CAMBRIA

November 30, 1999

Mr. Larry Seto
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

99 DEC -3 PM 2:59

Re: **Additional Investigation Work Plan**
Shell-branded Service Station
105 5th Street
Oakland, California
Incident # 98995757
SAP Code 135700
Cambria Project # 241-0472

Dear Mr. Seto:

On behalf of Equiva Services LLC (Equiva), Cambria Environmental Technology, Inc. (Cambria) has prepared this work plan in response to the Alameda County Health Care Services Agency (ACHCSA) letter to Equiva dated October 15, 1999 for the site referenced above. The objective of this investigation is to further assess the extent of subsurface hydrocarbons and MTBE.

SITE BACKGROUND

The site is an active Shell-branded service station located at the intersection of Fifth Street and Oak Street in Oakland, California.

On November 27, 1996, Cambria collected soil samples beneath the seven dispenser locations prior to replacement and beneath the inactive diesel fuel piping. The station was undergoing renovations at the time of sampling. Armer/Norman & Associates of Walnut Creek, California (Armer/Norman) removed and replaced five gasoline dispensers, two diesel dispensers, and associated piping. In addition, inactive piping to a former diesel fuel dispenser location was found and removed.

The samples were analyzed by Sequoia Analytical of Redwood City, California (Sequoia) for total purgeable petroleum hydrocarbons as gasoline (TPPH) and total extractable petroleum hydrocarbons as diesel (TEPH) by modified EPA Method 8015 and for benzene, ethylbenzene, toluene and xylenes (BTEX) and methyl tert-butyl ether (MTBE) using EPA Method 8020. Samples D-3 and D-5, collected beneath the southwest dispenser area, contained the lowest petroleum hydrocarbon concentrations. Except for samples D-3 and D-5, the soil samples contained TPPH concentrations of

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more than 1,000 mg/kg. Individual BTEX constituent maximum concentrations were typically less than 100 mg/kg in the samples. MTBE concentrations in the samples were less than 20 mg/kg, except for sample D-1. TEPH was detected in the three samples analyzed at concentrations ranging from 11 to 14,000 mg/kg.

In February, 1998 Paradiso Mechanical of San Leandro, California installed secondary containment on the turbine sumps. Since secondary containment had previously been added to the dispensers, no additional dispenser upgrade activities were performed. Cambria inspected the tank pit on February 26, 1998 and no field indications of hydrocarbons, such as staining or odor, were observed.

To determine the extent of hydrocarbons in soil and groundwater beneath the site, on July 23, 1998, Cambria installed three borings in the assumed down gradient direction from existing dispensers and two borings in the assumed up gradient direction from the existing dispensers. Based on topography and the location of the nearby Oakland Inner Harbor, it was anticipated that groundwater flowed in a southeasterly to southwesterly direction (Figure 1).

The soil borings were installed to depths of 11.0 to 12.0 feet below ground surface and groundwater was encountered in the soil borings at depths ranging from approximately 6 to 9 ft bgs. The site subsurface consists of silty sand of high estimated permeability to the total explored depth of 12 ft bgs. Selected soil and groundwater samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg) and total petroleum hydrocarbons as diesel (TPHd) by modified EPA Method 8015, methyl tert-butyl ether (MTBE) and benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8020.

Soil boring SB-3 contained the maximum hydrocarbon concentrations in soil with 15 milligrams per kilogram (mg/kg) TPHd and 2.8 mg/kg TPHg at 5.0 ft bgs. Soil boring SB-5 contained the highest concentration of MTBE with 0.48 mg/kg (EPA Method 8020) at 5.0 ft bgs. No benzene was detected in the soil samples. Water samples collected from borings SB-3 and SB-4 contained the highest hydrocarbon concentrations. SB-3 contained 90,000 micrograms per liter (µg/L) TPHg and 1,300 µg/L benzene. SB-4 contained 27,000 µg/L TPHd and 4,100 µg/L MTBE (EPA Method 8020).

On May 14, 1999, Cambria installed three groundwater monitoring wells, to determine the extent of hydrocarbons in soil and groundwater beneath the site. The wells were installed to a depth of 25 feet below ground surface and groundwater was encountered in the soil borings at depths ranging from approximately 12.5 to 15.8 ft below ground surface.

Petroleum hydrocarbon and MTBE contamination exists in groundwater onsite in the down-gradient direction near the UST complex. Groundwater sampled from MW-1, located in the up-gradient direction, was below detection limits for all analytes. Groundwater samples from MW-2 and MW-3, located in the down-gradient direction, indicate the presence of petroleum hydrocarbons and MTBE in groundwater. MW-2 had the highest concentrations of petroleum hydrocarbons onsite with 13,800 μg/L TPHg and 1790 μg/L benzene. The highest MTBE concentration onsite was in MW-3 at 324,000 μg/L (by EPA method 8260).

Soil beneath the site does not appear to be impacted with the exception of MW-2 at 5.5 ft bgs. The maximum TPHg concentration detected in soil was 1700 ppm in soil sample MW-2-5.5'. The maximum benzene concentration detected in soil was 0.0369 ppm in soil sample MW-2-10.5'. The maximum MTBE concentration detected in soil was 13.2 ppm (by EPA method 8260) in soil sample MW-2-5.5'. The impacted soils are likely a result of groundwater contamination onsite as the depth to water in MW-2 was only 5.98 ft bgs on July 23, 1999.

PROPOSED SCOPE OF WORK

To further delineate the extent of hydrocarbons in soil and groundwater beneath the site, Cambria proposes installing three borings, and converting one to a groundwater monitoring well. All three borings will be offsite, and selected soil samples will be analyzed for petroleum hydrocarbons and MTBE. Proposed locations for the three borings, and one converted monitoring well, are shown on Figure 1. These locations were selected based on assumed regional groundwater flow direction and previously identified hydrocarbon source areas.

Our scope of work for this investigation includes:

- Preparing a site Health and Safety Plan, coordinating field activities, securing drilling permits and notifying Underground Service Alert;
- Drilling and installing three 6-inch borings, converting one into a 4-inch diameter groundwater monitoring well and collecting soil samples;
- Preparing an investigation report presenting the results of the investigation.

Specific tasks are discussed below.

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

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

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

Soil Boring and Monitoring Installation: Three 6-inch diameter borings will be installed using a drill rig equipped with hollow-stem augers. We will collect soil samples at five foot intervals, at lithologic changes, and from just above the water table. We will select soil samples for chemical analysis based on observations of staining and odor and on the results of field screening with a PID. The southern most boring (MW-4) will then be converted to a 4-inch monitoring well. Following installation, the well will be developed using a combination of groundwater surging and extraction. Following development, the wells will be sampled on a quarterly basis. The well top-of-casing elevations will be surveyed with respect to mean sea level and for horizontal location with respect to an on site or nearby offsite landmark. Our Cambria's standard field procedures for soil borings monitoring wells installations and are presented as Attachment A.

Chemical Analysis: Selected soil samples will be analyzed for total petroleum hydrocarbons as gasoline (TPHg) by modified EPA Method 8015, and benzene, toluene, ethylbenzene, and xylenes (BTEX) and methyl tertiary butyl ether (MTBE) by EPA Method 8020. The highest MTBE concentrations detected by EPA Method 8020 in each boring will be confirmed by EPA Method 8260. Groundwater samples collected during scheduled monitoring events will be analyzed for TPHg by modified EPA Method 8015, and BTEX and MTBE by EPA Method 8020.

Reporting: Upon receipt of the analytical results, we will prepare an investigation report that, at a minimum, will contain:

- A summary of the site background and history;
- Descriptions of the drilling, soil sampling, and well installation methods;
- Boring logs;
- Tabulated analytical results;
- Analytical reports and chain-of-custody forms;
- Soil and water disposal methods; and,
- A discussion of the hydrocarbon distribution in the subsurface.

Upon receiving written approval of this work plan from your office, Cambria will apply for the necessary permits and schedule drilling.

CLOSING

We appreciate the opportunity to work with you on this project. Please call Darryk Ataide at (510) 420-3339 if you have any questions or comments.

Sincerely,
Cambria Environmental Technology, Inc.

Darryk Ataide
Project Manager

Ailsa LeMay, R.G.
Registered Geologist

REGISTERED PROFESSIONAL ENGINEER
DIANE M. LUNDQUIST
NO. C46725
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Attachments: A - Standard Field Procedures for Monitoring Wells

cc: Karen Petryna, Equiva Services LLC, P.O. Box 7869 Burbank, CA 91501-786

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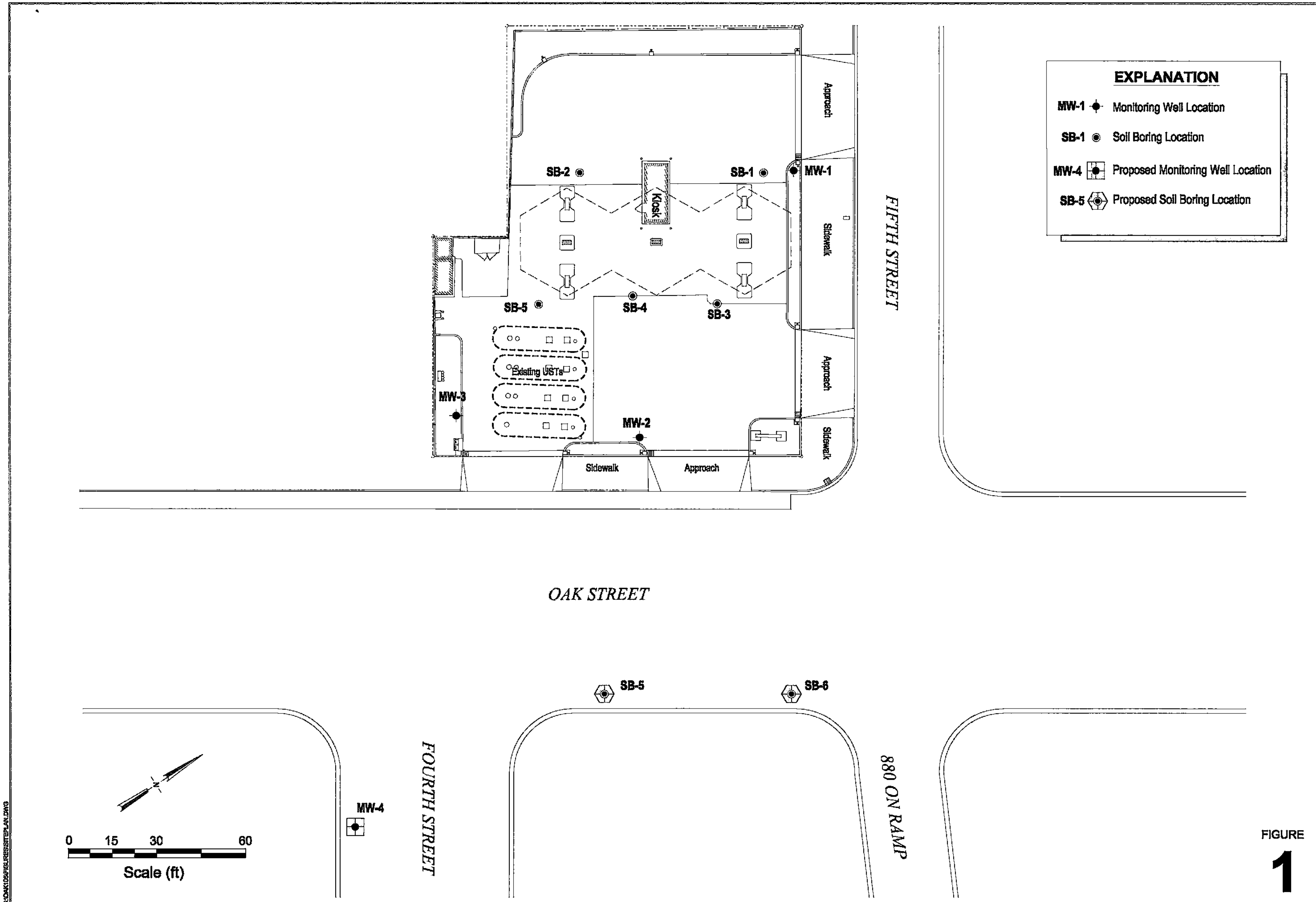

FIGURE
1

Site Plan

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Shell-branded Service Station
105 5th Street
Oakland, California

Attachment A

Standard Field Procedures for Monitoring Wells

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STANDARD FIELD PROCEDURES FOR MONITORING WELLS

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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