CAMBRIA

ENVIRONMENTAL PROTECTION

99 APR 20 PM 1:19

April 16, 1999

Ms. Eva Chu
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

see if they would like to move proposed MW-1 to vicinity of former boring SB-3, then can see if dispenser and/or USTs are a problem. Probably no upg. source. Before, across the street Unocal SS was closed their release was not significant.

Re: **Monitoring Well Installation Work Plan**
Shell-branded Service Station
11989 Dublin Boulevard
Dublin, California
Incident # 98995328
SAP Code - 135243
Cambria Project # 240-0548

Dear Ms. Chu:

On behalf of Equiva Services LLC (Equiva), Cambria Environmental Technology, Inc. (Cambria) has prepared this work plan to install ground water monitoring wells at the Shell-branded service station referenced above. This work plan was requested in the Alameda County Health Care Services Agency (ACHCSA) letter to Shell Oil Products Company dated November 24, 1998. The objective of this work plan is to implement a ground water monitoring program for the proposed monitoring wells.

SITE BACKGROUND

Site Location: This operating Shell-branded service station is located at the intersection of Dublin Boulevard and San Ramon Road in Dublin, California (Figure 1). The surrounding area is primarily commercial with retail businesses adjacent to the site. A Chevron service station is located northeast of the Shell-branded site.

Underground Storage Tanks (USTs): Three gasoline USTs and one diesel UST are in use on site.

Ground Water Depth and Flow Direction: Historical data from wells adjacent to the site indicates that ground water is typically located 20 to 25 ft bgs. Topography slopes slightly to the east, and ground water flow direction is estimated to be toward the east to southeast.

Surface Waters: Dublin Creek is located within 1/4-mile south of the site.

Oakland, CA
Sonoma, CA
Portland, OR
Seattle, WA

Cambria Environmental Technology, Inc.

1144 65th Street
Suite B
Oakland, CA 94608
Tel (510) 420-0700
Fax (510) 420-9170

Sediment Lithology: The shallow site subsurface consists mostly of gravelly sand with silt to a depth of approximately 5 feet below ground surface (ft bgs). Silty sand and sandy gravel with silt exists to a depth of approximately 8 to 12 ft bgs, followed by clayey sand to a depth of 22.5 ft bgs and silty clay from 22.5 ft to 30 ft bgs. Soils investigated are generally of low to moderate estimated permeability to the maximum explored depth of 41 ft bgs.

Dispenser and Piping Removal and Replacement: In June 1997, soil samples were collected and analyzed during dispenser and piping replacement. Maximum detected concentrations of total purgable petroleum hydrocarbons as gasoline (TPPH) and total extractable petroleum hydrocarbons as diesel (TEPH) were 690 milligrams per kilogram (mg/kg) and 12,000 mg/kg, respectively. The highest detected benzene and methyl tert-butyl ether (MTBE) concentrations during the same sampling event were 0.55 mg/kg and 8.9 mg/kg by EPA Method 8020, respectively, both from beneath the center dispenser in the northern pump island.

Site Wells: On August 8, 1997, six tank backfill wells were abandoned in accordance with permit #97433 issued by the Alameda County Flood Control and Water Conservation District Zone 7 (Zone 7). One tank backfill well still exists on site. Water was not encountered at 12 ft below ground surface (bgs), the maximum tank backfill well depth.

Subsurface Investigation: To evaluate soil and groundwater conditions in the area surrounding the UST complex, Cambria drilled four borings on November 19, 1997 using a Geoprobe® sampling rig. Cambria based the soil boring locations on the locations of the current dispenser islands and USTs and the location of detected hydrocarbon concentrations during the piping and dispenser sampling event. Boring locations are indicated on Figure 1.

The highest detected TPHg and TPHd concentrations in soil were 11 mg/kg and 300 mg/kg, respectively, in sample SB-3 at 25 ft bgs. This sample also contained the only benzene detection in soil at 0.0051 mg/kg. The highest detected MTBE concentration in soil was 0.11 mg/kg in sample SB-2 at 20 ft bgs by EPA Method 8020. In general, hydrocarbon concentrations were highest in soil samples collected east of the pump islands; however, the concentrations detected were negligible.

A ground water sample collected from SB-2 contained 470 parts per billion (ppb) TPHg and 4900 ppb TPHd. This sample also contained 17 ppb benzene and 110 ppb MTBE by EPA Method 8020. No ground water was encountered in the other borings.

Secondary Subsurface Investigation: To evaluate soil and groundwater conditions in the assumed downgradient direction from the UST complex, Cambria drilled two borings on August 5, 1998

using a Geoprobe® sampling rig (Figure 2). Selected soil and ground water samples were analyzed for TPPH and TEPH by modified EPA Method 8015, and BTEX and MTBE by EPA Method 8020. Maximum MTBE concentrations detected in ground water were confirmed by EPA Method 8260.

Soil samples from boring SB-2 reported low concentrations of TEPH at 5 and 10 ft bgs, with all other analytes reported below detection limits to an explored depth of 20 ft bgs. Maximum concentrations of 250 mg/kg TPPH and 2.8 mg/kg benzene were reported in soil boring sample SB-2(30'). Soil samples collected from soil boring SB-1 reported low concentrations of TEPH to an explored depth of 15 ft bgs and a trace concentration of 0.074 mg/kg MTBE by EPA Method 8020. All other analytes were below detection limits in SB-1 at 15 ft bgs. Benzene was reported below detection limits in all soil samples from SB-1. Petroleum hydrocarbons and MTBE concentrations detected at depths of 20 and 25 ft bgs appear to be present due to the presence of these compounds in groundwater.

Benzene was reported below detection limits in ground water samples collected from SB-1 and SB-2, however detection limits were 1000 ppb and 25 ppb respectively. A maximum concentration of 140,000 ppb TPPH was reported in ground water sample SB-1. Analysis by EPA Method 8260 reported a maximum MTBE concentration of 14,000 ppb in the ground water sample collected from SB-1.

PROPOSED SCOPE OF WORK

To determine the extent of hydrocarbons in ground water beneath the site, we propose installing three ground water monitoring wells on site and analyzing selected soil samples for petroleum hydrocarbons and MTBE. Proposed locations for the three monitoring wells 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 4-inch diameter ground water monitoring wells and collecting soil samples;
- Preparing an investigation report presenting the results of the soil sampling.

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. In addition, Cambria will arrange to have a private line locator survey the proposed drilling location for underground utilities.

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

Monitoring Well Installation: Three 4-inch diameter ground water monitoring wells 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 volatile vapor analyzer. Following installation, the wells will be developed using a combination of ground water 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 off site landmark. Our standard field procedures for monitoring well installations 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. The highest MTBE concentrations detected in quarterly ground water samples will be confirmed by EPA Method 8260.

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

- 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.
- A schedule for quarterly ground water monitoring.

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

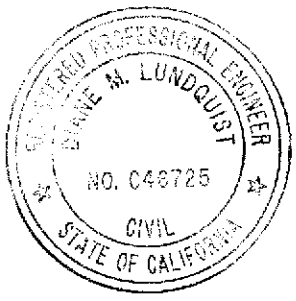
CLOSING

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.

D. Ataide for

Troy A. Buggle
Environmental Scientist



Diane Lundquist, P.E.
Principal Engineer

Attachments: A - Standard Field Procedures for Monitoring Wells

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

G:\Dublin 11989\Reports\wellinstallworkplan-4-99.wpd

G:\11989 DUBLIN\FIGURES\PROP-WELL.DWG

Shell-branded Service Station
11989 Dublin Boulevard
Dublin, California

CAMBRIA

Proposed Monitoring Well Location Map

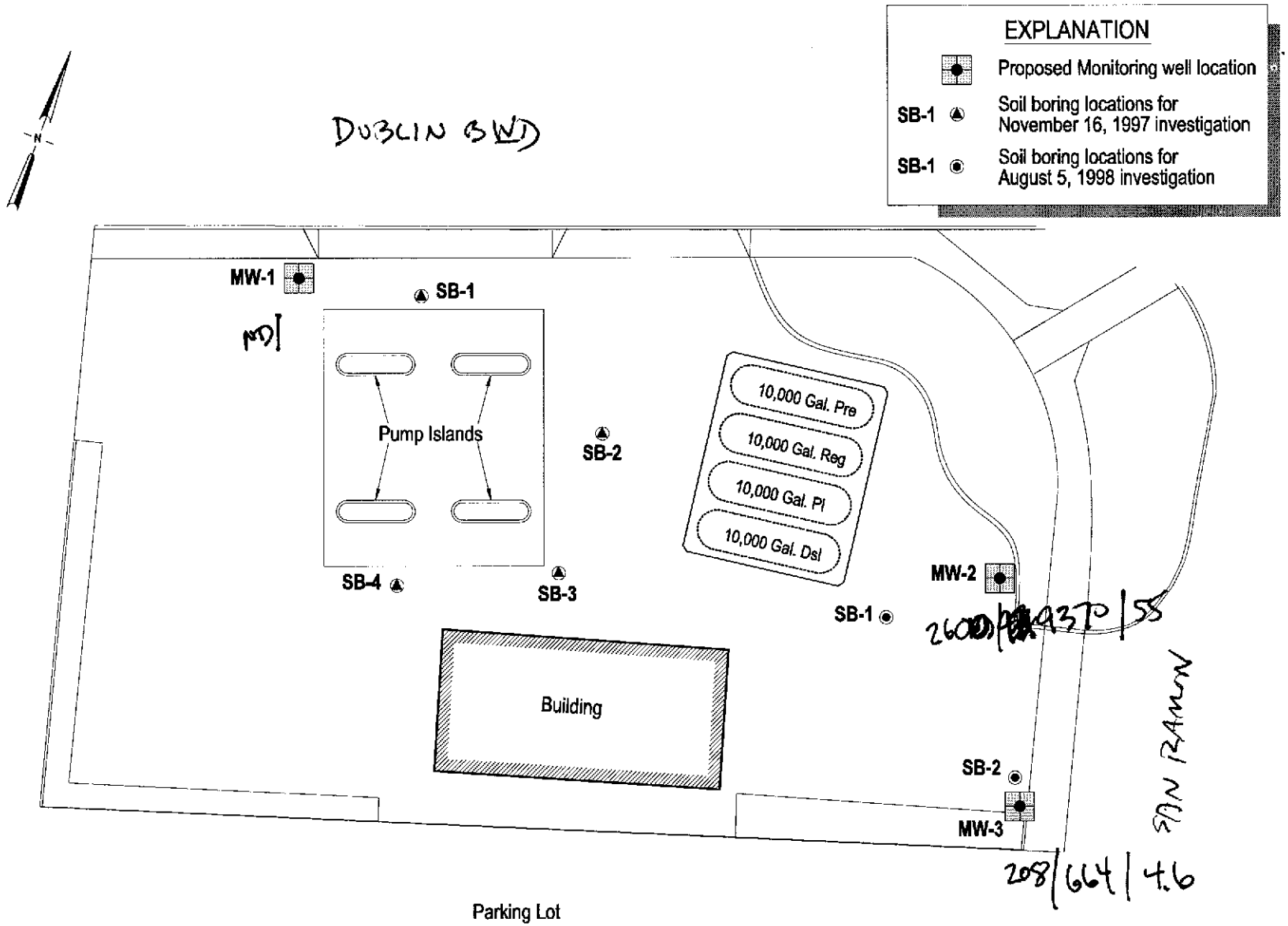


FIGURE
1

0416/99

Attachment A

Standard Field Procedures for Monitoring Wells

STANDARD FIELD PROCEDURES FOR MONITORING WELL INSTALLATION

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.

F:\TEMPLATE\SOPS\WELLS-GW.WPD