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Shell Oil Products US

February 10, 2003

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

Alameda County
FEB 18 2003
Environmental Health

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

Dear Mr. Chan:

Attached for your review and comment is a copy of the *Interim Remedial Action 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.

As always, please feel free to contact me directly at (559) 645-9306 with any questions or concerns.

Sincerely,

Shell Oil Products US

Karen Petryna
Sr. Environmental Engineer

February 10, 2003

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

Re: **Interim Remedial Action Work Plan**
Shell-branded Service Station
105 5th Street
Oakland, California
Incident #98995757
SAP #135700
Cambria Project #245-0472



Dear Mr. Chan:

On behalf of Equilon Enterprises LLC dba Shell Oil Products US (Shell), Cambria Environmental Technology, Inc. (Cambria) is submitting this *Interim Remedial Action Work Plan* to install a groundwater extraction (GWE) system at the subject site. The proposed GWE system will be used to address elevated concentrations of dissolved methyl-tertiary-butyl ether (MTBE) in groundwater at the site. A site summary and our proposed scope of work are presented below.

SITE BACKGROUND


Location: This active Shell-branded service station is located on the corner of Fifth Street and Oak Street in Oakland, California. The site is surrounded by commercial property.

Subsurface Conditions: The site is underlain by sand, silty sand, and clayey sand to the total explored depth of 25.0 feet below grade (fbg).

Groundwater Depth and Flow Direction: Since groundwater monitoring was initiated in November of 1999, depth to groundwater has typically ranged from approximately 4.5 to 6.5 fbg. The groundwater gradient is generally to the southeast.

**Cambria
Environmental
Technology, Inc.**

5900 Hollis Street
Suite A
Emeryville, CA 94608
Tel (510) 420-0700
Fax (510) 420-9170

PREVIOUS SOIL AND GROUNDWATER INVESTIGATIONS

1996 Upgrade Activities: During November and December of 1996, Armer/Norman & Associates of Walnut Creek, California removed five gasoline dispensers, two diesel dispensers, associated piping and inactive piping to a former diesel fuel dispenser. On November 27, 1996, Cambria collected soil samples from beneath the seven dispenser locations and the inactive diesel fuel piping prior to replacement. Armer/Norman & Associates replaced the gasoline and diesel dispensers and associated piping with additional secondary containment. After receiving analytical results indicating the presence of hydrocarbons, Cambria filed an *Underground Storage Tank Unauthorized Release Site Report* with the Alameda County Health Care Services Agency (ACHCSA) on behalf of Shell.

1998 Upgrade Activities: 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.

1998 Subsurface Investigation: On July 23, 1998, Cambria advanced three borings in the assumed downgradient direction from existing dispensers and two borings in the assumed upgradient direction from the existing dispensers. The soil borings were advanced to depths of 11.0 to 12.0 fbg. The maximum reported hydrocarbon concentrations in soil were 15 milligrams per kilogram (mg/kg) total purgeable hydrocarbons as gasoline (TPHg) in boring SB-3 at 5.0 fbg, and 0.48 mg/kg methyl tert-butyl ether (MTBE) (EPA Method 8020) in boring SB-5 at 5.0 fbg. No benzene was detected in the soil samples. The maximum detected hydrocarbon concentrations in groundwater were 90,000 micrograms per liter ($\mu\text{g/L}$) TPHg in boring SB-3, 27,000 $\mu\text{g/L}$ total purgeable hydrocarbons as diesel in SB-4, 1,300 $\mu\text{g/L}$ benzene in SB-3, and 4,100 $\mu\text{g/L}$ MTBE (EPA Method 8020) in SB-4.

1999 Monitoring Well Installations: On May 14, 1999, Cambria installed three groundwater monitoring wells (MW-1, MW-2 and MW-3) to a depth of 25 fbg. Hydrocarbons were not detected in soil samples from MW-1 or MW-3. The maximum reported hydrocarbon concentrations in soil samples collected from boring MW-2 were 1,700 mg/kg TPHg at 5.5 fbg, 0.0369 mg/kg benzene at 10.5 fbg, and 13.2 mg/kg MTBE (EPA Method 8020) at 5.5 fbg. Hydrocarbons were not detected in groundwater collected from MW-1, located upgradient of the existing dispensers. The maximum detected concentrations in groundwater were 13,800 $\mu\text{g/L}$

TPHg in MW-2, 1,790 µg/L benzene in MW-2, and 324,000 µg/L MTBE (by EPA Method 8260) in MW-3.

2001 Offsite Subsurface Investigation: On February 12, 2001, Cambria advanced three soil borings (SB-6 and SB-7) and converted one into a groundwater monitoring well (MW-4) constructed to a depth of 25 fbg.

2002 On- and Offsite Subsurface Investigation: On March 7 – 8, 2002, Cambria advanced five offsite soil borings (SB-8 through SB-12) and constructed one onsite groundwater monitoring well (MW-5) to a depth of 24 fbg.



2002 Offsite Monitoring Well Installation: On August 1, 2003, Cambria installed one offsite groundwater monitoring well (MW-6) to a depth of 24 fbg. Miller Brooks Environmental completed the *Well Installation Report* dated September 16, 2002 documenting installation of this well.

2000 - 2003 INTERIM REMEDIATION EFFORTS

Dual-Phase Vapor Extraction: Monthly mobile dual-phase vapor extraction (DVE), using wells MW-2 and MW-3, was initiated at the site on April 21, 2000 primarily to remediate MTBE in soil and groundwater. Advanced Clean-up Technologies Inc (ACTI) of Benecia, California was retained to conduct mobile DVE at the site. Extracted groundwater was disposed of at the Martinez Refinery Corporation in Martinez, California. Abatement of the extracted soil vapors through carbon filtration was determined to be inadequate. Therefore, mobile DVE was discontinued after October 26, 2000. A total of 7.1 pounds of vapor phase MTBE was removed during DVE activities.

2001 DVE Pilot Test: On March 20, 2001, Cambria performed DVE testing of MW-2 and MW-3 to better evaluate the viability of DVE as a remedial method. For each test, groundwater and vapor samples were collected for laboratory analysis. Vapor extraction data from the DVE pilot test indicated vapor-phase petroleum hydrocarbon recovery is possible, although expected recovery rates are relatively low. GWE data from the DVE pilot test suggested liquid-phase petroleum hydrocarbon recovery is feasible. Based on the test data and conclusions presented, Cambria recommended conducting semi-monthly GWE from backfill well T-1 for a period of 6 months by means of a vacuum truck. Details of the DVE pilot test are presented in Cambria's July 17, 2001 *Dual-Phase Vacuum Extraction Pilot Test Report*.

GWE: Beginning in November 2001, mobile GWE using a vacuum truck was performed at the site to remove dissolved-phase hydrocarbons and MTBE from beneath the site. Tank backfill well T-1 has been used for semi-monthly GWE events, which are currently ongoing. To date, a total of 104,644 gallons of groundwater has been extracted, resulting in removal of 69.4 pounds of liquid phase MTBE.

PROPOSED GWE SYSTEM



Shell has determined that contaminant concentrations detected at this facility warrant further remedial action. Shell authorized Cambria to design a GWE system to mitigate and remediate dissolved-phase MTBE in groundwater onsite and to hydraulically control MTBE migration in groundwater at the perimeter of the site. The system will also treat other fuel-related hydrocarbons detected in limited amounts in the groundwater, including benzene, ethylbenzene, xylene and tert-butanol. Cambria will complete the permitting and installation of this system. The conceptual design of the system is described below.

System Design: Cambria will prepare engineering design drawings for permitting and construction of the GWE system. The system will be designed with capacity for easy expansion to additional wells, and to handle additional groundwater flow, if necessary. In addition, the system will be designed so that a soil vapor extraction (SVE) system can be added to the system in the future, if found to be feasible and warranted. Depending on the results of future activities, additional pumping wells may be added.

Data pertaining to anticipated groundwater flow rates has been collected during mobile GWE events currently conducted on a semi-monthly basis. Although these events do not serve as a formal pump test designed to calculate properties such as transmissivity or hydraulic conductivity, sufficient data was gathered to allow for a reasonable estimation of system flow rates. Monitoring wells MW-2 and MW-3 are anticipated to produce flows of approximately 1 gallon per minute (gpm) each. The tank backfill wells, T-1 and T-2, are anticipated to produce a combined flow of approximately 4 gpm. The average total from all wells is anticipated to produce a flow of approximately 6 gpm.

Pumping Locations: The proposed interim GWE and treatment system design includes pumping from monitoring wells MW-2 and MW-3 and tank backfill wells T-1 and T-2. Refer to Figure 1 for the location of these wells.

Wells MW-2 and MW-3 were constructed using 4-inch diameter Schedule 40 polyvinyl chloride (PVC) casing installed to a depth of 24 and 25 feet bgs, respectively. Well MW-2 is screened from 4 to 24 feet bgs and well MW-3 is screened from 5 to 25 feet bgs, and both are screened with 0.010-inch slotted perforation. Backfill wells T-1 and T-2 are 4-inch and 12-inch slotted PVC casings installed within the pea gravel tank backfill.

System Equipment: Groundwater will be extracted from the wells using pneumatic submersible pumps due to the relatively low anticipated flow rates. Selection of pump makes and models will be determined as part of the final design. An air compressor will provide compressed air to drive the pneumatic pumps.



The extracted groundwater will be pumped from the wells into a 500-gallon surge tank, located in the remediation compound. The compound will be located in the rear of the station as shown in Figure 1. The surge tank will be equipped with two high/low water level shutoffs to control the downhole well pumps and the treatment system transfer pump.

From the transfer pump, water will flow through a particulate bag filter and then through three 1,200-pound aqueous-phase carbon vessels (in series) prior to discharge to the sanitary sewer. Flow meters, pressure gauges, and sample ports will be installed to control and monitor system operation.

The steel adsorber tanks will be bolted down onto a concrete pad surrounded by a 6-foot high chain-link fence. Cambria will obtain necessary permits from the City of Oakland, Pacific Gas and Electric, and the East Bay Municipal Utility District (EBMUD) prior to construction and installation of the proposed treatment system.

An electrical control panel with a programmable logic controller will interlock and operate the GWE system controls. A telephone autodialer will be installed to remotely notify Cambria of system shutdown events.

Building Permits: Cambria will prepare engineered drawings and specifications to submit to the City of Oakland for review and issuance of applicable construction permits.

Discharge Permitting: Cambria anticipates discharging treated groundwater to the local sanitary sewer system, under the authorization of an EBMUD discharge permit. Cambria will obtain necessary permits from EBMUD on behalf of Shell.

Construction: Cambria will issue engineered drawings, specifications, and a detailed scope of work to a Shell-preferred contractor for submittal of construction costs and schedule. The contractor will begin construction after Shell approves the construction cost and schedule and after all permits are obtained. Cambria will provide oversight of construction activities included in the contractor's scope of work. The contractor will arrange all required inspections.

Utility Location: The contractor will notify Underground Service Alert of the construction activities.



Site Health and Safety Plan: Cambria and the contractor will prepare comprehensive site safety plans to protect site workers. The plan will be kept onsite during field activities and will be reviewed and signed by each site worker.

Start-Up: After inspection approval, Cambria will collect GWE system start-up samples and operational data as specified by sewer discharge permit. The samples will be transported to a State-approved analytical laboratory for the appropriate chemical analysis. The analytical results will be submitted to the EBMUD for review. Start-up of the GWE system will occur after receiving discharge approval from EBMUD. Copies of any start-up reports submitted to EBMUD will also be sent to the ACHCSA.

Semi-Monthly GWE: Semi-monthly GWE through vacuum operations has been performed at this site as an interim measure to remove dissolved-phase hydrocarbons from the subsurface and currently continues. With the installation of the proposed fixed groundwater remediation system, these GWE events will no longer be necessary and will be discontinued. Semi-monthly GWE will continue until the GWE system is installed and operational.

C A M B R I A

Mr. Barney Chan
February 10, 2003

CLOSING

Please call Diane Lundquist at (510) 420-3334 if you have any questions or comments. Thank you for your assistance.

Sincerely,

Cambria Environmental Technology, Inc.



Diane M. Lundquist, P.E.
Principal Engineer

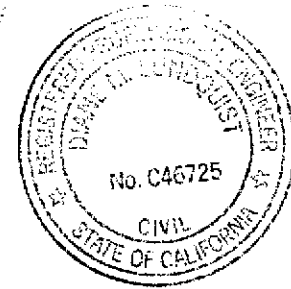


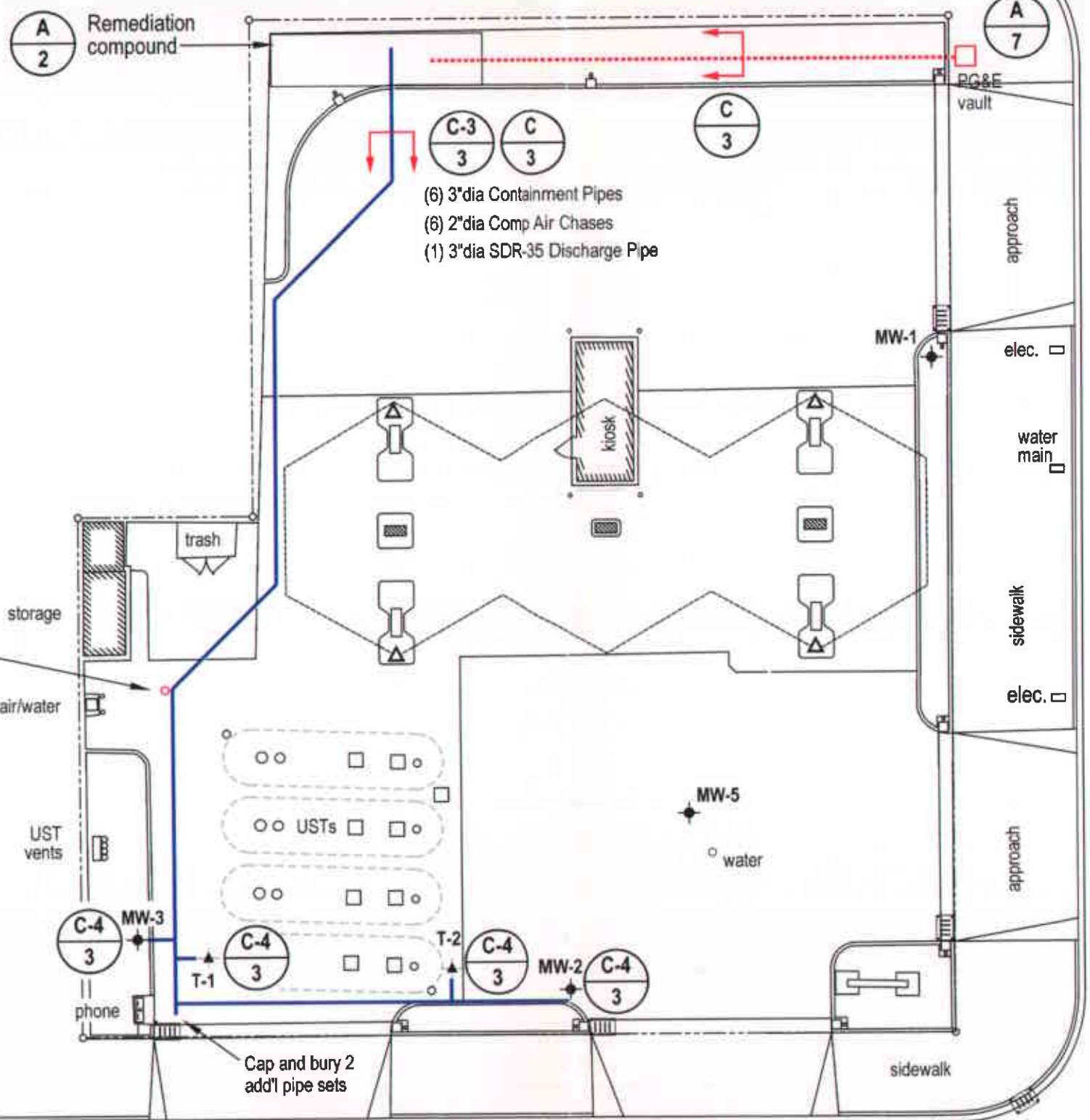
Figure: 1 - Groundwater Extraction and Treatment System Layout

cc: Karen Petryna, Shell Oil Products US, P.O. Box 7869, Burbank, CA 91510-7869

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EXPLANATION

- MW-1 + Monitoring well location
- T-1 + Tank backfill well location
- Proposed trench/electrical service
- Proposed Trench/Piping layout
- Existing Sanitary Sewer (SS)
- Existing Storm Drain (SD)
- C-3 Denotes Standard Drawing Number Drawing Number
- D Cross-section Indicator & Detail Designator



MH FL = 4.45 fbg

8" SS FL = 4.9 fbg

FL = 9.14 fbg

FL = 4.32 fbg
FL = 8.06 fbg



Alameda County
FEB 18 2003
Environmental Health

FIFTH STREET

OAK STREET

12" SS
24" SD

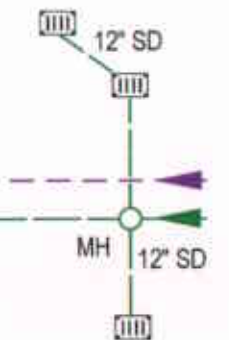


FIGURE 1

Groundwater Extraction and Treatment System Layout



C A M B R I A

Shell-branded Service Station
105 5th Street
Oakland, California
Incident # 98995757