius was Viejo Creek, located approximately ½-mile to the north of the site. Cambria's April 16, 1999 *Limited Phase I Environmental Assessment and Sensitive Receptor Survey Report* summarizes these findings.

***1999 Underground Storage Tanks (USTs), Piping and Dispenser Replacement Sampling:*** In July 1999, three 10,000-gallon fiberglass USTs and associated piping and dispensers were removed and replaced at the site. Soil samples collected beneath the removed USTs, dispensers, and product piping contained up to 6.20 parts per million (ppm) MTBE. Following removal activities and sampling, Shell discontinued operating USTs at the site. Cambria's September 20, 1999 *Underground Storage Tank Closure Report* summarizes these activities.

***2000 Well Survey:*** During the fourth quarter 2000, Shell conducted a well survey to identify potential receptors within ½-mile of the site. This survey was performed using well logs provided by the California Department of Water Resources (DWR). Five wells were identified downgradient of the site and classified as "irrigation/agricultural," "unknown," or "active water producing" wells. As recommended in the November 30, 2000 *Site Investigation Work Plan*, Cambria conducted a field reconnaissance to verify the existence of the five wells. Well locations are plotted on Figure 1. Well #4 was located was located and observed to be currently in use as an irrigation well. Well #5 and observed to be abandoned. Wells #28 and #29 were located on Pacific Bell property and appear to be out-of-service monitoring wells. Cambria could not locate well #10 using the location information given on the DWR well log. Well #10 is listed as an unknown well with similar owner information and construction details to well #11, which was reported as a cathodic protection well. Based on this information, Cambria believes well #10 is most likely a cathodic protection well. Well locations are included on Figure 1. Cambria's November 30, 2000 *Site Investigation Work Plan* reports well survey results.

***2000 Conduit Study:*** In order to determine whether underground utility trenches may be serving as preferential pathways for contaminant migration from the site, Shell conducted a subsurface conduit study of areas adjacent to the site. During the fourth quarter 2000, Cambria obtained local utility maps from the City of Oakland Public Works Department which located storm sewer and sanitary sewer conduits and their flow line elevations in relation to mean sea level (msl). Based on the findings, it appeared that adjacent sewer conduits existed at elevations which, at times, have been near or below the elevation of the on-site groundwater. Cambria concluded that it is possible groundwater had previously flowed in the permeable utility trench backfill material during periods of higher groundwater elevations. Conduit study results were reported in Cambria's November 30, 2000 *Site Investigation Work Plan.*

***2001 Subsurface Investigation:*** In April 2001, Cambria advanced soil borings SB-A, SB-B, and SB-C and collected grab groundwater samples within the public right-of-way, downgradient of the site and across Bancroft Avenue. MTBE was only detected in soil sample SB-B-18.0 at a concentration of 0.055 ppm. MTBE was detected only in groundwater sample SB-B-H2O at a concentration of 450 parts per billion (ppb). Groundwater was not encountered in boring SB-C to the total explored depth of 26 fbg. Details of the well installations were reported in Cambria's August 6, 2001 *Subsurface Investigation Report and Sampling Frequency Reduction Recommendation.*

***2001 Well Survey:*** In August 2001, Cambria performed a door-to-door well survey for properties within 500 feet downgradient of the site, including those northwest, west and southwest of the site. Cambria mailed questionnaires to property owners and followed up with a field reconnaissance of the survey area. Twenty-two of the 42 parcels provided well survey data. Based on the completed survey questionnaires, no water wells were identified within 500 feet downgradient of the site. Details of the well survey were reported in Cambria's September 25, 2001 *Door-to-Door Well Survey Report.*

***2004 Irrigation Well Sampling:*** Cambria's September 25, 2001 *Door-to-Door Well Survey Report* identified one active irrigation well approximately 1,300 feet downgradient of the site. After several attempts by Shell and the ACHCSA to contact the property owner by mail, a response was received from Ms. Wanda Brooks, the contact for the property owner. When Cambria spoke with Ms. Brooks on October 7, 2004, she confirmed that the well was currently being used as a backyard irrigation well, that it was installed in 1980, and that it is approximately 50 feet deep. Ms. Brooks granted verbal permission for Shell to sample water from the well. At Shell's request, Cambria collected one water sample from this well and analyzed it for MTBE on November 10, 2004. MTBE was not detected.

***Groundwater Monitoring Program:*** Quarterly groundwater monitoring has been performed at the site since January 1998. Currently, wells MW-4 and MW-5 are sampled quarterly, MW-2 and MW-6 are sampled semi-annually, and MW-1 and MW-3 are sampled annually. All wells

are gauged quarterly. Depth to water has ranged historically between 6.53 and 16.02 fbg. During the fourth quarter 2005 monitoring and sampling event, the depth to water in the wells ranged from 12.95 to 15.05 fbg. The groundwater flow direction, as calculated from depth to water measurements in on-site monitoring wells, is typically toward the west.

During the fourth quarter 2005 monitoring and sampling event, monitoring well MW-4 contained 2.5 ppb MTBE and monitoring well MW-5 contained 71 ppb total petroleum hydrocarbons as gasoline (TPHg). Wells MW-1 MW-2, MW-3, and MW-6 were not sampled this quarter.

## PROPOSED SCOPE OF WORK

Cambria proposes to advance two soil borings with a cone penetration testing (CPT) drill rig to further assess groundwater downgradient of the site (Figure 2). The borings will be completed as one transect of two borings, positioned parallel to the direction of groundwater flow, and are located off site and downgradient of existing groundwater monitoring well MW-5.

Specific tasks to be completed for this investigation include the following:

***Permit:*** Cambria will obtain an appropriate drilling permit from ACHCSA and an encroachment permit from the City of Oakland.

***Site Safety Plan:*** Cambria 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.

***Utility Clearance:*** Cambria will mark proposed drilling locations, and the locations will be cleared through Underground Service Alert prior to drilling. Additionally, a private utility locator will be used to identify subsurface obstacles prior to drilling.

***Site Investigation:*** Assuming the absence of overhead and subsurface obstructions, Cambria will advance two soil borings (CPT-1 and CPT-2) at the locations shown on Figure 2. CPT-1 will be advanced in the Bancroft Avenue concrete median southwest and downgradient of monitoring well MW-5. CPT-2 will be advanced in the street on the southwest site of Bancroft Avenue between previously advanced borings SB-A and SB-B. Each boring will be advanced until groundwater is encountered (expected to be at approximately 15 fbg). Cambria will collect groundwater samples of first-encountered groundwater from each of the borings. No soil samples will be collected during this investigation.

A Cambria geologist will supervise the drilling, and encountered soils will be continuously logged using electronic CPT technology. Groundwater samples will be collected with CPT groundwater sampling equipment and transferred into vials containing hydrochloric acid preservative with no head space. Groundwater samples will be labeled, entered onto a chain-of-custody record, and placed into a cooler with ice for transport to a State-certified laboratory for analyses. Cambria will request a standard 2-week turn around time for laboratory results. Cambria's Standard Field Procedures for Cone Penetrometer Testing and Sampling are included as Attachment A.

The proposed scope of work will be performed under the supervision of a registered professional geologist or engineer.

***Chemical Analyses:*** Groundwater samples will be analyzed for TPHg, benzene, toluene, ethylbenzene, total xylenes, MTBE, and tertiary-butyl alcohol using EPA Method 8260B.

***Report Preparation:*** Following the receipt of analytical results from the laboratory, Cambria will prepare a written report which will include field procedures, laboratory results, CPT logs, and conclusions.

## SCHEDULE

Cambria will begin work upon written approval of this work plan by ACHCSA and receipt of appropriate drilling and encroachment permits.

## CLOSING

If you have any questions regarding the scope of work outlined in this work plan, please call David Gibbs at (510) 420-3363.

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

David M. Gibbs, P.G.
Project Geologist

Aubrey K. Cool, P.G.
Senior Project Geologist

PROFESSIONAL GEOLOGIST
AUBREY K. COOL
No. 7659
STATE OF CALIFORNIA

Figures: 1 - Site Vicinity and Area Well Survey Map
2 - Proposed CPT Boring Location Map

Attachment: A - Standard Field Procedures for Cone Penetrometer Testing and Sampling

cc: Denis Brown, Shell Oil Products US, 20945 S. Wilmington Ave., Carson, CA 90810
Sidhu Associates, 8930 Bancroft Ave., Oakland, CA 94605

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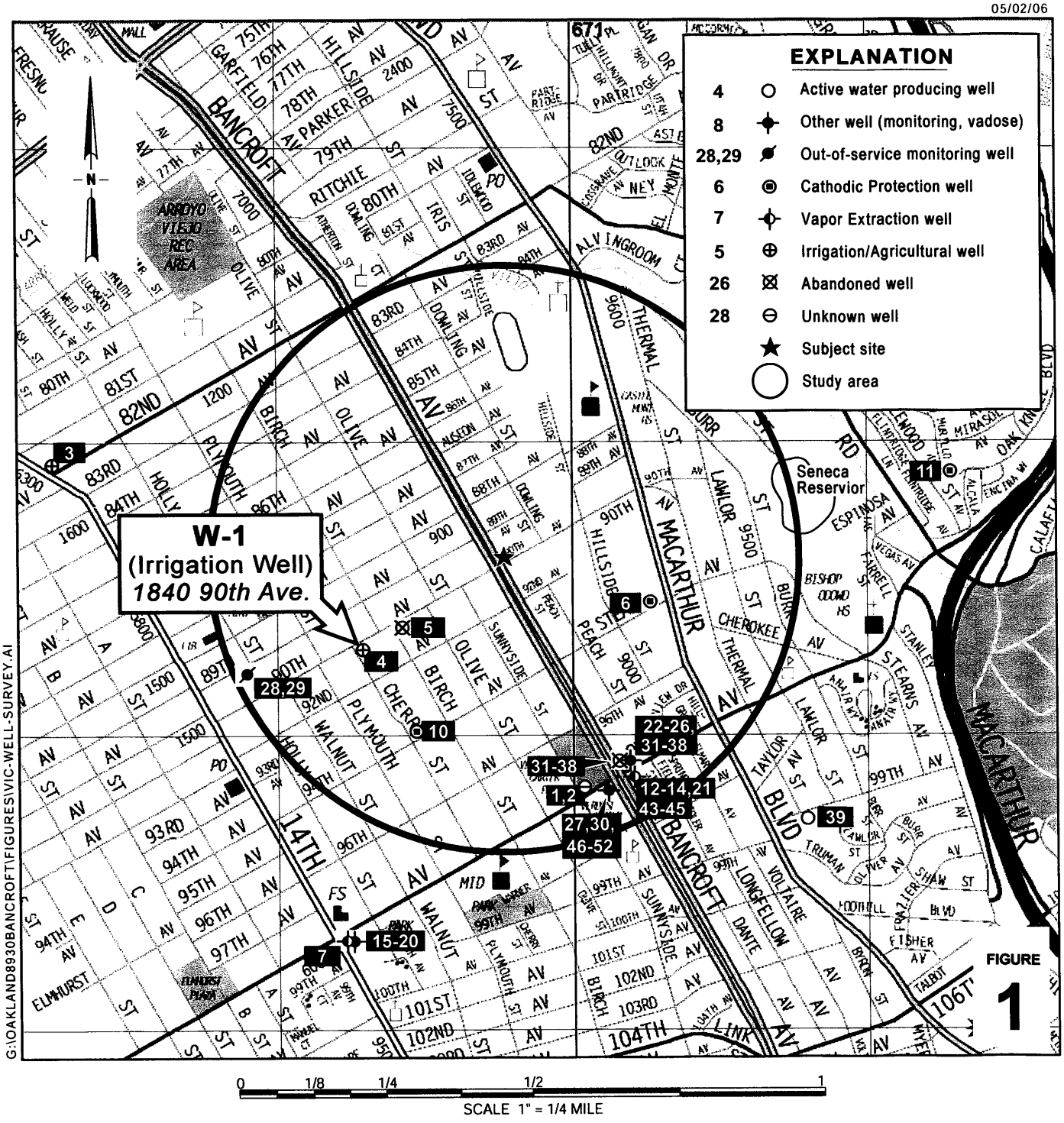


FIGURE 1

0 1/8 1/4 1/2 1

SCALE 1" = 1/4 MILE

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**Former Shell Service Station**
8930 Bancroft Avenue
Oakland, California
Incident No.98995742

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**Site Vicinity and Area Well Survey Map**
(1/2 Mile Radius)

04/04/06

# Proposed CPT Boring Location Map

## EXPLANATION

- CPT-1 — Proposed CPT location
- MW-1 — Monitoring well location
- SB-A — Cambria soil boring location (04/01/01)
- Sanitary Sewer line (SS)
- Storm Drain line (SD)
- Flow direction
- Storm drain inlet
- Manhole
- FL — Flowline elevation (in feet above msl)

NOTE: All conduit locations are approximate

Groundwater Flow Direction
(2Q00 through 4Q05)

property line

Former Shell Station
*8930 Bancroft Ave.*

MW-1
MW-2
MW-3
MW-4
MW-5
MW-6

former USTs
dispensers
USTs
former pump island

sidewalk

48"Ø SD
12"Ø SD
15"Ø SD
42"Ø SD
10"Ø SS
8"Ø SS

FL = 44.99'
FL = 44.21'
FL = 44.08'
FL = 43.06'
FL = 43.97'
FL = 51.30'
FL = 46.11'
FL = 45.00'

CPT-1
CPT-2
SB-A
SB-B
SB-C

median

*BANCROFT AVENUE*
*90TH AVENUE*

residential property
residential property
residential property

Nearest Sensitive Receptor to Site

Irrigation Well
1,100 ft. WSW

0 15 30 60
Scale (ft)

FIGURE
**2**

**Former Shell Service Station**
8930 Bancroft Avenue
Oakland, California
Incident No.98995742

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G:\OAKLAND 8930 BANCROFT\FIGURES\SITE PLAN.DWG

# ATTACHMENT A

Standard Field Procedures for
Cone Penetrometer Testing and Sampling

# STANDARD FIELD PROCEDURES FOR CONE PENETROMETER TESTING AND SAMPLING

This document describes Cambria Environmental Technology's standard field methods for Cone Penetrometer Testing (CPT) and direct-push soil and groundwater sampling. These procedures are designed to comply with Federal, State and local regulatory guidelines.

Use of CPT for logging and soil and groundwater sampling requires separate borings. Typically an initial boring is advanced to estimate soil and groundwater characteristics as described below. To collect soil samples a separate boring must be advanced using a soil sampling device. If groundwater samples are collected, another separate boring must be advanced using a groundwater sampling device. Specific field procedures are summarized below.

## Cone Penetrometer Testing (CPT)

Cone Penetrometer Testing is performed by a trained geologist or engineer working under the supervision of a California Professional Geologist (PG) or a Certified Engineering Geologist (CEG). Cone Penetrometer Tests (CPT) are carried out by pushing an integrated electronic piezocone into the subsurface. The piezocone is pushed using a specially designed CPT rig with a force capacity of 20 to 25 tons. The piezocones are capable of recording the following parameters:

Tip Resistance (Qc)
Sleeve Friction (Fs)
Pore Water Pressure (U)
Bulk Soil Resistivity (rho) - with an added module

A compression cone is used for each CPT sounding. Piezocones with rated load capacities of 5, 10 or 20 tons are used depending on soil conditions. The 5 and 10 ton cones have a tip area of 10 sq. cm. and a friction sleeve area of 150 sq. cm. The 20 ton cones have a tip area of 15 sq. cm. and a friction sleeve area of 250 sq. cm. A pore water pressure filter is located directly behind the cone tip. Each of the filters is saturated in glycerin under vacuum pressure prior to penetration. Pore Pressure Dissipation Tests (PPDT) are recorded at 5 second intervals during pauses in penetration. The equilibrium pore water pressure from the dissipation test can be used to identify the depth to groundwater.

The measured parameters are printed simultaneously on a printer and stored on a computer disk for future analysis. All CPTs are carried out in accordance with ASTM D-3441. A complete set of baseline readings is taken prior to each sounding to determine any zero load offsets.

The inferred stratigraphic profile at each CPT location is included on the plotted CPT logs. The stratigraphic interpretations are based on relationships between cone bearing (Qc) and friction ratio (Rf). The friction ratio is a calculated parameter (Fs/Qc) used in conjunction with the cone bearing to identify the soil type. Generally, soft cohesive soils have low cone bearing pressures and high friction ratios. Cohesionless soils (sands) have high cone bearing pressures and low friction ratios. The classification of soils is based on correlations developed by Robertson et al (1986). It is not always possible to clearly identify a soil type based on Qc and Rf alone. Correlation with existing soils information and analysis of pore water pressure measurements should also be used in determining soil type.

CPT and sampling equipment are steam-cleaned or washed prior to work and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent. Groundwater samples are decanted into 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.

After the CPT probes are removed, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

### Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor odor or staining, estimate groundwater 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 Professional Geologist (PG) 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

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[7] 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 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 groundwater depth to select soil samples for analysis.

## Grab Groundwater Sampling

Groundwater samples are collected from the open borehole using bailers, advancing disposable Tygon[7] tubing into the borehole and extracting groundwater using a diaphragm pump, or using a hydro-punch style sampler with a bailer or tubing. The groundwater 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.