RO 367

Wickham, Jerry, Env. Health

From: Gibbs, David [dgibbs@cambria-env.com]
Sent: Monday, February 27, 2006 11:30 AM
To: Wickham, Jerry, Env. Health
Cc: Denis Brown; Cool, Aubrey
Subject: 1784 150th WP Amendment
Attachments: site plan.pdf; Work Plan Well Installation SOP.doc

Jerry,

Attached please find an updated Site Plan with Soil Boring Locations map for the proposed investigation at 1784 150th Avenue in San Leandro. The map includes an updated location for proposed boring SB-22.

In addition to the altered location of SB-22, the installation of shallow monitoring wells is proposed at the locations of borings SB-20, SB-22, and SB-25. As we discussed in our February 2nd meeting, a clayey gravel interval that has been encountered at between approximately 20 and 25 fbg during the advancement of borings at the site is suspected of being impacted by petroleum hydrocarbons. Shallow wells to monitor groundwater conditions in this interval are proposed at the locations of the three borings, with actual well construction details based on soil types and photo ionization detector readings encountered during boring advancement. Cambria's standard field procedures for monitoring well installation are also attached. The wells will be constructed using 4-inch diameter Schedule 40 PVC casing. The filter pack will be placed from the bottom of the well screen up to 2 feet above the top of the well screen followed by a 2-foot-thick bentonite seal and cement grout to grade. The wells will be secured with a locking cap under traffic-rated well boxes. Blaine Tech will develop the new groundwater monitoring wells. Monitoring wells at the site are currently sampled during the first month of each quarter. Depending on when the well installation and development is completed, Blaine will either sample the new monitoring well immediately after development and submit the samples to a State-certified laboratory for chemical analysis, or the well will be added to the existing monitoring well network and sampled during the next scheduled sampling event.

Please reply with your concurrence with this amendment to the proposed investigation or with any requested modifications.

Sincerely,

Dave Gibbs

David M. Gibbs, P.G.
Project Geologist
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02/28/06

G:\SAN LEANDRO 1784 150TH\FIGURES\SITE PLAN.DWG

Site Plan with
Proposed Soil Boring Locations

Shell-branded Service Station
1784 150th Avenue
San Leandro, California
Incident No.98996068

CAMBRIA

FIGURE
2

CAMBRIA

STANDARD FIELD PROCEDURES FOR INSTALLING MONITORING WELLS

This document describes Cambria Environmental Technology's standard field methods for drilling, installing, developing and sampling groundwater monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Well Construction and Surveying

Groundwater monitoring wells are installed in soil borings to monitor groundwater quality and determine the groundwater elevation, flow direction and gradient. Well depths and screen lengths are based on groundwater depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 feet below and 5 feet 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 feet 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 feet 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 groundwater surging and extraction. Surging agitates the groundwater and dislodges fine sediments from the sand pack. After about ten minutes of surging, groundwater 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 groundwater are extracted and the sediment volume in the groundwater 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.

Groundwater Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of groundwater are purged prior to sampling. Purging continues until groundwater pH, conductivity, and temperature have stabilized. Groundwater 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.

RO367

Denis L. Brown

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January 9, 2006

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

Re: Subsurface Investigation Work Plan
Shell-branded Service Station
1784 150th Avenue
San Leandro, California
SAP Code 136019
Incident #98996068

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

January 9, 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**
Shell-branded Service Station
1784 150th Avenue
San Leandro, California
Incident No. 98996068
ACHCSA Fuel Leak Case No. RO0000367
Cambria Project No. 248-0612-006

Dear Mr. Wickham:

On behalf of Equilon Enterprises LLC dba Shell Oil Products US (Shell), Cambria Environmental Technology, Inc. (Cambria) has prepared this *Subsurface Investigation Work Plan* in response to the October 26, 2005 letter from the Alameda County Health Care Services Agency (ACHCSA). To assess the nature and extent of hydrocarbon impact to soil and groundwater, Cambria proposes an on-site soil investigation and an off-site groundwater investigation. The scope of work presented in this work plan complies with ACHCSA and Regional Water Quality Control Board guidelines.

SITE CHARACTERISTICS AND HISTORY

Site Location

The site is an operating Shell-branded service station located at the southern corner of 150th Avenue and Freedom Avenue in San Leandro, California (Figure 1). The area surrounding the site is mixed commercial and residential. The site layout includes a station building, two dispenser islands, one waste oil underground storage tank (UST), and three fuel USTs (Figure 2).

Previous Work

1986 Waste Oil Tank Removal: According to an October 13, 1989 letter from Weiss Associates (Weiss) of Emeryville, California to Shell, Petroleum Engineering of Santa Rosa, California removed a 550-gallon waste-oil tank from the site in November 1986 (Figure 2). Immediately following the tank removal, Blaine Tech Services, Inc. (Blaine) of San Jose, California collected

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soil samples (Soil #1 and Soil #2) beneath the former tank at 8 and 11 feet below grade (fbg). Soil #1 and Soil #2 contained petroleum oil and grease at 196 and 167 parts per million (ppm), respectively. The tank pit was over-excavated to a total depth of 16 fbg, but no additional soil samples were reportedly collected. Groundwater was not encountered in the tank excavation. A new 550-gallon fiberglass waste-oil tank was installed in the same location. Historical soil analytical results are included as Table 1.

1990 Well Installation: In March 1990, Weiss advanced soil boring BH-A, which was converted to groundwater monitoring well MW-1 adjacent to the waste- oil tank (Figure 2). In a soil sample collected at 29 fbg, 35 ppm total petroleum hydrocarbons as gasoline (TPHg) and 0.23 ppm benzene were detected.

1992 Well Installations: In February 1992, Weiss advanced soil borings BH-B and BH-C, which were converted to monitoring wells MW-2 and MW-3. A soil sample collected near the water table from the boring for well MW-2 contained 79 ppm TPHg. Soil samples from boring BH-C, which is located over 100 feet cross-gradient of the tanks, contained up to 68 ppm TPHg.

1992 Well Survey: In 1992, Weiss reviewed the California Department of Water Resources (DWR) and Alameda County records to identify water wells within a ½-mile radius of the site. A total of 21 wells were identified: 12 monitoring wells, 8 irrigation wells and 1 domestic well. No municipal wells were identified. The locations of the irrigation wells and the domestic well are included on Figure 1.

1994 Subsurface Investigation: In June 1994, Weiss advanced six soil borings (BH-1 through BH-6) at the site. No hydrocarbons were detected in soil samples from any borings, except for 0.013 ppm benzene in boring BH-3 at 16 fbg. No hydrocarbons were detected in grab groundwater samples from borings BH-1, BH-4, BH-5 and BH-6. The maximum concentrations of 120,000 parts per billion (ppb) TPHg and 25,000 ppb benzene were detected in the grab groundwater sample collected from boring BH-3. Historical grab groundwater analytical results are included as Table 2.

1995 Well Installation: In February and March 1995, Weiss advanced four soil borings (BH-7 through BH-10) and converted BH-10 to monitoring well MW-4. No petroleum hydrocarbons were detected in any of the soil samples. Up to 100 ppb TPHg and 1.0 ppb benzene were detected in grab groundwater samples from BH-7 and BH-9. No TPHg or benzene was detected in the grab groundwater sample from BH-10. Groundwater was not encountered in soil boring BH-8.

1996 Soil Vapor Survey and Soil Sampling: In July 1996, Weiss conducted a subsurface investigation to obtain site-specific data for a risk-based corrective action (RBCA) evaluation of

the site. Soil vapor and soil samples were collected from the vadose zone at 10 on- and off-site locations (SVS-1 through SVS-10). The highest soil vapor hydrocarbon concentrations were detected near the northwest corner of the UST complex (sample SVS-5 at 3.0 fbg, which contained 7,600 parts per million by volume [ppmv] benzene). No TPHg, benzene, toluene, ethylbenzene, and xylenes (BTEX), or methyl tertiary butyl ether (MTBE) was detected in any of the soil samples except for 1.1 ppm TPHg detected in sample SVS-5 at 18 to 20 fbg. Weiss concluded that depleted oxygen concentrations and elevated carbon dioxide and methane concentrations in the vadose zone indicated that biodegradation was occurring.

1997 RBCA Evaluation: In 1997, Weiss prepared a RBCA evaluation for the site. RBCA analysis results indicated that BTEX, MTBE, 1,2-dichloroethane, and tetrachloroethylene concentrations detected in soil and groundwater beneath the site did not exceed a target risk level of 10^{-5} for residential indoor or outdoor air exposure pathways. However, a risk threshold exceedance was identified associated with ingestion of groundwater from a hypothetical well 25 feet downgradient of the source.

1997 Dispenser and Turbine Sump Upgrade: The dispensers and turbine sumps at the station were upgraded in December 1997. Cambria collected soil samples Disp-A through Disp-D from beneath the dispenser islands during upgrade activities. Up to 590 ppm TPHg (Disp-C at 4.5 fbg), 1.8 ppm benzene (Disp-C at 2.0 fbg) and 1.4 ppm MTBE (Disp-C at 2.0 fbg) were detected.

1998 Soil Vapor Survey and Soil Sampling: In November 1998, Cambria conducted a subsurface investigation to obtain site-specific data for an updated RBCA evaluation of the site. Soil samples, soil vapor samples, and grab groundwater samples were collected from the vadose zone at three on-site and three off-site locations (SVS-11 through SVS-16). In soil vapor, maximum concentrations of 2.7 ppmv TPHg (C5+ hydrocarbons) and 0.17 ppmv TPHg (C2-C4 hydrocarbons) were detected in borings SVS-14 and SVS-15, respectively, at 10 fbg. A maximum concentration of 0.0099 ppmv benzene was detected in SVS-16 at 5 fbg. In soil, 1.6 ppm TPHg and 0.0050 ppm benzene were detected in boring SVS-11 at 19.5 fbg. No TPHg or benzene was detected in any other soil samples. MTBE was reported at 0.029 ppm in boring SVS-14 at 19 fbg using EPA Method 8020; however, MTBE was not detected in this sample using EPA Method 8260. TPHg and benzene were detected using EPA Method 8020 in groundwater from borings SVS-11 and SVS-12 at concentrations up to 130,000 ppb TPHg and 18,000 ppb benzene. MTBE was reported at a concentration of 1,500 ppb in boring SVS-11 by EPA Method 8020, but was not confirmed by EPA Method 8260. Soil vapor analytical data is included as Table 3.

1999 RBCA Evaluation: In September 1999, Cambria prepared a RBCA evaluation for the site. Cambria analyzed the following potential exposure pathways: off-site ingestion of groundwater,

on-site ingestion of surficial soil, volatilization of benzene from soil or groundwater into on-site or off-site indoor air, and migration of benzene soil vapor to on-site or off-site outdoor air. Results of Tier 1 and Tier 2 RBCA analyses indicated that contaminants within soil and groundwater did not present significant health risks.

2001 Off-Site Monitoring Well Installation: Two monitoring wells (MW-5 and MW-6) were installed off site to the southwest. Soil sample results from this investigation indicated only minimal MTBE impact (0.012 ppm) to off-site soil southwest of the site. This finding was corroborated by Cambria's 1998 subsurface investigation, in which no TPHg or benzene and only low MTBE concentrations were detected in soil from three borings (SVS-14 through SVS-16) along the private driveway.

200-2004 Mobile Groundwater Extraction (GWE): In July 2002, semi-monthly GWE was begun using monitoring well MW-2 and continued on a monthly basis until March 2004. Beginning in March 2004, monthly GWE was performed using well MW-2 and MW-11 once per month each, so that GWE was conducted twice per month at the site. The GWE frequency was increased to weekly (from both MW-2 and MW-11) beginning in May 2004.

Mobile GWE ceased on August 24, 2004. Approximately 19.6 pounds of TPHg, 3.45 pounds of benzene, and 5.12 pounds of MTBE had been removed during these activities.

2002 Off-Site Monitoring Well Installation: Two monitoring wells (MW-7 and MW-8) and one soil boring (SB-9) were installed off-site and northwest of the site in 150th Avenue. Soil sample results collected during this investigation indicated minimal TPHg and BTEX impact to off-site soil northwest of the site. Grab groundwater samples indicated elevated TPHg and benzene concentrations were present in groundwater northwest of the site beneath 150th Avenue.

2003 Soil and Groundwater Investigation: Six soil borings (SB-10 through SB-14 and SB-16) were advanced to the northwest of the site in both 150th Avenue and Portofino Circle; one boring (SB-15) was advanced on site (Figure 2). Initial groundwater was encountered between 24 and 28 fbg during drilling activities.

During the investigation, MTBE was only detected in on-site grab groundwater sample SB-15-W at 40 ppb. The highest TPHg concentration was detected in SB-14-W at 67,000 ppb, and the highest benzene concentration was detected in SB-15-W at 530 ppb. TPHg was detected only in soil samples SB-11-30' and SB-15-36' at concentrations of 650 ppm and 1.4 ppm, respectively. Benzene was detected only in soil sample SB-15-35' at 0.10 ppm. Based on typical groundwater depths in nearby well MW-7, it was determined that samples SB-11-30' and SB-15-36' were saturated, and results may be more indicative of chemical concentrations in groundwater.

2003 Sensitive Receptor Survey (SRS): In October 2003, Cambria completed an SRS at Shell's request. The SRS targeted the following as potential sensitive receptors: basements within 200 feet, surface water and sensitive habitats within 500 feet, hospitals, residential care and childcare facilities within 1,000 feet, and water wells within ½ mile. No basements, surface water or sensitive habitats, or educational or childcare facilities were identified within the search radius. The Fairmont Hospital campus, located at 15400 Foothill Boulevard, is located approximately 1,100 feet from the site, just outside the target radius of 1,000 feet.

To update the 1992 well survey performed by Weiss, Cambria researched DWR records in September 2003 and located no additional well records for locations within ½ mile of the site. The closest identified water well potentially used for drinking water is a well installed in 1952 and listed as a "domestic well." This well is located at Fairmont Hospital, approximately 2,445 feet east-southeast of the site. The well is reportedly 138 feet deep and has a screened interval between 62 and 95 fbg. The well's status and operation frequency are unknown. Due to the well's distance from the site and the site's observed groundwater flow directions, it is unlikely that this well would be impacted by groundwater from the site.

2003 Monitoring Well Installation: On November 19 and 20, 2003, Cambria installed on-site and off-site wells MW-9, MW-10, and MW-11. Off-site soil borings were not completed due to access agreement issues. MTBE was detected in two soil samples (MW-11-20' and MW-11-24.5') at concentrations of 0.039 and 1.4 ppm, respectively. TPHg was detected in four soil samples (MW-10-30', MW-10-31.5', MW-11-20', and MW-11-24.5') at concentrations of 14, 230, 1.8, and 330 ppm, respectively. All soil samples with detectable hydrocarbon and MTBE concentrations were saturated soil samples, so identified results appeared more indicative of chemical concentrations in groundwater than soil.

2004 Temporary GWE System Installation: On September 13, 2004, Cambria completed installation and began operation of a temporary GWE system. The temporary GWE system was installed as an interim remedial measure to address the elevated petroleum hydrocarbon and MTBE concentrations in groundwater near the west corner of the site.

On November 8, 2004, Cambria stopped the temporary GWE system to conduct interim remediation by dual phase extraction (DPE). During these temporary GWE activities approximately 0.448 pounds of TPHg, 0.036 pounds of benzene, and 0.121 pounds of MTBE were removed from the subsurface.

2004 DPE: During the period November 8 through November 13, 2004, DPE was conducted in on-site wells MW-2 and MW-11 as an interim remedial action to reduce hydrocarbon concentrations in groundwater near the western corner of the site and to progress the site toward closure.

Based on operating parameters and vapor sample analytical results, the total TPHg, benzene and MTBE vapor-phase masses removed from well MW-11 are estimated at 165 pounds, 0.291 pounds, and 0.063 pounds, respectively. The total TPHg, benzene, and MTBE vapor-phase masses removed from well MW-2 are estimated at 0.073 pounds, 0.0002 pounds, and 0.001 pounds, respectively.

The total TPHg, benzene and MTBE liquid-phase masses removed from wells MW-2 and MW-11 during interim remediation are estimated at 5.31 pounds, 0.193 pounds, and 0.143 pounds, respectively.

2005 Temporary GWE System: Upon completing the interim remedial action, Cambria intended to immediately resume operating the temporary GWE system. However, the restart was delayed due to repaving the site's parking lot. The temporary GWE system operated between January 10 and April 13, 2005. Because detected TPHg and MTBE concentrations were higher in well MW-11 than in well MW-2, MW-11 was chosen for extraction. During these activities, approximately 19.04 pounds of TPHg, 1.69 pounds of benzene, and 3.94 pounds of MTBE were removed from the subsurface. Cambria removed the temporary GWE system in April 2005.

2005 Fuel System Upgrade: Armer Norman of Pacheco, California replaced the fuel dispensers and piping and upgraded UST sumps between March and May 2005. On March 22 and April 4, 2005, soil samples were collected beneath each of the four dispensers and the product piping joints. TPHg was detected in 11 samples, with a maximum concentration of 4,100 ppm in sample P-4-5.0. Benzene was detected in six samples, with a maximum concentration of 11 ppm in sample P-4-2.5. MTBE was detected in five samples, with a maximum concentration of 0.18 ppm in sample D-1-3.5. Tert-butyl alcohol (TBA) was detected in sample D-3-3.5 at a concentration of 0.023 ppm. Lead was detected in four samples, with a maximum concentration of 75.7 ppm in sample D-1-3.5.

2005 GWE Restart: In September 2005, monthly GWE was re-instated using monitoring well MW-11. This interim remediation measure will continue until a corrective action plan (CAP) for the site is completed.

Groundwater Monitoring Program: Groundwater quarterly groundwater sampling began in March 1990. Groundwater samples from MW-1 have contained the highest TPHg concentrations, up to 790,000 ppb on June 12, 1996. Groundwater samples from MW-2 have contained the highest benzene concentrations, up to 36,000 ppb on March 3, 1993. Wells MW-7 and MW-8 have contained up to 49,000 ppb TPHg and 830 ppb benzene; no MTBE has been detected in these wells. In the third quarter of 2005, the highest TPHg concentrations were detected in samples collected from wells MW-1 (63,000 ppb) and MW-11 (65,000 ppb). The highest benzene concentration was measured in MW-1 at 3,900 ppb.

PROPOSED SCOPE OF WORK

Cambria proposes advancing six on-site borings to investigate the vertical and lateral extent of petroleum hydrocarbons in soil using direct-push technology. Cambria also proposes advancing one off-site boring to investigate the vertical and lateral extent of petroleum hydrocarbons in groundwater using direct-push technology. Cambria proposes advancing two borings (SB-21 and SB-23) in the vicinity of the dispensers, four borings (SB-19, SB-20, SB-22, and SB-24) in the vicinity of the UST complex, and one boring (SB-25) adjacent to off-site monitoring well MW-9 (Figure 2).

Upon ACHCSA approval of this work plan, Cambria will complete the following tasks:

Permits: Cambria will obtain required permits for boring advancement and an encroachment permit for advancing boring SB-25.

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 to drilling.

Soil Borings: Cambria proposes to advance six borings (SB-19 through SB-24) to investigate the vertical and lateral extent of petroleum hydrocarbons in soil beneath the site. In addition, Cambria proposes to advance one boring (SB-25) adjacent to existing off-site monitoring well MW-9 to investigate the dissimilar groundwater sampling results observed at MW-9 compared to that observed at nearby SB-14. Assuming the absence of overhead and subsurface obstructions, Cambria will advance borings at the approximate locations shown on Figure 2.

At locations SB-19 through SB-24, Cambria proposes to advance soil borings to approximately 30 fbg using direct-push technology. Borings will be logged continuously to provide detailed lithologic profiles. Soil samples will be screened for organic vapors using a photo-ionization detector (PID) and collected for laboratory analysis every 5 feet above the water table.

At location SB-25, Cambria proposes to advance one soil boring to approximately 35 fbg using direct-push technology. This boring will be logged continuously to provide a detailed lithologic profile. A "dual tube" sampling system will be used to collect discrete grab groundwater samples, where sufficient groundwater is available, at 5-foot intervals from first-encountered

groundwater to approximately 35 fbg. No soil samples will be retained for chemical analysis from this boring.

Upon sampling completion, all borings will be grouted from the bottom to the surface with neat Portland cement and surfaced to match the existing grade. Soil and groundwater samples will be transported to a State-of-California-approved analytical laboratory for chemical analysis. Cambria's standard field procedures for soil borings are presented as Attachment A.

Under the supervision of a California professional geologist or civil engineer, a Cambria geologist will oversee these borings. Cambria will describe encountered soils using the Unified Soil Classification System and prepare a lithologic log of each boring. Between groundwater sampling events, the drill rods and the stainless steel bailer used to collect groundwater samples will be decontaminated to prevent cross contamination from one zone to another. Soil samples for laboratory analysis will be retained in the Geoprobe® liner, cut into 6-inch lengths, and covered on both ends with Teflon sheets and plastic end caps. Groundwater samples will be collected with a stainless steel bailer and transferred into vials containing hydrochloric acid preservative with no head space. Soil and 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 analysis. Cambria will request a standard 2-week turnaround time for laboratory results.

Chemical Analyses: A State-approved analytical laboratory will analyze soil and groundwater samples for TPHg, BTEX, MTBE, TBA, di-isopropyl ether (DIPE), ethyl-tertiary butyl ether (ETBE), tert-amyl methyl ether (TAME), 1,2-dichloroethane , and 1,2-dibromomethane using EPA Method 8260B.

Report Preparation: Within 60 days following the receipt of analytical results from the laboratory, Cambria will prepare a written report which will include field procedures, laboratory results, boring logs, conclusions and recommendations. Within 60 days following the submission of the investigation report, Cambria will submit a CAP for the site.

SCHEDULE

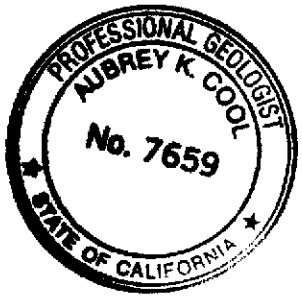
Upon receiving written work plan approval, Cambria will acquire permits and schedule field activities.

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

Figures: 1 - Vicinity/Sensitive Receptor Survey Map
2 - Site Plan with Proposed Soil Boring Locations

Tables: 1 - Historical Soil Analytical Results
2 - Historical Grab Groundwater Analytical Results
3 - Soil Vapor Analytical Data

Attachment: A- Standard Field Procedures for Geoprobe® Soil and Groundwater Sampling

cc: Denis Brown, Shell Oil Products US, 20945 S. Wilmington Ave., Carson, CA 90810

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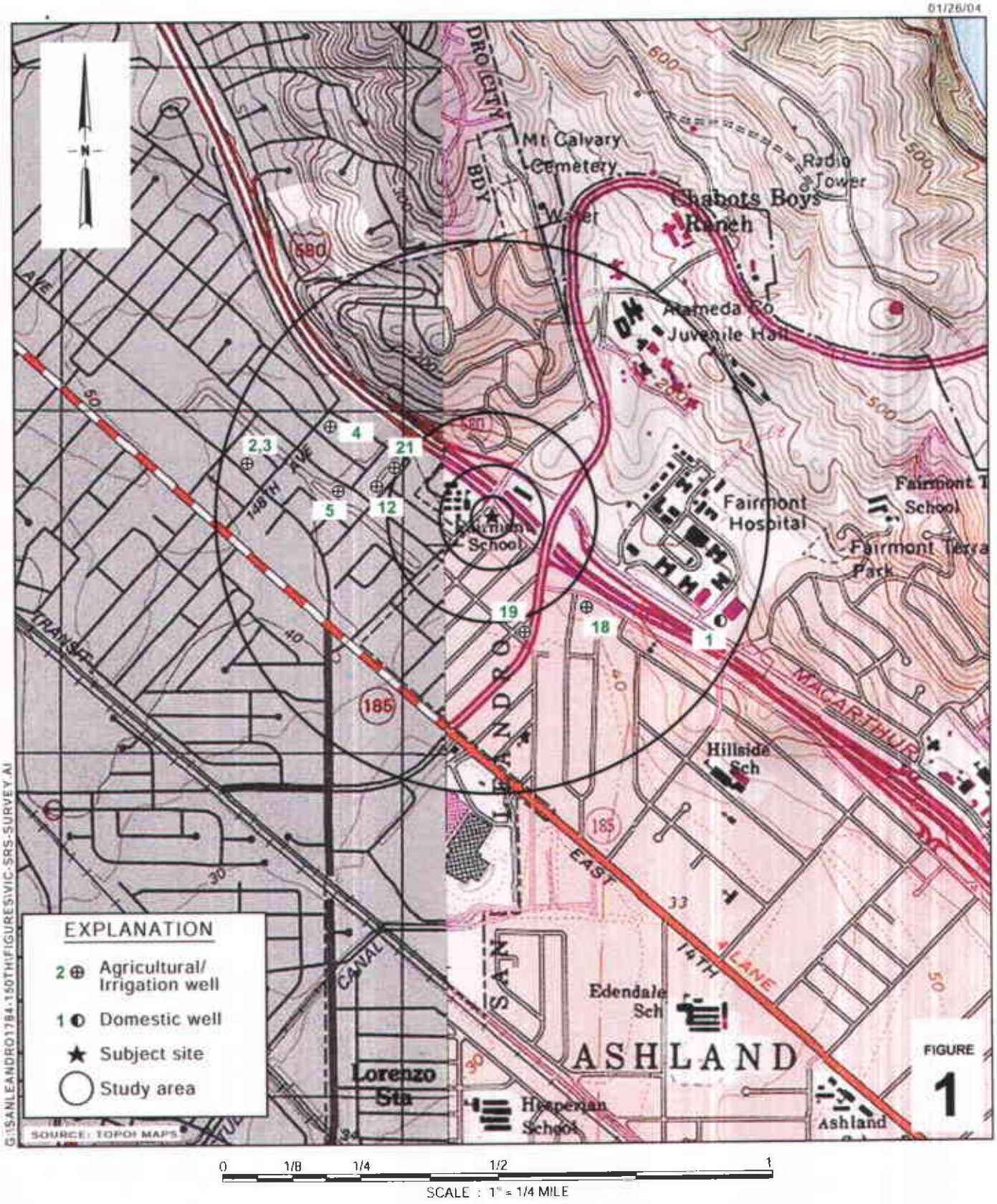

Shell-branded Service Station
1784 150th Avenue
San Leandro, California
Incident #98996068

CAMBRIA

Vicinity/Sensitive Receptor Survey Map
(1/2-Mile Radius)

12/27/05

Site Plan with Proposed Soil Boring Locations

EXPLANATION

- S-19 — Proposed soil boring location
- MW-4 — Monitoring well location
- MW-6* — Monitoring well location not used for contouring
- D-1-5.0 — Soil sample location (04/05/05)
- D-1-3.5 — Soil sample location (03/22/05)
- SB-17 — Soil boring location (Cambria, 9/04)
- SB-10 — Soil boring location (Cambria, 6/03)
- SB-9 — Soil boring location (Cambria, 10/02)
- SVS-11 — Soil boring location (Cambria, 11/98)
- SVS-1 — Soil boring location (Cambria, 7/96)
- BH-7 — Soil boring location (Weiss, 3/95)
- A — Dispenser soil sample location (Weiss, 3/95)
- BH-1 — Soil boring location (Weiss, 6/94)
- 1 — Dispenser number
- Product piping

PORTOFINO DRIVE
PORTOFINO CIRCLE
150TH AVENUE
FREEDOM AVENUE
I-580
I-580 OFF-RAMP
Residential
Residential (townhouses)
brick sound wall
Shell Station
1784 150th Ave.
Denny's Restaurant
15015 Freedom Ave.
USTs
former dispenser island
Station Building
parking lot
Storm drain (piped)
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
SB-9
SB-10
SB-11
SB-12
SB-13
SB-14
SB-15
SB-16
SB-17
SB-18
SB-19
SB-20
SB-21
SB-22
SB-23
SB-25
BH-1 located 210' SE
BH-4 located 350' SE

Groundwater Flow Direction
(12/15/03 to 09/20/05)

0 25 50 100
Scale (ft)

FIGURE
2

Shell-branded Service Station
1784 150th Avenue
San Leandro, California
Incident No.98996068

CAMBRIA

G:\SAN LEANDRO 1784 150TH\FIGURES\SITE PLAN 12-05.DWG

Table 1. Historical Soil Analytical Results - Incident #98996068, Shell-branded Service Station, 1784 150th Ave., San Leandro, California -

Sample ID	Date	Depth	TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE (8020)	MTBE (8260)	TBA	ETBE	DIPE	TAME	1,2-DCA	EDB	Ethanol	TOG	Lead
		(fbg)	(Concentrations in mg/kg)															
Soil #1	11/7/1986	8.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**196**	---
Soil #2	11/11/1986	11.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**167.4**	---
BH-A[a,b]	3/5/1990	5.0	<1	<0.0025	<0.0025	<0.0025	<0.0025	---	---	---	---	---	---	---	---	---	---	---
BH-A[a,b]	3/5/1990	15.7	<1	<0.0025	<0.0025	<0.0025	<0.0025	---	---	---	---	---	---	---	---	---	---	---
BH-A[a,b, c]	3/5/1990	24.7	<1	**0.020**	<0.0025	<0.0025	<0.0025	---	---	---	---	---	---	---	---	---	---	---
BH-A[a,d]	3/5/1990	29.2	**35**	**0.23**	**0.20**	<0.0025	**0.64**	---	---	---	---	---	---	---	---	---	---	---
BH-A[a,b]	3/5/1990	41.2	<1	<0.0025	<0.0025	<0.0025	<0.0025	---	---	---	---	---	---	---	---	---	---	---
BH-B[b]	2/4/1992	11.5	<1	**0.0026**	<0.0025	<0.0025	<0.0025	---	---	---	---	---	---	---	---	---	---	---
BH-B	2/4/1992	16.5	<1	**0.0058**	<0.0025	<0.0025	<0.0025	---	---	---	---	---	---	---	---	---	---	---
BH-B[b,e]	2/4/1992	21.5	**79**	**0.20**	**0.60**	**1.0**	**4.1**	---	---	---	---	---	---	---	---	---	---	---
BH-B	2/4/1992	26.5	**74**	**0.59**	**0.91**	**1.5**	**3.9**	---	---	---	---	---	---	---	---	---	---	---
BH-C[b]	2/5/1992	11.5	<1	**0.0042**	**0.0029**	**0.0039**	<0.0025	---	---	---	---	---	---	---	---	---	---	---
BH-C[b]	2/5/1992	21.5	<1	<0.0025	<0.0025	<0.0025	<0.0025	---	---	---	---	---	---	---	---	---	---	---
BH-C[b,f]	2/5/1992	26.5	**3.9**	<0.0025	<0.0025	<0.0025	**0.0054**	---	---	---	---	---	---	---	---	---	---	---
BH-C	2/5/1992	31.5	**68**	<0.05	<0.05	<0.05	**0.17**	---	---	---	---	---	---	---	---	---	---	---
BH-1-21	6/6/1994	21	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	---	---	---	---	---	---	---	---	---	---
BH-2-20	6/6/1994	20	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	---	---	---	---	---	---	---	---	---	---
BH-3-16[g]	6/6/1994	16	<1.0	**0.013**	<0.0050	<0.0050	<0.0050	---	---	---	---	---	---	---	---	---	---	---
BH-4-20.6	6/7/1994	20.6	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	---	---	---	---	---	---	---	---	---	---
BH-5-15.6	6/7/1994	15.6	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	---	---	---	---	---	---	---	---	---	---
BH-6-20.5	6/7/1994	20.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	---	---	---	---	---	---	---	---	---	---
BH-7-15.8	2/14/1995	15.8	<1.0	<0.0025	<0.0025	<0.0025	<0.0025	---	---	---	---	---	---	---	---	---	---	---
BH-8-16.0	2/14/1995	16.0	<1.0	<0.0025	<0.0025	<0.0025	<0.0025	---	---	---	---	---	---	---	---	---	---	---
BH-9-19.5	2/14/1995	19.5	<1.0	<0.0025	<0.0025	<0.0025	<0.0025	---	---	---	---	---	---	---	---	---	---	---
BH-10-15.2	3/3/1995	15.2	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	---	---	---	---	---	---	---	---	---	---
SVS-3	7/18-19/96	16-18	<1.0	<0.005	<0.005	<0.005	<0.005	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-5	7/18-19/96	4-6	<1.0	<0.005	<0.005	<0.005	<0.005	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-5	7/18-19/96	8-10	<1.0	<0.005	<0.005	<0.005	<0.005	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-5	7/18-19/96	18-20	**1.1**	<0.005	<0.005	<0.005	<0.005	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-9	7/18-19/96	3-5	<1.0	<0.005	<0.005	<0.005	<0.005	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-9	7/18-19/96	8-10	<1.0	<0.005	<0.005	<0.005	<0.005	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-9	7/18-19/96	16-18	<1.0	<0.005	<0.005	<0.005	<0.005	<0.025	---	---	---	---	---	---	---	---	---	---
Disp-A	12/4/1997	2.0	**3.1**	<0.005	**0.037**	**0.022**	<0.01	**0.019**	---	---	---	---	---	---	---	---	---	---
Disp-A, 4.5	12/4/1997	4.5	**6.3**	**0.096**	**0.012**	**0.46**	**0.037**	**0.056**	---	---	---	---	---	---	---	---	---	---
Disp-B	12/4/1997	2.0	**130**	<1	<1	<1	<2	<1	---	---	---	---	---	---	---	---	---	---
Disp-B, 4.5	12/4/1997	4.5	**1.0**	**0.045**	<0.005	**0.064**	**0.32**	<0.03	---	---	---	---	---	---	---	---	---	---
Disp-C	12/4/1997	2.0	**190**	**1.8**	**2.1**	**3.6**	**20**	**1.4**	---	---	---	---	---	---	---	---	---	---
Disp-C, 4.5[h]	12/4/1997	4.5	**590**	<0.5	**0.98**	**2.3**	**3.1**	<0.5	---	---	---	---	---	---	---	---	---	---

Table 1. Historical Soil Analytical Results - Incident #98996068, Shell-branded Service Station, 1784 150th Ave., San Leandro, California -

Sample ID	Date	Depth	TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE (8020)	MTBE (8260)	TBA	ETBE	DIPE	TAME	1,2-DCA	EDB	Ethanol	TOG	Lead
		(fbg)	(Concentrations in mg/kg)															
Disp-D	12/4/1997	2.0	**3.8**	**0.11**	<0.005	**0.15**	**0.17**	**0.11**	---	---	---	---	---	---	---	---	---	---
Disp-D, 4.5	12/4/1997	4.5	**1.4**	**0.027**	<0.005	**0.036**	**0.178**	**0.005**	---	---	---	---	---	---	---	---	---	---
SVS-11-5.5	11/10/1998	5.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-11-6	11/10/1998	6	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-11-9.5	11/10/1998	9.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-11-10	11/10/1998	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-11-15	11/10/1998	15	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-11-15.5	11/10/1998	15.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-11-19	11/10/1998	19	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-11-19.5	11/10/1998	19.5	**1.6**	**0.0050**	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-14-5	11/11/1998	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-14-5.5	11/11/1998	5.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-14-10	11/11/1998	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-14-10.5	11/11/1998	10.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-14-15	11/11/1998	15	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-14-15.5	11/11/1998	15.5	<1.0	<0.0050	**0.006**	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-14-19	11/11/1998	19	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	**0.029**	<25	---	---	---	---	---	---	---	---	---
SVS-14-19.5	11/11/1998	19.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-15-4.5	11/11/1998	4.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-15-5	11/11/1998	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-15-10	11/11/1998	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-15-10.5	11/11/1998	10.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-15-15	11/11/1998	15	<1.0	<0.0050	<0.0050	<0.0050	**0.013**	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-15-15.5	11/11/1998	15.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-15-19.5	11/11/1998	19.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-15-20	11/11/1998	20	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-16-5	11/11/1998	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-16-5.5	11/11/1998	5.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-16-10	11/11/1998	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-16-10.5	11/11/1998	10.5	<1.0	<0.0050	<0.0050	<0.0050	**0.0093**	**0.026**	---	---	---	---	---	---	---	---	---	---
SVS-16-15	11/11/1998	15	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
SVS-16-15.5	11/11/1998	15.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.025	---	---	---	---	---	---	---	---	---	---
MW-5-15.5	10/24/2001	15.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
MW-6-5.5	10/24/2001	5.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	**0.012**	---	---	---	---	---	---	---	---	---
MW7@5'	10/3/2002	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.5	---	---	---	---	---	---	---	---	---
MW7@10'	10/3/2002	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.5	---	---	---	---	---	---	---	---	---
MW7@15'	10/3/2002	15	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.5	---	---	---	---	---	---	---	---	---
MW7@20'	10/3/2002	20	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.5	---	---	---	---	---	---	---	---	---
MW7@25'	10/3/2002	25	**11**	<0.0050	**0.0060**	**0.086**	**0.13**	---	<0.5	---	---	---	---	---	---	---	---	---
MW7@30'	10/3/2002	30	**68**	<0.025	**0.19**	**0.89**	**3.7**	---	<0.5	---	---	---	---	---	---	---	---	---
MW7@32'	10/3/2002	32	**1.2**	<0.0050	**0.0069**	**0.025**	**0.11**	---	<0.5	---	---	---	---	---	---	---	---	---

Table 1. Historical Soil Analytical Results - Incident #98996068, Shell-branded Service Station, 1784 150th Ave., San Leandro, California -

Sample ID	Date	Depth	TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE (8020)	MTBE (8260)	TBA	ETBE	DIPE	TAME	1,2-DCA	EDB	Ethanol	TOG	Lead
		(fbg)	(Concentrations in mg/kg)															
MW8@5'	10/4/2002	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.5	---	---	---	---	---	---	---	---	---
MW8@10'	10/4/2002	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.5	---	---	---	---	---	---	---	---	---
MW8@15'	10/4/2002	15	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.5	---	---	---	---	---	---	---	---	---
MW8@20'	10/4/2002	20	**1.2**	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.5	---	---	---	---	---	---	---	---	---
MW8@25'	10/4/2002	25	**140**	**0.072**	**0.15**	**1.5**	**5.8**	---	<0.5	---	---	---	---	---	---	---	---	---
SB9@22	10/4/2002	22	1.1	<0.0050	<0.0050	**0.016**	**0.088**	---	<0.5	---	---	---	---	---	---	---	---	---
SB-10-10'	6/23/2003	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-10-20'	6/23/2003	20	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-10-22'	6/23/2003	22	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-10-25'	6/23/2003	25	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-10-30	6/23/2003	30	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-10-37'	6/23/2003	37	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-10-39.5'	6/23/2003	39.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-11-10'	6/24/2003	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-11-15'	6/24/2003	15	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-11-20'	6/24/2003	20	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-11-24'	6/24/2003	24	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-11-28'	6/24/2003	28	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-11-30'	6/24/2003	30	**650**	<0.50	<0.50	**3.5**	**9.9**	---	<0.50	---	---	---	---	---	---	---	---	---
SB-12-10'	6/24/2003	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-12-20'	6/24/2003	20	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-12-25'	6/24/2003	25	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-12-30'	6/24/2003	30	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-12-35'	6/24/2003	35	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-12-39.5'	6/24/2003	39.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-13-10'	6/23/2003	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-13-20'	6/23/2003	20	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-13-24'	6/23/2003	24	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-13-30'	6/23/2003	30	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-13-35'	6/23/2003	35	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-13-39.5'	6/23/2003	39.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-14-10'	6/24/2003	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-14-20'	6/24/2003	20	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-14-24'	6/24/2003	24	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-14-30'	6/24/2003	30	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-14-35'	6/24/2003	35	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-14-39.5'	6/24/2003	39.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-15-10'	6/26/2003	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-15-15'	6/26/2003	15	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-15-20'	6/26/2003	20	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-15-22.5'	6/26/2003	22.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-15-35'	6/26/2003	35	**1.4**	**0.10**	<0.0050	**0.030**	**0.0055**	---	<0.0050	---	---	---	---	---	---	---	---	---

Table 1. Historical Soil Analytical Results - Incident #98996068, Shell-branded Service Station, 1784 150th Ave., San Leandro, California -

Sample ID	Date	Depth	TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE (8020)	MTBE (8260)	TBA	ETBE	DIPE	TAME	1,2-DCA	EDB	Ethanol	TOG	Lead
		(fbg)	(Concentrations in mg/kg)															
SB-16-10'	6/23/2003	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-16-20'	6/23/2003	20	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-16-24'	6/23/2003	24	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-16-28'	6/23/2003	28	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-16-35'	6/23/2003	35	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
SB-16-39.5'	6/23/2003	39.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
MW-9-5'	11/19/2003	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
MW-9-10'	11/19/2003	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
MW-9-15'	11/19/2003	15	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
MW-9-20'	11/19/2003	20	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
MW-9-25'	11/19/2003	25	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
MW-9-30'	11/19/2003	30	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
MW-9-35'	11/19/2003	35	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
MW-10-5'	11/20/2003	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
MW-10-10'	11/20/2003	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
MW-10-15'	11/20/2003	15	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
MW-10-20'	11/20/2003	20	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
MW-10-25'	11/20/2003	25	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
MW-10-30'	11/20/2003	30	**14**	<0.023	<0.023	<0.023	<0.023	---	<0.023	---	---	---	---	---	---	---	---	---
MW-10-31.5'	11/20/2003	31.5	**230**	<0.50	<0.50	**2.2**	**1.5**	---	<0.50	---	---	---	---	---	---	---	---	---
MW-11-5'	11/20/2003	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
MW-11-10'	11/20/2003	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
MW-11-15'	11/20/2003	15	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	---	---	---	---	---	---	---	---	---
MW-11-20'	11/20/2003	20	**1.8**	<0.0050	<0.0050	**0.0084**	**0.013**	---	**0.039**	---	---	---	---	---	---	---	---	---
MW-11-24.5'	11/20/2003	24.5	**330**	<0.50	**1.6**	**4.8**	**29**	---	**1.4**	---	---	---	---	---	---	---	---	---
SB-17-5'	9/13/2004	5.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	<0.10	<0.0050	<0.10	<0.0050	<0.0050	<0.0050	<0.1	---	---
SB-17-10'	9/13/2004	10.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	<0.10	<0.0050	<0.10	<0.0050	<0.0050	<0.0050	<0.1	---	---
SB-17-15'	9/13/2004	15.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	<0.10	<0.0050	<0.10	<0.0050	<0.0050	<0.0050	<0.1	---	---
SB-17-20'	9/13/2004	20.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	<0.10	<0.0050	<0.10	<0.0050	<0.0050	<0.0050	<0.1	---	---
SB-17-25'	9/13/2004	25.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	<0.10	<0.0050	<0.10	<0.0050	<0.0050	<0.0050	<0.1	---	---
SB-17-35.5'	9/13/2004	35.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	<0.10	<0.0050	<0.10	<0.0050	<0.0050	<0.0050	<0.1	---	---
SB-18-5'	9/13/2004	5.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	<0.10	<0.0050	<0.10	<0.0050	<0.0050	<0.0050	<0.1	---	---
SB-18-10'	9/13/2004	10.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	<0.10	<0.0050	<0.10	<0.0050	<0.0050	<0.0050	<0.1	---	---
SB-18-15'	9/13/2004	15.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	<0.10	<0.0050	<0.10	<0.0050	<0.0050	<0.0050	<0.1	---	---
SB-18-20'	9/13/2004	20.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	<0.10	<0.0050	<0.10	<0.0050	<0.0050	<0.0050	<0.1	---	---
SB-18-25'	9/13/2004	25.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	<0.10	<0.0050	<0.10	<0.0050	<0.0050	<0.0050	<0.1	---	---
SB-18-30'	9/13/2004	30.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	<0.0050	<0.10	<0.0050	<0.10	<0.0050	<0.0050	<0.0050	<0.1	---	---
D-1-3.5	3/22/2005	3.5	**460**	**0.76**	**0.17**	**16**	**8.1**	---	**0.18**	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	---	---	**75.7**
D-1-5.0	4/4/2005	5.0	**330**	<0.50	**0.75**	**3.2**	**0.91**	---	<0.50	---	---	---	---	---	---	---	---	---
D-2-3.5	3/22/2005	3.5	**1400**	**1.6**	**75**	**18**	**170**	---	**0.066**	<0.15	<0.25	<0.25	<0.25	<0.25	<0.25	---	---	**2.06**
D-2-5.0	4/4/2005	5.0	<50	<0.50	<0.50	<0.50	**0.95**	---	<0.50	---	---	---	---	---	---	---	---	---
D-3-3.5	3/22/2005	3.5	**30**	**0.78**	**0.24**	**1.8**	**2.7**	---	**0.053**	**0.023**	<0.050	<0.050	<0.050	<0.050	<0.050	---	---	**5.19**

Table 1. Historical Soil Analytical Results - Incident #98996068, Shell-branded Service Station, 1784 150th Ave., San Leandro, California -

Sample ID	Date	Depth	TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE (8020)	MTBE (8260)	TBA	ETBE	DIPE	TAME	1,2-DCA	EDB	Ethanol	TOG	Lead
		(fbg)	(Concentrations in mg/kg)															
D-4-3.5	3/22/2005	3.5	**110**	**0.52**	**6.3**	**1.3**	**10**	---	**0.028**	<0.25	<0.050	<0.050	<0.050	<0.050	<0.050	---	---	**1.89**
D-4-5.0	4/4/2005	5.0	**290**	<0.50	<0.50	**6.3**	**3.6**	---	<0.50	---	---	---	---	---	---	---	---	---
P-1-2.5	4/4/2005	2.5	<50	<0.50	<0.50	<0.50	**0.87**	---	<0.50	---	---	---	---	---	---	---	---	---
P-1-5.0	4/4/2005	5.0	**69**	<0.50	<0.50	**1.1**	**5.0**	---	<0.50	---	---	---	---	---	---	---	---	---
P-2-3.5	4/4/2005	3.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	---	**0.013**	---	---	---	---	---	---	---	---	---
P-2-5.0	4/4/2005	5.0	**85**	<0.50	<0.50	**0.84**	**0.50**	---	<0.50	---	---	---	---	---	---	---	---	---
P-3-3.0	4/4/2005	3.0	**2300**	<1.0	<1.0	<1.0	<1.0	---	<1.0	---	---	---	---	---	---	---	---	---
P-4-2.5	4/4/2005	2.5	**3700**	**11**	**83**	**42**	**280**	---	<1.0	---	---	---	---	---	---	---	---	---
P-4-5.0	4/4/2005	5.0	**4100**	**10**	**23**	**48**	**240**	---	<2.5	---	---	---	---	---	---	---	---	---

Abbreviations:

TPHg = Total petroleum hydrocarbons as gasoline. From 1990 through 1998, analyzed by modified EPA Method 8015; from 2001 through 2005, analyzed by EPA Method 8260B.
Benzene, toluene, ethylbenzene, and total xylenes analyzed by EPA Method 8020 from 1990 through 1998; from 2001 through 2005, analyzed by EPA Method 8260B.
MTBE = Methyl tert-butyl ether analyzed by EPA Method 8020 or EPA Method 8260B (as indicated).
TBA = Tert-Butyl alcohol, analyzed by EPA Method 8260B.
ETBE = Ethyl tert butyl ether, analyzed by EPA Method 8260B.
DIPE = Di-isopropyl Ether, analyzed by EPA Method 8260B.
TAME = tert-Amyl methyl ether, analyzed by EPA Method 8260B.
1,2-DCA = 1,2-dichloroethane, analyzed by EPA Method 8260B.
EDB = Ethyl di-bromide, analyzed by EPA Method 8260B.
Ethanol analyzed by EPA Method 8260B.
fbg = Feet below grade
mg/kg = Milligrams per kilogram
<n = Not detected at reporting limit n
--- = Not analyzed

Notes:

a = Petroleum oil and grease analyzed by American Public Health Association Standard Method 503E; no detections above 100 ppm reporting limit. Total oil and grease analyzed by American Public Health Association Standard Method 503E; no detections above 50 ppm reporting limit.
b = Analyzed for halogenated volatile organic compounds by EPA Method 8010; none detected.
c = Total petroleum hydrocarbons as diesel (TPHd) and total petroleum hydrocarbons as motor oil (TPHmo) analyzed by modified EPA Method 8015; no TPHd detected at 1 ppm reporting limit; no TPHmo detected at 10 ppm reporting limit.
e = TPHd detected at 23 ppm by modified EPA Method 8015; lab characterized detected compounds as hydrocarbons lighter than diesel.
f = TPHd detected at 4.9 ppm by modified EPA Method 8015; lab characterized detected compounds as hydrocarbons lighter than diesel.
g = Analyzed for volatile organic compounds by EPA Method 8010; none detected.
h = Sample saturated with perched water from beneath dispenser.

G:\San Leandro 1784 150th\2006 Subsurface Investigation\[Summary Tables 1784 150th.xls]Soil Summary

Table 2. Historical Grab Groundwater Analytical Results - Shell-branded Service Station, Incident # 98996068, 1784 150th Ave., San Leandro, California

Sample ID	Sample Date	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	TBA	DIPE	ETBE	TAME	1,2 DCA	EDB	Ethanol
		← concentrations in µg/L →												
BH-1	6/6/1994	<50	<0.50	<0.50	<0.50	<0.50	---	---	---	---	---	---	---	---
BH-2	6/6/1994	**5,200 a**	**8.8**	<0.50	**9.1**	<0.50	---	---	---	---	---	---	---	---
BH-3	6/6/1994	**120,000 b**	**25,000**	**14,000**	**3,100**	**13,000**	---	---	---	---	---	---	---	---
BH-4	6/7/1994	<50	<0.50	<0.50	<0.50	<0.50	---	---	---	---	---	---	---	---
BH-5	6/7/1994	<50	<0.50	<0.50	<0.50	<0.50	---	---	---	---	---	---	---	---
BH-6	6/7/1994	<50	<0.50	<0.50	<0.50	<0.50	---	---	---	---	---	---	---	---
BH-7-17-W	2/14/1995	**100**	**1.0**	**1.0**	<0.5	<0.5	---	---	---	---	---	---	---	---
BH-9-20-W	2/14/1995	**90**	**0.9**	**0.9**	<0.5	<0.5	---	---	---	---	---	---	---	---
SVS-11-W1	11/10/1998	**130,000**	**18,000**	**1,800**	**5,700**	**31,000**	**1,500**	---	---	---	---	---	---	---
SVS-12-W1	11/11/1998	**64,000**	**1,800**	**770**	**2,700**	**17,000**	<250	---	---	---	---	---	---	---
SVS-14-W1	11/11/1998	<50	<0.50	<0.50	<0.50	<0.50	<2.5	---	---	---	---	---	---	---
SVS-15-W1	11/11/1998	<50	<0.50	<0.50	<0.50	**0.80**	<2.5	---	---	---	---	---	---	---
SVS-16-W1	11/11/1998	<50	<0.50	<0.50	<0.50	<0.50	<2.5	---	---	---	---	---	---	---
MW7-W	10/03/02	**60,000**	**59**	**590**	**1,900**	**7,300**	<100	---	---	---	---	---	---	---
MW8-W	10/04/02	**83,000**	**810**	**2,000**	**3,700**	**17,000**	<500	---	---	---	---	---	---	---
SB9-W	10/04/02	**78,000**	**2,200**	**8,200**	**2,300**	**13,000**	<500	---	---	---	---	---	---	---
SB-10-W	6/23/03	<50	**1.1**	**0.84**	<0.50	**1.7**	<0.50	<5.0	<2.0	<2.0	<2.0	<0.50	<0.50	<50
SB-11-W	6/24/03	**75**	**0.84**	**0.53**	**1.5**	**7.1**	<0.50	<5.0	<2.0	<2.0	<2.0	<0.50	<0.50	<50
SB-12-W	6/24/03	<50	<0.50	<0.50	<0.50	<1.0	<0.50	<5.0	<2.0	<2.0	<2.0	<0.50	<0.50	<50
SB-13-W	6/23/03	<50	**0.89**	**0.52**	<0.50	<1.0	<0.50	<5.0	<2.0	<2.0	<2.0	<0.50	<0.50	<50
SB-14-W	6/24/03	**67,000**	<100	**280**	**3,800**	**16,000**	<100	<1000	<400	<400	<400	<100	<100	<1000

Table 2. Historical Grab Groundwater Analytical Results - Shell-branded Service Station, Incident # 98996068, 1784 150th Ave., San Leandro, California

Sample ID	Sample Date	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	TBA	DIPE	ETBE	TAME	1,2 DCA	EDB	Ethanol
		← concentrations in µg/L →												
SB-15-W	6/26/03	**6,800**	**530**	<25	**380**	**560**	**40**	<250	<100	<100	<100	<25	<25	<2500
SB-16-W	6/23/03	<50	**0.67**	<0.50	<0.50	<1.0	<0.50	<5.0	<2.0	<2.0	<2.0	<0.50	<0.50	<50
SB-17-W	09/13/04	<50	<0.50	**4.2**	**2.0**	**7.9**	<0.50	<5.0	<2.0	<2.0	<2.0	<0.50	<0.50	<50
SB-18-W	09/13/04	**55**	<0.50	**5.5**	**2.5**	**10.0**	<0.50	<5.0	<2.0	<2.0	<2.0	<0.50	<0.50	<50

Abbreviations and Notes:

TPHg = Total petroleum hydrocarbons as gasoline by modified EPA Method 8015 from 1994 to 1998, and by EPA Method 8260B afterwards.

Benzene, toluene, ethylbenzene and total xylenes by EPA Method 8020 in 1998, and by EPA Method 8260B afterwards.

MTBE = Methyl tertiary butyl ether by EPA Method 8020 in 1998 and by EPA Method 8260B afterwards

TBA = Tert-Butyl alcohol, analyzed by EPA Method 8260B.

ETBE = Ethyl tert butyl ether, analyzed by EPA Method 8260B.

DIPE = Di-isopropyl Ether, analyzed by EPA Method 8260B.

TAME = tert-Amyl methyl ether, analyzed by EPA Method 8260B.

1,2-DCA = 1,2-dichloroethane

EDB = Ethyl di-bromide, analyzed by EPA Method 8260B.

Ethanol analyzed by EPA Method 8260B.

µg/L =Micrograms per Liter

--- = not analyzed

a - Chromatogram pattern as weathered gasoline

b - Chromatogram pattern as gasoline

Table 3. **Soil Vapor Analytical Data -** Shell-branded Service Station, Incident # 98996068, 1784 150th Avenue, San L
San Leandro, California

Sample ID	Date	TPHg C5 + Hydrocarbons	TPHg C2-C4 Hydrocarbons	Benzene	Toluene	Ethylbenzene	Xylenes
		← (Concentrations in ppmv) →					
SVS-11-5	11/10/1998	**1.0**	**0.10**	<0.0029	**0.029**	<0.0029	<0.0029
SVS-11-10	11/10/1998	**0.67**	**0.029**	**0.0025**	**0.065**	<0.0023	<0.0023
SVS-11-15	11/10/1998	**1.4**	**0.063**	**0.0060**	**0.012**	<0.0023	<0.0023
SVS-12-5	11/10/1998	**1.2**	**0.035**	**0.0070**	**0.014**	**0.0032**	**0.017**
SVS-12-10	11/10/1998	**1.3**	**0.056**	**0.0038**	**0.024**	**0.0034**	**0.015**
SVS-12-15	11/10/1998	**1.4**	**0.072**	**0.0053**	**0.010**	<0.0025	**0.0038**
SVS-12-20	11/10/1998	**1.5**	**0.053**	**0.0045**	**0.017**	**0.0034**	**0.011**
SVS-13-5	11/10/1998	**1.6**	**0.033**	<0.0024	**0.011**	**0.0031**	**0.012**
SVS-13-10	11/10/1998	**1.4**	**0.060**	**0.0043**	**0.0099**	<0.0023	**0.0031**
SVS-13-15	11/10/1998	**1.4**	**0.090**	**0.0036**	**0.011**	<0.0034	**0.0042**
SVS-13-20	11/10/1998	**1.6**	**0.033**	<0.0033	<0.0033	<0.0033	<0.0033
SVS-14-5	11/11/1998	**1.9**	**0.043**	<0.0035	**0.0081**	**0.0036**	**0.0064**
SVS-14-10	11/11/1998	**2.7**	**0.056**	**0.0077**	**0.035**	**0.0084**	**0.037**
SVS-14-15	11/11/1998	**2.1**	**0.070**	<0.0023	**0.0086**	<0.0023	**0.0024**
SVS-14-15 D	11/11/1998	**1.9**	**0.061**	<0.0023	**0.0069**	<0.0023	**0.0018**
SVS-15-5	11/11/1998	**0.70**	**0.034**	<0.0034	**0.0069**	<0.0034	<0.0034
SVS-15-10	11/11/1998	**1.2**	**0.17**	**0.0056**	**0.016**	<0.0045	<0.0045
SVS-15-15	11/11/1998	**1.1**	<0.045	<0.0045	**0.010**	<0.0045	<0.0045
SVS-15-20	11/11/1998	**1.4**	**0.038**	<0.0035	**0.018**	<0.0035	<0.0035
SVS-16-5	11/11/1998	**1.3**	**0.075**	**0.0099**	**0.039**	<0.0033	**0.0041**
SVS-16-10	11/11/1999	**1.9**	**0.12**	**0.0074**	**0.020**	<0.0023	<0.0023

Table 3. Soil Vapor Analytical Data - Shell-branded Service Station, Incident # 98996068, 1784 150th Avenue, San L
San Leandro, California

Sample ID	Date	TPHg C5 + Hydrocarbons	TPHg C2-C4 Hydrocarbons	Benzene	Toluene	Ethylbenzene	Xylenes
		← (Concentrations in ppmv) →					
SVS-16-10 D	11/11/1999	**2.0**	**0.11**	**0.0072**	**0.018**	<0.0023	<0.0023
SVS-16-15	11/11/1999	**2.0**	**0.038**	**0.0023**	**0.0073**	<0.0023	<0.0023

Abbreviations and Notes:

TPHg = Total petroleum hydrocarbons as gasoline by Modified CARB 410A
Benzene, toluene, ethylbenzene, and total xylenes by Modified CARB 410A
ppmv = Parts per million by volume
<n = Below detection limit of n ppmv
D = Duplicate

ATTACHMENT A

Standard Field Procedures for Geoprobe® Soil and Groundwater Sampling

CAMBRIA

STANDARD FIELD PROCEDURES FOR GEOPROBE® SOIL AND GROUNDWATER SAMPLING

This document describes Cambria Environmental Technology's standard field methods for GeoProbe® soil and ground water sampling. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor odor or staining, estimate ground water 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

GeoProbe® 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® 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 GasTech® or 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 ground water depth to select soil samples for analysis.

Grab Ground Water Sampling

Ground water samples are collected from the open borehole using bailers, advancing disposable Tygon® tubing into the borehole and extracting ground water using a diaphragm pump, or using a hydro-punch style sampler with a bailer or tubing. 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.

Discrete Depth Soil and Ground Water Sampling

Soil and groundwater samples are collected for lithologic and chemical analysis using a direct driven, dual tube soil coring system. A hydraulic hammer drives sampling rods into he ground to collect continuous soil cores. Two nested sampling rods are driven at the same time: a larger diameter outer rod to act as a temporary drive casing and a smaller inner rod to retrieve soil cores. As the rods are advanced the soil is driven into a sample barrel that is attached to the end of the inner rod. The outer rod ensures that the sample is collected from the desired interval by preventing sloughing of the overlying material. After reaching the desired depth the inner rods are removed from the boring and the sleeves containing the soil sample are removed from the inner sample barrel. 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.

When collecting groundwater samples, the sample barrel and inner rods are removed from the boring once the targeted water bearing zone has been reached. The drive casing is pulled up from 0.5 to 5 feet to allow groundwater to enter the borehole. Small diameter well casing and screen is then installed in the borehole to facilitate sample collection. The drive casing is then pulled up sufficiently to expose the desired length of screen and samples are collected using a bailer, peristaltic, bladder or inertial pump. 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.

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.

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