CONESTOGA-ROVERS & ASSOCIATES

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TRANSMITTAL

DATE: May 26, 2011

REFERENCE NO.: 241513

PROJECT NAME: 500 40th Street, Oakland

TO: Jerry Wickham
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

RECEIVED
11:09 am, Jun 01, 2011
Alameda County
Environmental Health

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QUANTITY	DESCRIPTION
1	Subsurface Investigation Work Plan

- ☐ As Requested
- ☐ For Your Use
- ☒ For Review and Comment
- ☐
- ☐

COMMENTS:
If you have any questions regarding the contents of this document, please call Peter Schaefer at (510) 420-3319.

Copy to: Denis Brown, Shell Oil Products US (electronic copy)
Young Song and In Song, Trustees, 1015 Sanders Drive, Moraga, CA 94556

Completed by: Peter Schaefer Signed: Peter Schaefer

Filing: **Correspondence File**

Denis L. Brown
Shell Oil Products US
HSE – Environmental Services
20945 S. Wilmington Ave.
Carson, CA 90810-1039
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Mr. Jerry Wickham
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94205-6577

Re: Former Shell Service Station
500 40th Street
Oakland, California
SAP Code 129452
Incident No. 97093400
ACEH Case No. RO0000264

Dear Mr. Wickham:

The attached document is provided for your review and comment. 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 (707) 865-0251 with any questions or concerns.

Sincerely,

Denis L. Brown
Senior Program Manager

SUBSURFACE INVESTIGATION WORK PLAN

FORMER SHELL SERVICE STATION
500 40TH STREET
OAKLAND, CALIFORNIA

SAP CODE	129452
INCIDENT NO.	97093400
AGENCY NO.	RO0000264

Prepared by:
Conestoga-Rovers & Associates

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MAY 26, 2011
REF. NO. 241513 (8)
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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) prepared this work plan on behalf of Equilon Enterprises LLC dba Shell Oil Products US (Shell) to assess potential for soil vapor intrusion to the on-site building and adjacent properties as discussed during a February 17, 2011 meeting with Alameda County Environmental Health (ACEH) and as requested in ACEH's March 7, 2011 letter.

The site is a former Shell Service Station located on the northwestern corner of 40th Street and Telegraph Avenue in Oakland, California (Figure 1). The site was an operating service station prior to 1987 and currently is occupied by a strip mall. The former site layout included three underground storage tanks and four dispenser islands (Figure 2). The area surrounding the site is of mixed commercial and residential use. The parking lot for the MacArthur Bay Area Rapid Transit station is located to the southwest across 40th Street.

A summary of previous work performed at the site and additional background information is contained in Appendix A.

2.0 WORK TASKS

CRA proposes to install four soil vapor probes on site to assess soil vapor concentrations near the on-site building and adjacent properties at the locations shown on Figure 2. Specific tasks are described below.

2.1 PERMITS

CRA will obtain a boring permit to install the soil vapor probes from the Alameda County Public Works Agency (ACPWA).

2.2 HEALTH AND SAFETY PLAN (HASP)

CRA will prepare a HASP to protect site workers. The plan will be kept on site during field activities and will be reviewed and signed by each site worker.

2.3 UTILITY CLEARANCE

CRA will mark the proposed probe locations, and the locations will be cleared by Underground Service Alert and a private utility locating service prior to drilling.

2.4 SOIL VAPOR PROBE INSTALLATION

CRA proposes to install four soil vapor probes (SVP-1 through SVP-4) into the subsurface in the west portion of the property (Figure 2). The probes are proposed near the former station source areas and adjacent to the on-site building and residential properties.

Assuming the absence of subsurface obstructions, CRA will advance the soil borings to 5 feet below grade (fbg) using an air-knife rig. The nested soil vapor probes will be installed with two screen intervals (3 and 5 fbg) at each location to assess the vertical attenuation of soil vapors.

A CRA geologist will supervise the drilling and describe the encountered soils using the Unified Soil Classification System and Munsell Soil Color Charts. Soil cuttings will be collected for field screening for organic vapors using a photo-ionization detector (PID). CRA will prepare a boring log for each soil vapor probe boring, and PID measurements will be recorded on the boring logs.

After the borings are advanced, fixed vapor-sampling points will be installed in each boring using ¼-inch diameter Teflon® tubing. Each point will use a ¾-inch screen interval attached to the Teflon® tubing. To ensure the tubing does not curl or kink during installation, CRA will first straighten out each length of tubing prior to installation and then use a small-diameter PVC guide pipe to hold the tubing in place within the boring while packing the annulus with sand. A clean, fine-grained silica sand filter pack will be installed approximately 3 inches below and above the deepest screened interval (5 fbg), and the guide pipe will be lifted as the sand pack is installed to ensure the pack stabilizes the tubing within each boring. The annulus will then be sealed to 3 inches below the 3 fbg sample point, with a bentonite slurry set atop a 2-inch base of bentonite pellets. The shallow sample point (3 fbg) will be installed in the same manner. The probe will be sealed to the surface using bentonite slurry, set atop a 2-inch base of bentonite pellets. Each soil vapor probe will be completed at the surface using a traffic-rated well box at grade.

CRA will perform this work under the supervision of a professional geologist or engineer.

2.5 SOIL VAPOR PROBE SAMPLING

At least 2 weeks following probe installation, CRA will collect soil vapor samples from each sampling point. Sampling is affected by rain. CRA's standard procedure is to allow 2 days or more after a heavy rain event prior to collecting soil vapor samples.

CRA will sample the soil vapor probes using a vacuum pump and Tedlar® bags. Soil vapor samples will be collected from each screened interval of each probe. Prior to sampling, CRA will purge at least three tubing volumes of air from the probes using a vacuum pump. Then CRA will attach a sealed "lung sampler" containing a 1-liter Tedlar® bag to the probe and attach the vacuum pump to the box. The vacuum pump will lower the pressure in the "lung sampler" and draw air from the probe into the Tedlar® bag. To avoid breakage, CRA will fill the bags no more than two-thirds full. Each sample will be labeled, entered onto a chain-of-custody, and placed into a protective box at room temperature for transport to a State of California-certified laboratory for analysis within 72 hours.

2.6 LEAK TESTING

To check the system for leaks, CRA will cover the soil gas probe surface casing and sampling equipment with a containment unit (or shroud). Prior to soil gas probe purging, CRA will introduce helium into the containment unit to obtain a minimum 50 percent helium content level. CRA will confirm the helium content within the containment unit using a helium meter and will record the helium meter readings in our field notes. Helium will continue to be introduced to the containment unit during soil gas probe purging and sampling.

All samples will be analyzed in a laboratory for helium. In the event that the soil vapor samples contain a helium content of greater than 10 percent of the source concentration (i.e., 10 percent of the helium content measured within the containment unit), the soil gas sample will be considered invalid.

2.7 CHEMICAL ANALYSES

Vapor samples will be analyzed for total petroleum hydrocarbons as gasoline, benzene, toluene, ethylbenzene, and xylenes by EPA Method 8260B and for oxygen and argon, carbon dioxide, methane, and helium by ASTM D Method 1946 (M).

2.8 REPORT PREPARATION

Following receipt of the analytical results from the laboratory, CRA will prepare a written report, which will include field procedures, tabulated analytical data, boring logs, and analytical laboratory reports.

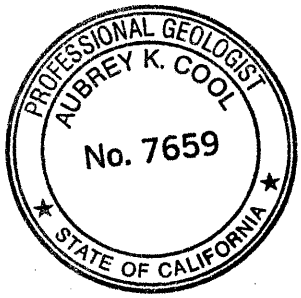
3.0 SCHEDULE

CRA will implement the soil vapor probe installation activities upon receiving ACEH's written approval of this work plan and the drilling permit from ACPWA.

All of Which is Respectfully Submitted,
CONESTOGA-ROVERS & ASSOCIATES

Peter Schaefer, CEG, CHG

Aubrey K. Cool, PG



FIGURES

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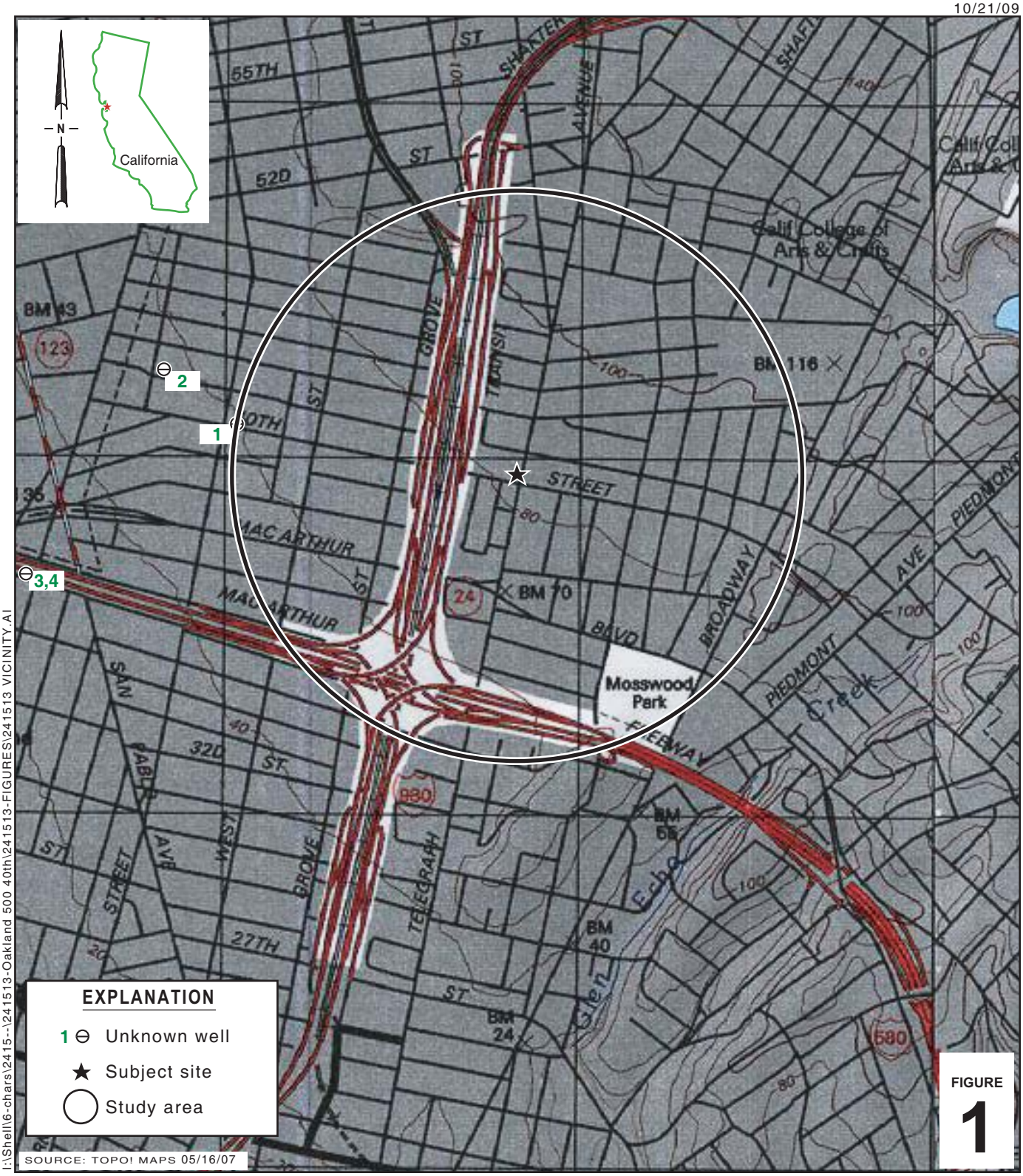

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FIGURE
1

0 1/8 1/4 1/2 1

SCALE : 1" = 1/4 MILE

Former Shell Service Station

500 40th Street

Oakland, California

CONESTOGA-ROVERS & ASSOCIATES

Vicinity Map

05/23/2011

EXPLANATION

- SVP-1 — Proposed soil vapor probe location
- MW-2 — Monitoring well location
- MW-4 — Destroyed monitoring well location
- B-1 — Monitoring wells paved over or built upon
- CSB-1 — Soil boring location

Residential 530 40th St.
Residential 526 40th St.
Residential 522 40th St.
Residential 518 40th St.
OMW-12
Sidewalk
40th STREET
CSB-1
OMW-6
Median Planter
OMW-11
OMW-13
Sidewalk
Planter
Bart Station Parking Lot Access
BART Station Parking Lot
OMW-9
OMW-10
Planter
Residential (Apts.) 505 40th St.
Sidewalk
Bart Station Parking Lot Access
MW-8
B-5
B-6
B-4
R-1
B-3
R-2
EW-1
B-11
B-1
B-10
B-9
B-2
SVP-3
B-7
B-8
SVP-4
Former Station Building
Stores
Former Dispenser Island (typ.)
Stores
Former USTs
Planter
Parking
SVP-1
MW-2
MW-4
Former Shell Station
500 40th St.
Parking
SVP-2
MW-3
Planter
Parking
Planter
MW-5
Sidewalk
TELEGRAPH AVENUE

N

0 15 30 60

Scale (ft)

Base map taken from City of Oakland General Plan and Zoning Map

I:\Shell\6-chars\2415--\241513-Oakland 500 40th\241513-FIGURES\241513 SITE PLAN.DWG

Site Plan

CONESTOGA-ROVERS & ASSOCIATES

Former Shell Service Station

500 40th Street
Oakland, California

FIGURE

2

APPENDIX A

SITE HISTORY

SITE HISTORY

1982 Pipe Leak: In July 1982, Shell Oil Products US (Shell) reported a leak in the piping over one of the underground storage tanks (USTs). The volume of release is unknown.

1982 Subsurface Investigation: In July 1982, IT Enviroscience (IT) installed eight groundwater monitoring wells (B-1 through B-8). Separate-phase hydrocarbons (SPHs) were observed in and purged from wells B-3, B-4, B-7, and B-8. IT also stated that "combustible vapors were also detected in the storm sewer system in the BART [Bay Area Rapid Transit] station parking lot located across 40th Street." A hand-drawn map included in Shell's archived files notes "vapors" in storm system drains on the western side of the BART parking lot, on the eastern side of the BART station building, and in an "electrical vault" west of the parking lot and station building. Details of the investigation are included in IT's July 28, 1982 *Progress Reports #1 - Gasoline Leakage.*

1982-1984 SPH Removal and Mobile Groundwater Extraction (GWE): In July 1982, IT initially observed SPHs in wells B-7 and B-8, and mobile GWE was conducted from the wells, which removed approximately 100 gallons of water with gasoline. Subsequently, SPHs were detected in wells B-2, B-3, and B-4. SPHs were periodically removed from wells B-3 and B-4 by manual bailing. In addition, in July 1983, mobile GWE was conducted from wells B-3 and B-4 using a vacuum truck. Based on available data, IT removed an estimated 73.3 pounds of SPHs by bailing and mobile GWE. Details of the SPH monitoring and removal are included in IT's July 28, 1982 *Progress Report #1 - Gasoline Leakage* through January 31, 1984 *Progress Report #13 - Gasoline Leakage.*

1983 Subsurface Investigations: Between July and September 1983, IT installed three groundwater monitoring wells (B-9 through B-11) and two recovery wells (R-1 and R-2). On October 4, 1983, IT purged recovery wells R-1 and R-2 twice, and on October 10, 1983, they purged both wells and held the groundwater depth at 30 feet below grade (fbg) for 2 hours. Details of the investigation are presented in IT's October 18, 1983 *Summary of Work Performed Since July 28, 1983.*

1983 UST Removal: According to a site chronology included in Converse Environmental Consultants' (Converse's) April 14, 1989 *Work Plan for Site Characterization and Remediation,* four USTs (two 5,000-gallon tanks, one 7,500-gallon tank, and one 8,000-gallon tank) were removed and wells R-1 and R-2 were destroyed during tank removal activities in November 1983.

1986 Well Destruction: According to a site chronology included in Converse's July 7, 1989 *Quarterly Report,* IT destroyed monitoring well B-6 in June 1986.

1986 UST Removal: In September 1986, three second-generation USTs (three 10,000-gallon fiberglass tanks) were removed and Blaine Tech Services, Inc. (Blaine) collected five soil

samples at 9.5 to 10 fbg beneath the west and east ends of the USTs. UST excavation soil samples contained up to 99 milligrams per kilograms (mg/kg) total petroleum hydrocarbons as gasoline (TPHg). Blaine's September 26, 1986 *Sampling Report* presents soil sampling details. Zone 7 Water Agency's September 25, 1986 letter transmits two well destruction permits, likely for recovery wells R-1 and R-2, which were constructed directly adjacent to the UST complex. Monitoring well B-11 was constructed within the UST backfill and was also likely destroyed during the UST removal.

1987 Construction: The shopping center which currently occupies the site was likely completed during the first half of 1987. The shopping center covered wells B-2, B-7, B-9, and B-10, and wells B-1, B-3, B-4, B-5, and B-8 were covered by parking lot and rear driveway pavement.

1989 Subsurface Investigations: Between May and November 1989, Converse installed four on-site monitoring wells (MW-2 through MW-5), three off-site monitoring wells (OMW-6, OMW-9, and OMW-10), and an off-site soil boring (CSB-1). Soil samples collected from the borings contained up to 27 mg/kg total petroleum hydrocarbons as motor oil (TPHmo), 40 mg/kg total petroleum hydrocarbons as diesel (TPHd), 28 mg/kg TPHg, 0.064 mg/kg benzene, 0.46 mg/kg toluene, 1.1 mg/kg ethylbenzene, 6.3 mg/kg xylenes, and 22 mg/kg total lead. Converse's July 7, 1989 *Quarterly Report* and December 30, 1989 *Quarterly Report* present details of this investigation.

1990 Subsurface Investigation: In June 1990, Converse installed two on-site monitoring wells (MW-8 and EW-1). Soil samples collected from well boring EW-1 contained up to 21 mg/kg TPHmo, 4.4 mg/kg TPHd, 110 mg/kg TPHg, 0.028 mg/kg benzene, 0.38 mg/kg toluene, 0.41 mg/kg ethylbenzene, 1.6 mg/kg xylenes, and 9.1 mg/kg total lead. Converse's September 28, 1990 *Report of Quarterly Activities* describes this investigation.

1991 Subsurface Investigation: In November 1991, Converse installed three off-site monitoring wells (OMW-11 through OMW-13). Soil samples collected from the monitoring well borings contained up to 56 mg/kg TPHmo. TPHd, TPHg, benzene, toluene, ethylbenzene, and xylenes were not detected in the soil samples. Converse's December 31, 1991 *Report of Quarterly Activities* presents details of this investigation.

2002-2005 Oxygen Releasing Compound (ORC) Groundwater Treatment: Between November 2002 and April 2005, ORCs were installed in wells MW-3, MW-5, OMW-6, OMW-9, and OMW-13 for various periods. ORCs were removed because they had no observable effect. Cambria Environmental Technology, Inc.'s (Cambria's) quarterly monitoring reports during this period summarize these activities.

2003 Well Survey: In August 2003, Cambria conducted a survey of California Department of Well Resources records for wells within one mile of the site. Cambria did not identify any wells within a one-half mile radius of the site. Four wells of unknown use were identified

within an area between one-half mile and one mile radius of the site. Cambria's November 21, 2005 *Site Conceptual Model* (SCM) presents results of the well survey.

2004 Well Destructions: In November 2004, Cambria properly destroyed six monitoring wells (EW-1, MW-4, MW-5, OMW-10, OMW-11, and OMW-12) by pressure grouting. Well destruction details are provided in Cambria's January 21, 2005 *Well Destruction Report.*

2005 SCM and Closure Request: On November 21, 2005, Cambria submitted an SCM which summarized site conditions and requested that Alameda County Environmental Health (ACEH) consider case closure.

2006 Sewer Lateral Replacement: In May 2006, Manley & Sons Trucking, Inc. removed approximately 14.22 tons of stockpiled soil from the site which was generated during sewer lateral replacement. The soil was transported to Forward Inc.'s landfill in Manteca, California for disposal.

2006 SCM Addendum: On May 5, 2006, Cambria submitted an SCM addendum requested by ACEH, which provided additional details of site activities between 1982 and 1986 and presented additional groundwater halogenated volatile organic compound (HVOC) analysis data.

Groundwater Monitoring Program: The summary of previous work provided in Converse's September 12, 1989 *Report of Activities* indicates that groundwater monitoring for SPHs was conducted from wells B-1 through B-11 from their installation (July 1982 through September 1983) to December 1986. A groundwater sample collected from well B-3 in September 1986 contained 900 micrograms per liter (µg/l) volatile organics, 320 µg/l benzene, 230 µg/l toluene, and 160 µg/l xylenes. Historically, SPHs were observed intermittently in wells B-2, B-7, and B-8 and regularly in wells B-3 and B-4. The maximum thickness of SPHs measured in these wells was 6.34 feet in well B-4 on July 15, 1983. Monitoring wells B-1 through B-10 were installed between 1982 and 1983 and built over in 1987 (building and parking). Monitoring well B-11 was constructed in 1983 within the UST backfill and was likely destroyed during the 1986 UST removal.

Groundwater sampling of the current wells began in June 1989. Groundwater depth at the site has historically ranged from approximately 7.8 to 14.7 fbg. No SPHs have been found in the current wells.

Groundwater samples collected in November 1993 from wells EW-1, MW-4, MW-5, MW-8, and OMW-9 through OMW-13 and in March 2006 from wells MW-2, MW-3, MW-8, OMW-6, OMW-9, and OMW-13 were analyzed for HVOCs. Samples from off-site monitoring wells OMW-11 and OMW-12 collected during the November 1993 event contained up to 400 µg/l tetrachloroethene (PCE), which exceeded the San Francisco Bay Regional Water Quality Control

Board environmental screening levels[1] (ESLs) for groundwater where groundwater is not a source of drinking water. These wells, the most distant of the off-site wells, were destroyed in November 2004. No other HVOC concentrations exceeded ESLs. Because the PCE was detected in wells cross gradient of possible source areas at the site and not detected in down-gradient wells OMW-6 and OMW-13, it is unlikely that they originated from the subject site. Historical HVOC data is included in Cambria's May 5, 2006 *First Quarter 2006 Groundwater Monitoring Report.*

1 *Screening for Environmental Concerns at Site With Contaminated Soil and Groundwater,* California Regional Water Quality Control Board, Interim Final - November 2007 [Revised May 2008]