Denis L. Brown

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May 30, 2006

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

Re: Subsurface Investigation and Monitoring Well Installation Report
Shell-branded Service Station
230 West MacArthur Boulevard
Oakland, California
SAP Code 135676
Incident No. 98995741
RO 0303

Dear Mr. Wickham:

Attached for your review and comment is a copy of the *Subsurface Investigation and Monitoring Well Installation Report* 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

May 30, 2006

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

Re: **Subsurface Investigation and Monitoring Well Installation Report**
Shell-branded Service Station
230 West MacArthur Boulevard
Oakland, California
SAP Code 135676
Incident #98995741
Cambria Project #248-0902-006
RO 00000303

Dear Mr. Wickham:

On behalf of Equilon Enterprises LLC dba Shell Oil Products US (Shell), Cambria Environmental Technology, Inc. (Cambria) prepared this report to document the recent subsurface investigation activities at the referenced site. The purpose of the investigation was to vertically profile the site's lithology, to determine the effectiveness of the existing groundwater monitoring network, and to further assess the nature and extent of hydrocarbon impact to soil and groundwater. Cambria attempted to follow the scope of work presented in the January 4, 2006 *Subsurface Investigation Work Plan,* which Alameda County Health Care Services Agency (ACHCSA) approved in a January 20, 2006 letter to Shell. One off-site soil boring and well installation location was not completed because of safety concerns due to underground utilities. In addition, one on-site boring location could not be hand cleared to the required depth or relocated due to utilities. This location was not completed to the proposed depth. Cambria performed the work in accordance with ACHCSA and San Francisco Regional Water Quality Control Board (RWQCB) guidelines.

SITE LOCATION AND BACKGROUND

Site Location: This Shell-branded service station is located on the northern corner of West MacArthur Boulevard and Piedmont Avenue in Oakland, California (Figure 1). Three underground storage tanks (USTs), two dispenser islands, and a kiosk are currently on site

Cambria Environmental Technology, Inc.

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(Figure 2). The neighborhood is primarily commercial and includes Kaiser Hospital. A former Gulf service station, now the Oakland Auto Works auto repair shop, is located northwest and adjacent to the site.

1986 Site Investigation: In April 1986, Emcon Associates of San Jose, California drilled four exploratory borings (S-A through S-D) within the tank complex to total depths of 20.5 feet below grade (fbg). Groundwater was encountered at approximately 13 fbg. Total hydrocarbon concentrations up to 5,700 parts per million (ppm) were detected in soil samples collected at depths ranging from 4 to 15 fbg. The report for this investigation could not be located at the time of this writing. Table 1 presents cumulative soil analytical results.

1986 Additional Site Assessment: In December 1986, W.W. Irwin, Inc. analyzed soil gas vapors from 38 probe locations throughout the site. The highest hydrocarbon concentrations were reported in the area of the tank complex and dispenser islands. Cambria was unable to locate a report of this investigation.

1987 Recovery Well Installation: In March 1987, Wayne Perry Construction, Inc. (Wayne Perry) installed three 4-inch-diameter, 13-foot-deep, soil-vapor recovery wells (VR-1, VR-2, and VR-3). A soil venting system utilizing an activated carbon scrubber operated between April and November 1987. On August 28, 1987, soil borings B-1 and B-2 were advanced to characterize petroleum hydrocarbons remaining in the soil. The maximum total hydrocarbon concentration of 1,870 ppm was detected in boring B-1 at a depth of 8 fbg. In their January 26, 1988 *Review of Venting Operations,* Wayne Perry concluded that the venting operation had significantly decreased the contamination levels.

1987 UST Removal: On November 2, 1987, the USTs were removed, and soil samples were collected in native soil from the bottom of the UST excavation. Hydrocarbon concentrations ranged from 8.6 to 480 ppm, as documented in Kaprealian Associates December 1, 1987 *Soil Sampling Investigation* report. New USTs were installed in the same excavation.

1988 Soil and Groundwater Investigation: On July 11 and 12, 1988, Ensco Environmental Services Inc. (Ensco) of Fremont, California installed three groundwater monitoring wells (MW-1 through MW-3). Soil samples were collected during well installation for laboratory analysis, and total petroleum hydrocarbons as gasoline (TPHg) were detected at a concentration of 278 ppm in the boring for MW-3 at 10 fbg. Ensco's September 30, 1988 *Soil and Groundwater Investigation* report documents this investigation.

1989 Phase II Supplemental Soil Investigation: On August 16, 1989, Ensco advanced three soil borings (SB-1, SB-2, and SB-3) to investigate possible hydrocarbon impacts to soil adjacent to the pump islands. TPHg was detected in boring SB2-3 only, at a concentration of 490 ppm at

15.5 fbg. Benzene was not detected in any soil samples collected during this investigation. Ensco's October 9, 1989 *September Quarterly Report* documents investigation results.

1989 Phase II Shallow Groundwater Survey: On October 10, 1989, Ensco subcontractor NET Pacific of Santa Rosa, California advanced three probes (GS-1, GS-2, and GS-3) to sample the shallow groundwater adjacent to the pump islands. TPHg was detected in samples from GS-2 and GS-3 at concentrations of 5,600 parts per billion (ppb) and 8,800 ppb, respectively. Benzene was detected in samples GS-2 and GS-3 at concentrations of 340 ppb and 380 ppb, respectively. Neither TPHg nor benzene was detected in sample GS-1. Ensco's January 19, 1990, *December Quarterly Report* presents the investigation results.

1990 Well Installation: On January 9, 1990, Ensco drilled one exploratory boring at the site and converted it to monitoring well MW-4. Well MW-4 is screened from 15 to 25 fbg. Ensco's March 29, 1990 *March Quarterly Report* documents the well installation.

1990 Shallow Groundwater Investigation: On May 19, 1990, Exceltech subcontractor CHIPS Environmental Consulting, Inc. advanced six probes (Probe 1 through Probe 6) in the sidewalk along West MacArthur Boulevard and collected shallow groundwater samples. TPHg was detected in Probe 2 and Probe 6 at concentrations of 25,000 ppb and 31,000 ppb, respectively. Benzene was detected in Probes 2, 4, 5, and 6 at concentrations ranging from 1 to 430 ppb. Exceltech's July 3, 1990 *June Quarterly Report* documents investigation results. Table 2 presents cumulative grab groundwater analytical results.

1998 Dispenser and Turbine Sump Upgrades: In February 1998, Paradiso Mechanical of San Leandro, California upgraded fuel-related equipment at the service station. Secondary containment was added to the existing dispensers and the turbine sumps above the USTs. Cambria inspected the dispenser and tank excavation areas. The City of Oakland required sampling at dispensers only if there was evidence of hydrocarbon impact. No field indications of hydrocarbons, such as staining or odor, were observed during the site visit; so no samples were collected. Cambria's March 10, 1998 *1998 Upgrade Site Inspection Report* presents details.

2002 Sensitive Receptor Survey (SRS), Conduit Study Report, and Subsurface Investigation Work Plan: The October 31, 2002 *Sensitive Receptor Survey, Conduit Study Report, and Subsurface Investigation Work Plan* included a conduit study which reported that a storm drain located just west of the site, along West MacArthur Boulevard, might intersect groundwater, and that the conduit backfill material may act as a preferential pathway for contaminant migration. The SRS identified two wells of unknown use located approximately ½-mile downgradient of the site and one well of unknown use located approximately 1,500 feet upgradient of the site. Due to the distance from the site to the nearest identified wells, the site is unlikely to impact the identified wells. Glen Echo Creek, the nearest surface water body identified by Cambria, is

located approximately 600 feet south of the site. Since calculated groundwater flow direction at the site has been to the west-southwest, petroleum hydrocarbons and fuel oxygenates from the site are not expected to impact Glen Echo Creek.

2003 SRS: In October 2003, Cambria completed an SRS for the site 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 were observed within 200 feet, nor were any surface water or sensitive habitats observed within 500 feet. Snow White Day Care (214 West MacArthur Boulevard) is located approximately 150 feet from the site. Kaiser Permanente Hospital (280 West MacArthur Boulevard) is located approximately 450 feet from the site. National Hispanic University (262 Grand Avenue) is located approximately 825 feet from the site. No water wells in addition to those mentioned above were identified within ½ mile of the site.

2004 Subsurface Investigation: In March 2004, two soil borings (SB-1 and SB-2) were advanced to 20 fbg adjacent to the storm drain located just west of the site, and soil and groundwater samples were collected. TPHg was detected in only three soil samples at concentrations ranging from 10 ppm to 43 ppm. Benzene was not detected in any soil sample collected during this investigation. Methyl tertiary-butyl ether (MTBE) was detected in only two soil samples at concentrations of 0.0078 ppm and 0.0099 ppm. All soil samples with detectable TPHg and/or MTBE concentrations were from saturated soils or from within the capillary fringe. TPHg was detected in both grab groundwater samples SB-1-W and SB-2-W at concentrations of 10,000 ppb and 520 ppb, respectively. Benzene was detected in both grab groundwater samples at concentrations of 430 ppb and 4.9 ppb, respectively. MTBE was detected in both grab groundwater samples at concentrations of 110 ppb and 320 ppb, respectively. Cambria's July 2, 2004 *Subsurface Investigation Report* details the investigation.

2005 Fueling System Upgrade: In April 2005, Cambria collected soil samples from beneath the site's dispensers and at selected piping locations following an upgrade of the site's fueling system. Five dispenser soil samples were collected at depths of between 1.5 and 4 fbg and into native soil, and five piping trench soil samples were collected at depths of between 2 and 4.5 fbg and into native soil. Field indications of hydrocarbons, including staining and odor, were observed in the vicinity of the sample locations in the western portion of the site. TPHg was detected in three of five dispenser samples, at a maximum concentration of 1,700 ppm. TPHg was detected in three of five piping samples, at a maximum concentration of 2,700 ppm. Benzene was detected at a maximum concentration of 4.2 ppm. Based on the field observations and laboratory results, Cambria, at Shell's request, directed over-excavation. Due to the Oakland Fire Department's concern over encountering shallow groundwater, the vertical extent of over-

excavation was limited to 6 fbg. The lateral extent of over-excavation was limited by the proximity of the site's canopy supports and the site kiosk foundation. Cambria collected eight over-excavation bottom and side-wall samples. Staining and odors were observed in all over-excavation sample locations. TPHg was detected in six of eight over-excavation samples, at a maximum concentration of 830 ppm. Benzene and MTBE concentrations were below the laboratory detection limits in all eight over-excavation samples. Details of the sampling are included in Cambria's June 23, 2005 *Dispenser and Piping Upgrade and Limited Over-Excavation Soil Sampling Report.*

2005 Site Conceptual Model (SCM): Cambria submitted an SCM to the ACHCSA on September 23, 2005. Cambria concluded that the current groundwater conditions appear to be low-risk for all identified potential receptors and that current soil conditions in previously impacted and remediated areas are not known. Based on the site's history and current conditions, Cambria recommended additional soil sampling, a semi-annual groundwater monitoring schedule for all site wells, continued coordinated monitoring with 240 W. MacArthur Blvd., and the evaluation of site soil and groundwater conditions versus RWQCB environmental screening levels (ESLs) and City of Oakland risk-based screening levels (RBSLs).

Groundwater Monitoring Program: Quarterly groundwater monitoring has been performed at the site since July 1988. Depth to water has ranged historically between 11.31 and 16.76 fbg. During the first quarter 2006 monitoring and sampling event, the depth to water in the wells ranged from 10.6 to 11.25 fbg, The groundwater flow direction, as calculated from depth-to-water measurements in on-site monitoring wells, is typically toward the west to southwest, but has occasionally ranged to the northwest.

During the first quarter 2006 monitoring and sampling event, monitoring well MW-4 contained 2,740 ppb TPHg, 2.01 ppb benzene, and 220 ppb MTBE.

Since the fourth quarter of 2003, coordinated monitoring and sampling has been conducted with the adjacent former gas station (currently Oakland Auto Works) at 240 West MacArthur Boulevard.

INVESTIGATION SUMMARY

Cambria oversaw the advancement of four soil borings (SB-4, SB-6, SB-7, and SB-8) at the locations shown on Figure 2. Proposed soil boring and monitoring well location SB- 9 was not attempted due to underground utilities. Soil boring SB-5 was attempted several times at the proposed location, but because it could not be cleared to the required depth or moved to a location

that would comply with Shell's safety protocols, it was not completed to the proposed depth. Soil boring SB-8 was converted into a groundwater monitoring well, MW-5. After hand auguring to 5 feet for utility clearance, all borings except SB-5 were advanced using a direct-push drill or hollow-stem auger rig and continuously logged for lithologic description. Soil samples at boring locations SB-4, SB-7, and SB-8 were collected at 5-foot intervals beginning at approximately 5 fbg to first-encountered groundwater. Soil samples at boring location SB-6 were collected at 3-foot intervals beginning at approximately 3 fbg to first-encountered groundwater. A grab groundwater sample was collected from each boring at first-encountered groundwater. In each boring, temporary well casing was installed at the depth of first-encountered groundwater, and a grab groundwater sample was collected using a stainless steel bailer. Additional discrete depth groundwater samples were proposed at borings SB-4, SB-7, and SB-8. However, there was insufficient water available for collecting additional samples below first-encountered groundwater.

Attachment A presents Cambria's standard field procedures for soil boring and monitoring well installation.

Personnel Present: Ron Barone, Cambria Staff Geologist.

Permit: Alameda County Public Works Agency Water Resources Well Permit # W2006-0158 and W2006-0160 (Attachment B).

Drilling Company: Gregg Drilling and Testing, Martinez, California (C-57 License # 485156).

Drilling Dates: April 4 through 6, 2006.

Drilling Methods: A 2-inch hydraulic push Geoprobe® and 5-inch hollow-stem augers were used to advance soil borings, and 10-inch hollow-stem augers were used to over-drill the well boring.

Number of Borings: Four borings (SB-4, SB-6, SB-7, SB-8/MW-5). Table 3 provides well and boring data.

Boring Depths: Boring SB-4 was advanced to a depth of 50 fbg; boring SB-6 was advanced to a depth of 15 fbg; SB-7 and SB-8 were advanced to a depth of 48 fbg. Soil boring SB-8 was converted into 4-inch monitoring well MW-5. Proposed boring SB-5 was advanced to only 4 fbg due to concrete and rebar debris obstructing the hole and preventing clearance in accordance with safety requirements..

Groundwater Depths: Groundwater was observed in all borings at initial depths ranging from 13.5 to 16.5 fbg. Wet media was encountered at 5 fbg in boring SB-4. However, Cambria believes that this was a result of heavy rain during hand clearing activities. Examination of soils beneath 5 fbg indicated that first-encountered groundwater was between 15.5 and 16.5 fbg.

Soil Sampling Methods: Cambria logged soil types using the Unified Soil Classification System and described the encountered soils on the boring logs presented in Attachment C. Cambria collected soil samples continuously for soil description, headspace analysis, and possible chemical analyses. Cambria screened selected soil samples for the presence of organic vapors using a photo-ionization detector (PID) and recorded the PID readings on the boring logs.

Groundwater Sampling: Grab groundwater samples were collected from borings SB-4, SB-6, SB-7, and SB-8 at first-encountered groundwater through temporary well casing using a stainless steel bailer. The bailer was properly decontaminated between locations. Groundwater samples were collected at between 12 and 16 fbg. As proposed, attempts were made to collect additional, depth-discrete groundwater samples from borings SB-4, SB-7, and SB-8. However, there was insufficient water available below the initial saturated zone to allow for sample collection.

Soil Classification: Soils consisted primarily of silts, sandy silts, sands, and silty sands to the total explored depth of 50 fbg. Boring logs are presented as Attachment C. Geologic cross sections are presented as Attachment D.

Backfill Method: Borings SB-4 through SB-7 were backfilled with neat cement grout to match the existing grade.

Chemical Analyses: State-certified laboratory Test America Laboratories of Nashville, Tennessee analyzed groundwater and selected soil samples for TPHg, benzene, toluene, ethylbenzene and xylenes (BTEX), and fuel oxygenates by EPA Method 8260B. Tables 1 and 2 summarize analytical results for soil and grab groundwater, respectively. Selected analyte concentrations are included on Figure 3. Certified laboratory analytical reports for soil and groundwater are included in Attachment E.

Well Construction: Well MW-5 was constructed using 4-inch-diameter Schedule 40 PVC casing. Well MW-5 was screened from 10 to 25 fbg, using 0.010-inch

machine slotted screen. The well was completed by placing a filter pack of Monterey #2/12 sand from the bottom of the well casing to approximately 2 feet above the top of the screened casing. Approximately 2 feet of bentonite were placed above the filter pack. Neat Portland cement was placed in the annular space between the boring wall and the PVC casing from the top of the bentonite seal to approximately 1 fbg. A flush-mounted, traffic-rated well box was installed to protect and finish the well to grade. Cambria presents monitoring well construction details in Table 3 and on the boring log (Attachment C). The Department of Water Resources well driller's completion report is included as Attachment F.

Well Development and Sampling: Blaine Tech Services, Inc. of San Jose, California will develop the new well using surge block agitation and pump evacuation prior to sampling. The site groundwater monitoring schedule has been modified to include sampling MW-5 quarterly beginning second quarter 2006.

Wellhead Survey: On May 11, 2006, Virgil Chavez Land Surveying (licensed land surveyor No. 6323) of Vallejo, California surveyed the rim and top of casing elevations for well MW-5 relative to mean sea level and surveyed the well's longitude and latitude. The survey report is included as Attachment G.

Soil Disposal: Investigation activities generated approximately 2.57 tons of soil. Cambria temporarily stockpiled the soil on site and profiled it for disposal. Attachment E includes the laboratory report. On May 2, 2006, Manley and Sons Trucking, Inc. of Sacramento, California transported the soil to Allied Waste Industries' Forward Landfill in Manteca, California for disposal as non-hazardous waste. The disposal confirmation is included as Attachment H.

INVESTIGATION RESULTS

Soil Analytical Results: TPHg was detected in seven samples at concentrations ranging from 0.452 ppm (SB-7-5) to 1,510 ppm (SB-5-3). Benzene was detected in five samples at concentrations ranging from 0.00340 ppm (SB-8-10) and 2.90 ppm (SB-5-3). Toluene was detected in three samples at concentrations ranging from 0.00204 ppm (SB-8-14) to 9.47 ppm (SB-5-3). Ethylbenzene was detected in six samples at concentrations ranging from 0.00325 ppm

(SB-7-5) to 9.46 ppm (SB-5-3). Xylenes were detected in four samples at concentrations ranging from 0.0199 ppm (SB-7-5) to 70.6 ppm (SB-5-3). MTBE was detected in six samples at concentrations ranging from 0.00221 ppm (SB-7-10) to 0.00970 (SB-6-9.5). Di-isopropyl ether (DIPE) was detected in two samples at concentrations of 0.0132 ppm (SB-8-14) and 0.0142 ppm (SB-5-3). No other analytes were detected in soil samples collected during this investigation.

Reanalysis of sample SB-5-3 for TPHg and BTEX was performed due to dilution or confirmation. The reanalysis was performed outside the EPA recommended holding time. Due to the short amount of time by which the holding time was exceeded, Cambria does not believe there was any appreciable effect on the sampling results.

Table 1 contains the site's cumulative soil analytical data. Data for selected analytes is also included on Figure 3. The laboratory analytical reports are included in Attachment E.

Groundwater Analytical Results: TPHg was detected in sample SB-8-W1 at a concentration of 34,000 ppb. Benzene was detected in sample SB-8-W1 at a concentration of 404 ppb. Toluene was detected in samples SB-4-W1 and SB-8-W1 at concentrations of 50.4 ppb and 22.5 ppb, respectively. Ethylbenzene was detected in samples SB-4-W1 and SB-8-W1 at concentrations of 3.92 ppb and 110 ppb, respectively. Xylenes were detected in samples SB-4-W1 and SB-8-W1 at concentrations of 13.3 ppb and 56.8 ppb, respectively. Tertiary-butyl alcohol (TBA) was detected in samples SB-4-W1 and SB-8-W1 at concentrations of 15.1 ppb and 40.2 ppb, respectively. MTBE was detected in samples SB-4-W1 and SB-8-W1 at concentrations of 29.2 ppb and 15.0 ppb, respectively. DIPE was detected in sample SB-8-W1 at a concentration of 26.6 ppb. No other analytes were detected in grab groundwater samples collected during this investigation.

Table 2 summarizes groundwater analytical data, and Figure 3 also includes data for selected analytes. The laboratory analytical reports are included in Attachment E.

CONCLUSIONS AND RECOMMENDATIONS

With the exception of localized shallow soils in the vicinity of the northwestern-most dispensers (D-5 and D-6), hydrocarbon impact to soil in the area investigated is minimal. Due to the site's location and the lack of known water supply wells in the site vicinity, Cambria believes it is unlikely that groundwater in the area is or will be used for drinking water. Therefore, soil sampling results were compared to the San Francisco RWQCB ESLs and The City of Oakland Urban Land Redevelopment Program's Tier 1 RBSLs for soil at sites with commercial land uses and where groundwater is not used as drinking water. None of the soil sample results exceed the

applicable RBSL. The sample collected at 3 fbg in boring SB-5 exceeded the ESLs for TPHg, benzene, toluene, and total xylenes. These concentrations are consistent with those detected in the nearby piping samples collected during the 2005 fuel system upgrade. Due to debris encountered while advancing SB-5, deeper soil samples could not be collected and the vertical extent of impact is not known. Based on the location of the impacted soil, the lack of concentrations in excess of the Oakland Tier 1 RBSLs, and the existence of two groundwater monitoring wells downgradient of the impacted soil, Shell does not recommend further action at this time.

TPHg and benzene concentrations in the grab groundwater sample collected from boring SB-8 exceeded the ESL for sites at which groundwater is not a current source of drinking water. The benzene concentration also exceeds its RBSL. SB-8 is located downgradient of the dispenser islands and the impacted soil encountered at SB-5. The boring was converted to groundwater monitoring well MW-5 and has been added to the site's groundwater monitoring network. In its September 23, 2005 *Site Conceptual Model,* Shell recommended semi-annual sampling and gauging of all site wells during the first and third quarters, and ACHCSA concurred in a January 20, 2006 letter to Shell. However, based on the results of this investigation, MW-5 will be sampled during second quarter 2006 and then quarterly for at least four consecutive quarters.

The work plan proposed depth-discrete grab groundwater sampling at locations SB-4, SB-7, SB-8, and SB-9 to investigate the vertical extent of hydrocarbon and fuel oxygenate impact to groundwater and to determine the effectiveness of the current groundwater monitoring network. As stated previously, SB-9 was not completed due to its proximity to underground utilities. Additional, deeper grab groundwater sampling was attempted in borings SB-4, SB-7, and SB-8. However, soil beneath approximately 20 fbg contained insufficient water for sample collection. At SB-4, SB-7, and SB-8, silt, sand and gravel encountered between approximately 15 and 20 fbg is the primary water producing interval. This interval is effectively monitored by the new monitoring well MW-5, screened between 10 and 25 fbg. The other monitoring wells on site (MW-1 through MW-4) are screened across intervals of similar lithology. The screened intervals of theses wells range in length from 10 feet for well MW-4 to 20 feet for well MW-1. With the exception of MW-1, the deeper portions of the screens do not encounter an additional interval sufficiently saturated to significantly contribute to the water column in the wells, and the wells are effectively monitoring the target interval. MW-1 is screened between 10 and 30 fbg, and the primary water bearing unit appears to be between 15 and 21 fbg. An additional saturated sand layer, encountered at approximately 28 fbg and continuing to the total depth of the well, is also being monitored by MW-1 though the contribution of this second interval to the water column observed in the well cannot be determined. Shell believes that the current groundwater monitoring wells are effectively monitoring the interval in which groundwater impact is most likely to occur.

CLOSING

We appreciate your continued assistance with this project. Please call David Gibbs at (510) 420-3363 if you have any questions or comments regarding the contents of this report.

Sincerely,
Cambria Environmental Technology, Inc.

David M. Gibbs, P.G.
Project Geologist

Aubrey K. Cool

Aubrey K. Cool, P.G.
Senior Project Geologist

Figures:
1 - Site Vicinity and Area Well Survey Map
2 - Site Plan
3 - Site Plan with Soil and Grab Groundwater Chemical Concentrations

Tables:
1 - Cumulative Soil Analytical Data
2 - Cumulative Grab Groundwater Analytical Data
3 - Well and Boring Data

Attachments:
A - Standard Field Procedures for Soil Borings and Monitoring Well Installation
B - Permits
C - Boring Logs
D - Geologic Cross-sections
E - Laboratory Analytical Reports
F - Department of Water Resources Well Completion Report
G - Survey Report
H - Disposal Confirmation

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

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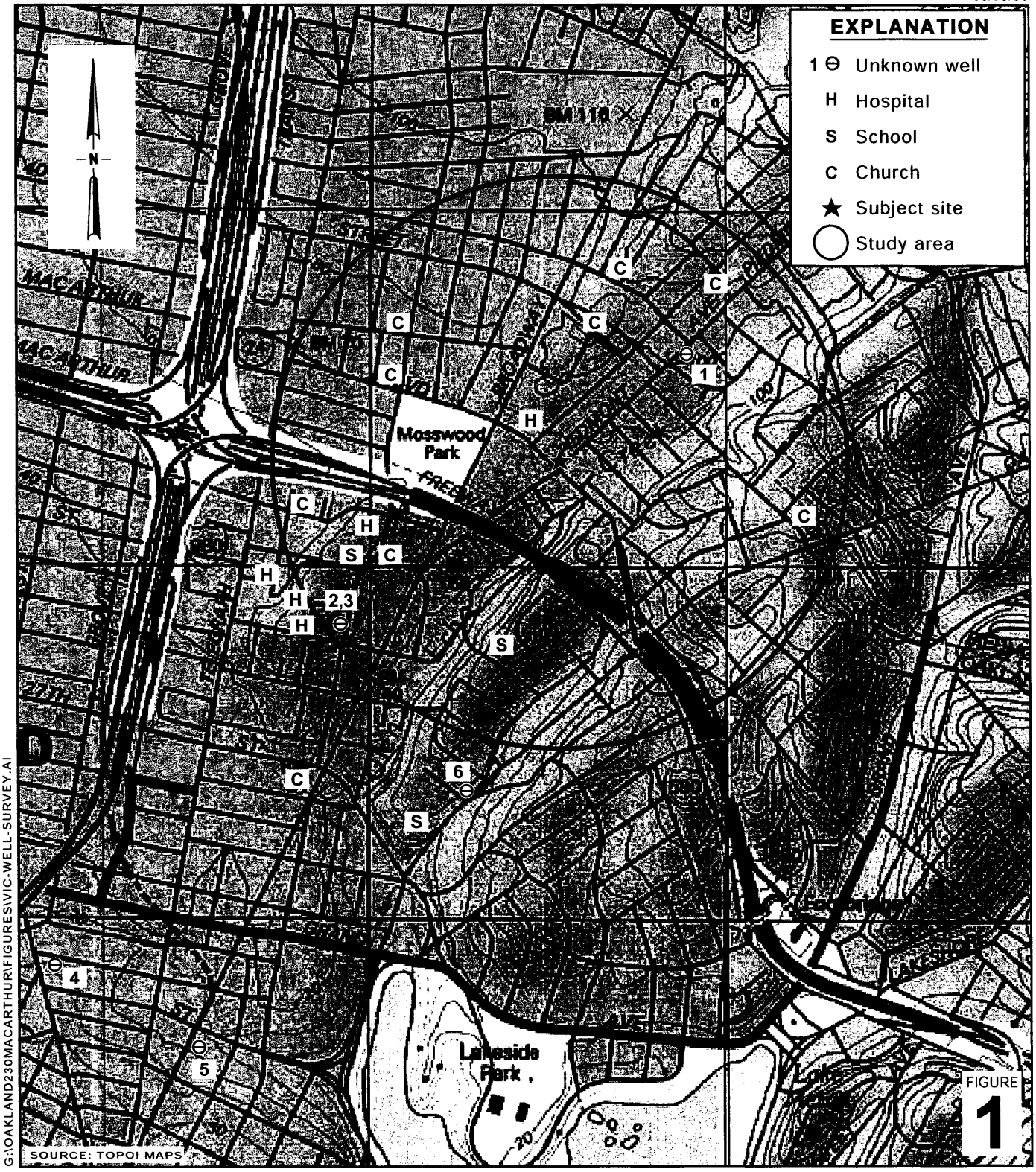
05/05/06



G:\OAKLAND230MACARTHUR\FIGURES\VIC-WELL-SURVEY.AI

FIGURE 1

0 1/8 1/4 1/2 1

SCALE : 1" = 1/4 MILE

Shell-branded Service Station
230 West MacArthur Boulevard
Oakland, California
Incident No.9899574

CAMBRIA

Site Vicinity and Area Well Survey Map
(1/2-Mile Radius)

05/18/06

Site Plan

SB-4	◉	Soil boring location (4/4-6/06)
SB-9	◉	Proposed soil boring location, uncompleted
EX-1-6	▲	Over-excavation soil sample location (4/27/05)
D-1-4.0	▪	Soil sample location (4/18/05)
MW-1	✦	Monitoring well location (Shell, 7/11-12/88)
MW-1	✦	Monitoring well location (240 W. MacArthur)
SB-1	◉	Soil boring location (3/24/04)
Probe 1	▲	Grab groundwater sample location (05/19/90)
GS-1	▪	Grab groundwater sample location (10/17/89)
SB-1	◉	Soil boring location (8/16/89)
A1	*	Soil sample location (11/05/87)
B-1	◉	Soil boring location (8/27/87)
VR-1	✦	Soil venting well location (3/12/87)
S-A	•	Soil boring location (4/14/86)

EXPLANATION

- Storm drain line (SD)
- Sanitary sewer line (SS)
- Water line (W)
- Gas line (G)
- Electrical line (E)
- Telecommunications line (T)
- Flow direction
- Storm drain inlet
- FL — Flow line elevation, in feet above mean sea level
- fbg — Feet below grade
- ❶ Product dispenser number

HOWE STREET

PIEDMONT AVENUE

WEST MACARTHUR BOULEVARD

Oakland Auto Works
240 W. MacArthur

Former W/O sump

Former W/O UST

Former Fuel USTs

Shell-branded Service Station
230 W. MacArthur

Existing USTs (rounded)

former USTs (reuse)

kiosk

building

planter

air/water

sidewalk

Over-excavation areas (2004)

benchmark elev. 75.96' msl

Kaiser MB Center
235 W. MacArthur

Groundwater Flow Direction
(Shell, 4Q96 through 1Q06)

Site features for 240 W. MacArthur based on figure provided by Stellar Environmental Solutions, Inc.

0 15 30 60
Scale (ft)

G:\OAKLAND 230 W. MACARTHUR\FIGURES\SITE PLAN.DWG

CAMBRIA

Shell-branded Service Station
230 West MacArthur Boulevard
Oakland, California
Incident No.98995741

FIGURE
2

05/18/06

Site Plan with Soil and Grab Groundwater Chemical Concentrations

April 4-6, 2006

EXPLANATION

- SB-4 — Soil boring location (4/4-6/06)
- SB-9 — Proposed soil boring location, uncompleted
- EX-1-6 — Over-excavation soil sample location (4/27/05)
- D-1-4.0 — Soil sample location (4/18/05)
- MW-1 — Monitoring well location (Shell, 7/11-12/88)
- MW-1 — Monitoring well location (240 W. MacArthur)
- SB-1 — Soil boring location (3/24/04)
- Probe 1 — Grab groundwater sample location (05/19/90)
- GS-1 — Grab groundwater sample location (10/17/89)
- SB-1 — Soil boring location (8/16/89)
- A1 — Soil sample location (11/05/87)
- B-1 — Soil boring location (8/27/87)
- VR-1 — Soil venting well location (3/12/87)
- S-A — Soil boring location (4/14/86)

- Storm drain line (SD)
- Sanitary sewer line (SS)
- Water line (W)
- Gas line (G)
- Electrical line (E)
- Telecommunications line (T)
- Flow direction
- Storm drain inlet
- FL — Flow line elevation, in feet above mean sea level
- fbg — Feet below grade
- Product dispenser number

SB-4: SOIL (ppm)			
Depth	TPHg	Benz.	MTBE
5'	<0.86	<0.0043	<0.0043

Soil Sample ID

Soil sample depth and TPHg, benzene, and MTBE concentrations in soil, in ppm

SB-4: WATER (ppb)			
Depth	TPHg	Benz.	MTBE
5'	<50.0	<1.00	29.2

Soil sample depth and TPHg, benzene, and MTBE concentrations in groundwater, in ppb

HOWE STREET

PIEDMONT AVENUE

WEST MACARTHUR BOULEVARD

Oakland Auto Works
240 W. MacArthur

Former W/O sump

Former W/O UST

Former Fuel USTs

Shell-branded Service Station
230 W. MacArthur

Existing USTs (rounded)

former USTs (rect.)

kiosk

planter

sidewalk

air/water

Kaiser MB Center
235 W. MacArthur

benchmark elev. 75.96' msl

MW-1 MW-2 MW-3 MW-4 MW-5 MW-6 MW-7 MW-8

SB-1 SB-2 SB-4 SB-5 SB-6 SB-7 SB-8/MW-5 SB-9

SB-4: SOIL (ppm)			
Depth	TPHg	Benz.	MTBE
5'	<0.100	<0.00200	<0.00200
11.5'	<0.100	<0.00200	<0.00200
15.5'	0.544	<0.00200	<0.00200

SB-4: WATER (ppb)			
Depth	TPHg	Benz.	MTBE
NA	<50.0	<1.00	29.2

SB-5: SOIL (ppm)			
Depth	TPHg	Benz.	MTBE
3'	1,510	2.90	0.00403

SB-6: SOIL (ppm)			
Depth	TPHg	Benz.	MTBE
3'	0.638	<0.00200	<0.00200
6.5'	<0.100	<0.00200	0.00418
9.5'	2.43	0.0168	0.00970
12'	6.16	0.0160	0.00541

SB-8/MW-5: SOIL (ppm)			
Depth	TPHg	Benz.	MTBE
5'	<0.100	<0.00200	<0.00200
10'	<0.100	0.00340	<0.00200
14'	0.942	0.0588	0.00855

SB-8/MW-5: WATER (ppb)			
Depth	TPHg	Benz.	MTBE
NA	34,000	404	15.0

SB-7: SOIL (ppm)			
Depth	TPHg	Benz.	MTBE
5'	0.452	<0.00200	<0.00200
10'	<0.100	<0.00200	0.00221
15'	<0.100	<0.00200	<0.00200

SB-7: WATER (ppb)			
Depth	TPHg	Benz.	MTBE
NA	<50.0	<1.00	<1.00

Groundwater Flow Direction (Shell, 4Q96 through 1Q06)

Over-excavation areas (2004)

Probe 1 Probe 2 Probe 3 Probe 4 Probe 5 Probe 6

SS (FL = 67.8)

FL = ~67.24, ~9 fbg

FL = 66.68

FL = 66.7

MH = ~10.5 fbg

W 3-10 fbg

FL = ~66, ~10 fbg

FL = 65.4, ~11 fbg

FL = 65.2

MH = ~11 fbg

FL = 52.4

SS ~23 fbg

E 3-8 fbg

G 3-8 fbg

FL = 53.7, ~22.25 fbg

FL = 53.8

0 15 30 60

Scale (ft)

Site features for 240 W. MacArthur based on figure provided by Stellar Environmental Solutions, Inc.

G:\OAKLAND 230 W. MACARTHUR\FIGURES\SOIL DATA 4-06.DWG

CAMBRIA

Shell-branded Service Station
230 West MacArthur Boulevard
Oakland, California
Incident No.98995741

FIGURE
3

Table 1. **Cumulative Soil Analytical Data -** Shell-branded Service Station - SAP Code 135676, 230 W. MacArthur Boulevard, Oakland, California

Sample ID	Date	Depth (feet)	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TBA	MTBE	DIPE	ETBE	TAME	Total Lead	Organic Lead
			← parts per million →											
1986 Site Investigation														
S-A	4/14/1986	4 - 5.5	17[a]	--	--	--	--	--	--	--	--	--	--	--
S-A	4/14/1986	8.5 - 10	**1,200**[a]	--	--	--	--	--	--	--	--	--	--	--
S-A	4/14/1986	11 - 12.5	**4,300**[a]	--	--	--	--	--	--	--	--	--	--	--
S-A	4/14/1986	13.5 - 15	ND[a]	--	--	--	--	--	--	--	--	--	--	--
S-B	4/14/1986	5 - 6.5	36[a]	--	--	--	--	--	--	--	--	--	--	--
S-B	4/14/1986	8 - 9.5	78[a]	--	--	--	--	--	--	--	--	--	--	--
S-B	4/14/1986	12 - 13	6.4[a]	--	--	--	--	--	--	--	--	--	11.0[b]	--
S-C	4/14/1986	4 - 5.5	ND[a]	--	--	--	--	--	--	--	--	--	---	---
S-C	4/14/1986	7 - 8.5	ND[a]	--	--	--	--	--	--	--	--	--	---	---
S-C	4/14/1986	11 - 12.5	ND[a]	--	--	--	--	--	--	--	--	--	---	---
S-C	4/14/1986	13.5 - 15	**5,700**[a]	--	--	--	--	--	--	--	--	--	---	---
S-D	4/14/1986	Composite	**571**[a]	--	--	--	--	--	--	--	--	--	--	--
1987 Soil Borings														
B-1 @ 4'	8/28/1987	4	**412**	<0.05	<0.05	<0.1	5.4	--	--	--	--	--	65.9[d]	--
B-1 @ 6'	8/28/1987	6	**1,440**	<0.05	<0.05	<0.1	**130**	--	--	--	--	--	26.4[d]	--
B-1 @ 8'	8/28/1987	8	**1,870**	<0.05	**4.3**	14	**325**	--	--	--	--	--	14.3[d]	--
B-1 @ 10'	8/28/1987	10	<10	<0.05	<0.05	<0.1	<0.1	--	--	--	--	--	<5[a]	--
B-1 @ 12'	8/28/1987	12	122	**0.60**	0.36	0.38	0.33	--	--	--	--	--	<5[a]	--
B-1 @ 14'	8/28/1987	14	52	<0.05	<0.05	<0.1	<0.1	--	--	--	--	--	<5[a]	--
B-2 @ 5'	8/28/1987	5	<10	<0.05	1.5	5.7	<0.1	--	--	--	--	--	<5[a]	--
B-2 @ 6-7'	8/28/1987	6 - 7	<10	<0.05	0.37	0.55	<0.1	--	--	--	--	--	<5[a]	--
B-2 @ 8-9'	8/28/1987	8 - 9	<10	0.5	0.4	0.3	<0.1	--	--	--	--	--	<5[a]	--
B-2 @ 10'	8/28/1987	10	<10	<0.05	<0.05	<0.1	<0.1	--	--	--	--	--	<5[a]	--
B-2 @ 12'	8/28/1987	12	<10	<0.05	<0.05	<0.1	<0.1	--	--	--	--	--	<5[a]	--

Table 1. **Cumulative Soil Analytical Data -** Shell-branded Service Station - SAP Code 135676, 230 W. MacArthur Boulevard, Oakland, California

Sample ID	Date	Depth (feet)	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TBA	MTBE	DIPE	ETBE	TAME	Total Lead	Organic Lead
			← parts per million →											
1987 UST Removal and Soil Sampling														
A1	11/2/1987	15.0	380	**1.6**	2.2	--	**55**	--	--	--	--	--	---	--
A2	11/2/1987	15.0	310	**1.3**	1.3	--	**33**	--	--	--	--	--	---	--
B1	11/2/1987	15.0	**480**	**4.3**	0.5	--	**22**	--	--	--	--	--	---	--
B2	11/2/1987	15.0	9.1	**1.6**	0.3	--	0.1	--	--	--	--	--	---	--
C1	11/2/1987	15.0	12	**1.5**	<0.1	--	1.1	--	--	--	--	--	---	--
C2	11/2/1987	15.0	170	**4.1**	<0.1	--	2.4	--	--	--	--	--	---	--
D1	11/2/1987	15.0	8.6	<0.1	<0.1	--	<0.1	--	--	--	--	--	---	--
D2	11/2/1987	15.0	44	<0.1	<0.1	--	5.3	--	--	--	--	--	---	--
1988 Monitoring Well Installation														
MW1-2	7/11/1988	10	<10	<0.003	0.0116	<0.003	<0.003	--	--	--	--	--	---	--
MW1-3	7/11/1988	15	<10	<0.003	0.0129	<0.003	0.0051	--	--	--	--	--	---	--
MW1-4	7/11/1988	20	<10	<0.003	0.023	<0.003	<0.003	--	--	--	--	--	---	--
MW2-1	7/11/1988	5	<10	<0.003	0.0161	<0.003	<0.003	--	--	--	--	--	---	--
MW2-2	7/11/1988	10	<10	<0.003	0.0093	<0.003	<0.003	--	--	--	--	--	---	--
MW2-3	7/11/1988	15	<10	<0.003	0.01	<0.003	<0.003	--	--	--	--	--	---	--
MW3-1	7/12/1988	10	278	<0.05	0.388	<0.003	0.411	--	--	--	--	--	11[e]	--
MW3-2	7/12/1988	15	<10	<0.003	0.0367	<0.003	<0.003	--	--	--	--	--	8.3[e]	--
MW3-3	7/12/1988	20	<10	<0.003	0.0304	0.0076	<0.003	--	--	--	--	--	---	--
1989 Phase II Supplemental Soil Investigation														
SB1-1	8/16/1989	5	<1.0	<0.05	<0.1	<0.1	<0.1	--	--	--	--	--	---	--
SB1-2	8/16/1989	10	<1.0	<0.05	<0.1	<0.1	<0.1	--	--	--	--	--	---	--
SB1-3	8/16/1989	15	<1.0	<0.05	<0.1	<0.1	<0.1	--	--	--	--	--	---	--
SB1 (composite)	8/16/1989	Composite	--	--	--	--	--		--	--	--	--	4.5[a]	<0.05
SB2-1	8/16/1989	5.5	<1.0	<0.05	<0.1	<0.1	<0.1	--	--	--	--	--	--	--

Table 1. **Cumulative Soil Analytical Data -** Shell-branded Service Station - SAP Code 135676, 230 W. MacArthur Boulevard, Oakland, California

Sample ID	Date	Depth (feet)	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TBA	MTBE	DIPE	ETBE	TAME	Total Lead	Organic Lead
			← parts per million →											
SB2-2	8/16/1989	10.5	<1.0	<0.05	<0.1	<0.1	<0.1	--	--	--	--	--	--	--
SB2-3	8/16/1989	15.5	**490**	<0.05	0.28	1.3	1.0	--	--	--	--	--	--	--
SB2 (composite)	8/16/1989	Composite	--	--	--	--	--	--	--	--	--	--	2.5[a]	<0.05
SB3-1	8/16/1989	4.5	6.6	<0.05	**0.26**	0.14	0.63	--	--	--	--	--	--	--
SB3-2	8/16/1989	9.5	<1.0	<0.05	<0.1	<0.1	<0.1	--	--	--	--	--	--	--
SB3-3	8/16/1989	15.5	<1.0	<0.05	<0.1	<0.1	<0.1	--	--	--	--	--	--	--
SB3 (composite)	8/16/1989	Composite	--	--	--	--	--	--	--	--	--	--	5.5[a]	<0.05
SB-1-5'	3/24/2004	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	--	<0.0050	--	--	--	--	--
SB-1-10'	3/24/2004	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	--	<0.0050	--	--	--	--	--
SB-1-15'	3/24/2004	15	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	--	0.0078	--	--	--	--	--
SB-1-17'	3/24/2004	17	12	<0.025	<0.025	<0.025	<0.025	--	<0.025	--	--	--	--	--
SB-1-19.5'	3/24/2004	19.5	43	<0.024	<0.024	<0.024	<0.024	--	<0.024	--	--	--	--	--
SB-2-5'	3/24/2004	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	--	<0.0050	--	--	--	--	--
SB-2-10'	3/24/2004	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	--	<0.0050	--	--	--	--	--
SB-2-15'	3/24/2004	15	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	--	<0.0050	--	--	--	--	--
SB-2-17'	3/24/2004	17	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	--	0.0099	--	--	--	--	--
SB-2-19.5'	3/24/2004	19.5	10	<0.025	<0.025	<0.025	<0.025	--	<0.025	--	--	--	--	--
2005 Dispenser, Piping, and Limited Over-Excavation Soil Sampling														
D-1-4.0	4/18/2005	4.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	6.2	--
D-2-1.5	4/18/2005	1.5	**1,700**	<0.40	2.4	3.8	5.4	<2.0	<0.40	<0.40	<0.40	<0.40	130	--
D-2-3.5	4/18/2005	3.5	**940**	0.060	6.6	9.5	**85**	<0.15	<0.025	<0.025	<0.025	<0.025	8.0	--
D-3-3.0	4/18/2005	3.0	2.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	6.5	--
D-4-4.0	4/18/2005	4.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	<0.0050	<0.0050	8.1	--
P-1-2.0	4/18/2005	2.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	4.2	--

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Sample ID	Date	Depth (feet)	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TBA	MTBE	DIPE	ETBE	TAME	Total Lead	Organic Lead
			← parts per million →											
P-2-4.5	4/18/2005	4.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	9.7	--
P-3-3.5	4/18/2005	3.5	**620**	<0.025	0.20	1.6	**6.1**	0.18	0.066	<0.025	<0.025	<0.025	22	--
P-4-4.0	4/18/2005	4.0	**2,700**	**4.2**	1.6	**39**	**78**	<1.5	0.30	<0.25	<0.25	<0.25	140	--
P-5-4.0	4/18/2005	4.0	**1,600**	**0.98**	0.28	7.4	**13**	<1.5	<0.25	<0.25	<0.25	<0.25	11	--
EX-1-6	4/28/2005	6.0	**830**	<0.50	1.4	4.1	<0.50	<2.5	<0.50	<1.0	<0.50	<0.50	7.2	--
EX-2-6	4/28/2005	6.0	200	<0.50	<0.50	<0.50	<0.50	<2.5	<0.50	<1.0	<0.50	<0.50	7.1	--
EX-3-6	4/28/2005	6.0	7.3	<0.0050	<0.0050	<0.0050	<0.0050	0.015	<0.0050	<0.010	<0.0050	<0.0050	4.1	--
EX-4-6	4/28/2005	6.0	21	<0.023	<0.023	<0.023	<0.023	<0.046	<0.023	<0.023	<0.023	<0.023	12	--
EX-B-6.5	4/28/2005	6.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	0.017	<0.0050	<0.010	<0.0050	<0.0050	3.6	--
EX-5-6	4/28/2005	6.0	7.6	<0.019	<0.019	<0.019	0.10	<0.038	<0.019	<0.038	<0.019	<0.019	4.1	--
EX-6-6	4/28/2005	6.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	0.013	<0.0050	<0.010	<0.0050	<0.0050	7.3	--
EX-B2-6.5	4/28/2005	6.5	260	<0.50	<0.50	1.6	1.5	<2.5	<0.50	3.3	<0.50	<0.50	4.0	--
2006 Subsurface Investigation														
SB-4-5	4/4/2006	5.0	<0.100	<0.00200	<0.00200	<0.00200	<0.00500	<0.0500	<0.00200	<0.00200	<0.00500	<0.00200	--	--
SB-4-11.5	4/5/2006	11.5	<0.100	<0.00200	<0.00200	<0.00200	<0.00500	<0.0500	<0.00200	<0.00200	<0.00500	<0.00200	--	--
SB-4-15.5	4/5/2006	15.5	0.544	<0.00200	0.119	0.00995	0.0388	<0.0500	<0.00200	<0.00200	<0.00500	<0.00200	--	--
SB-5-3	4/4/2006	3.0	**1,510[f]**	**2.90[f]**	**9.47[f]**	9.46[f]	**70.6[f]**	<0.0500	0.00403	0.0142	<0.00500	<0.00200	--	--
SB-6-3	4/4/2006	3.0	0.638	<0.00200	<0.00200	<0.00200	<0.00500	<0.0500	<0.00200	<0.00200	<0.00500	<0.00200	--	--
SB-6-6.5	4/5/2006	6.5	<0.100	<0.00200	<0.00200	<0.00200	<0.00500	<0.0500	0.00418	<0.00200	<0.00500	<0.00200	--	--
SB-6-9.5	4/5/2006	9.5	2.43	0.0168	<0.00200	0.00746	<0.00500	<0.0500	0.00970	<0.00200	<0.00500	<0.00200	--	--
SB-6-12	4/6/2006	12.0	6.16	0.0160	<0.00200	0.0319	0.0222	<0.0500	0.00541	<0.00200	<0.00500	<0.00200	--	--
SB-7-5	4/4/2006	5.0	0.452	<0.00200	<0.00200	0.00325	0.0199	<0.0500	<0.00200	<0.00200	<0.00500	<0.00200	--	--
SB-7-10	4/6/2006	10.0	<0.100	<0.00200	<0.00200	<0.00200	<0.00500	<0.0500	0.00221	<0.00200	<0.00500	<0.00200	--	--
SB-7-15	4/6/2006	15.0	<0.100	<0.00200	<0.00200	<0.00200	<0.00500	<0.0500	<0.00200	<0.00200	<0.00500	<0.00200	--	--
SB-8-5	4/4/2006	5.0	<0.100	<0.00200	<0.00200	<0.00200	<0.00500	<0.0500	<0.00200	<0.00200	<0.00500	<0.00200	--	--
SB-8-10	4/6/2006	10.0	<0.100	0.00340	<0.00200	<0.00200	<0.00500	<0.0500	<0.00200	<0.00200	<0.00500	<0.00200	--	--

Table 1. **Cumulative Soil Analytical Data -** Shell-branded Service Station - SAP Code 135676, 230 W. MacArthur Boulevard, Oakland, California

Sample ID	Date	Depth (feet)	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TBA	MTBE	DIPE	ETBE	TAME	Total Lead	Organic Lead
			← parts per million →											
SB-8-14	4/6/2006	14.0	0.942	0.0588	0.00204	0.00416	<0.00500	<0.0500	0.00855	0.0132	<0.00500	<0.00200	--	--
Shallow Soil (≤10 fbg) ESL[g]:			**400**	**0.38**	**9.3**	**32**	**11**	**110**	**5.6**	**NA**	**NA**	**NA**	**750**	**NA**
Deep Soil (>10 fbg) ESL[g]:			**400**	**0.51**	**9.3**	**32**	**11**	**110**	**5.6**	**NA**	**NA**	**NA**	**750**	**NA**
Oakland Tier 1 Surface Soil RBSL[h]:			*NA*	*510*	*56,000*	*33,000*	*300,000*	*NA*	*1,700*	*NA*	*NA*	*NA*	*NA*	*NA*
Oakland Tier 1 Subsurface Soil RBSL[i]:			*NA*	*66*	*SAT*	*SAT*	*SAT*	*NA*	*SAT*	*NA*	*NA*	*NA*	*NA*	*NA*

Table 1. **Cumulative Soil Analytical Data -** Shell-branded Service Station - SAP Code 135676, 230 W. MacArthur Boulevard, Oakland, California

Sample ID	Date	Depth (feet)	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TBA	MTBE	DIPE	ETBE	TAME	Total Lead	Organic Lead
			← parts per million →											

Abbreviations and Notes:

ND = Below detection limit

<x = Below detection limit of x

-- = Not analyzed

TPHg = Total petroleum hydrocarbons as gasoline analyzed by EPA Method 8260B (before 2004, analyzed by EPA method 8015).

Benzene, ethylbenzene, toluene, total xylenes by EPA Method 8260B (before 2004, analyzed by EPA Method 8020).

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

MTBE = Methyl tertiary-butyl ether, analyzed by EPA Methods 8260B.

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

ETBE = Ethyl tertiary-butyl ether, analyzed by modified EPA Method 8260B.

TAME = Tertiary-amyl methyl ether, analyzed by EPA Method 8260B.

Lead by EPA Method 6010

Organic lead analyzed by Cal LUFT Manual, 12/87

[a] = Analytical method is unknown

[b] = Total lead analyzed by unknown method

[c] = Composite of four samples taken from depths of 4 - 5 fbg, 7 - 8.5 fbg, 11 - 12.5 fbg, and 13.5 - 15 fbg

[d] = Lead analyzed by EPA Method 7421

[e] = Total lead analyzed by EPA Method 7240

[f] = Initial analysis within holding time. Reanalysis for the required dilution or confirmation was past holding time.

[g] = San Francisco Bay Regional Water Quality Control Board commercial/industrial Environmental Screening Level for soil where groundwater is not a source of drinking water

BOLD = Concentration exceeds RWQCB ESL

[h] = City of Oakland Tier 1 Risk-Based Screening Level - Commercial/Industrial Ingestion/Dermal/Inhalation Hazard

[i] = City of Oakland Tier 1 Risk-Based Screening Level - Commercial/Industrial Inhalation of Indoor Air Vapors Hazard

Italicized = Concentration exceeds Oakland Tier 1 RBSL

SAT = RBSL exceeds satuarated soil concentration of chemical

NA = Not available

Table 2. Cumulative Grab Groundwater Analytical Data - Shell-branded Service Station - SAP Code 135676, 230 W. MacArthur Boulevard, Oakland, California

Sample ID	Date	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TBA	MTBE	DIPE	ETBE	TAME
		← parts per billion →									
Probe 2	5/19/1990	**25,000**	***280***	**290**	160	**470**	---	---	---	---	---
Probe 3	5/19/1990	<50	<0.5	<0.5	<0.5	<0.5	---	---	---	---	---
Probe 4	5/19/1990	<50	5	<0.5	2	<0.5	---	---	---	---	---
Probe 5	5/19/1990	<50	1	2	1	4	---	---	---	---	---
Probe 6	5/19/1990	**31,000**	***430***	**600**	240	**1,400**	---	---	---	---	---
SB-1-W	3/24/2004	**10,000**	***430***	75	98	44	---	110	---	---	---
SB-2-W	3/24/2004	***520***	4.9	<1.0	<1.0	<2.0	---	320	---	---	---
SB-4-W1	4/5/2006	<50.0	<1.00	50.4	3.92	13.3	15.1	29.2	<1.00	<1.00	<1.00
SB-7-W1	4/6/2006	<50.0	<1.00	<1.00	<1.00	<3.00	<10.0	<1.00	<1.00	<1.00	<1.00
SB-8-W1	4/6/2006	**34,000**	***404***	22.5	110	56.8	40.2	15.0	26.6	<1.00	<1.00
Groundwater ESL[a]:		**500**	**46**	**130**	**290**	**100**	**18,000**	**1,800**	**NA**	**NA**	**NA**
Oakland Tier 1 RBSL[b]:		*NA*	*110*	*>SOL*	*>SOL*	*>SOL*	*NA*	*>SOL*	*NA*	*NA*	*NA*

Abbreviations and Notes:

--- = Not analyzed

<x = Below detection limit of x

TPHg = Total petroleum hydrocarbons as gasoline analyzed by EPA Method 8260B (before 2004, analyzed by EPA method 8015).

Benzene, ethylbenzene, toluene, total xylenes by EPA method 8260B (before 2004, analyzed by EPA Method 8020).

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

MTBE = Methyl tertiary-butyl ether by EPA Method 8260B.

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

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

TAME = Tertiary-amyl methyl ether, analyzed by EPA Method 8260B.

[a] = San Francisco Bay Regional Water Quality Control Board Environmental Screening Level where groundwater is not a source of drinking water

BOLD = Concentration exceeds RWQCB ESL

[b] = City of Oakland Tier 1 Risk-Based Screening Level - Commercial/Industrial Inhalation of Indoor Air Vapors Hazard

Italicized = Concentration exceeds Oakland Tier 1 RBSL

> SOL = RBSL exceeds solubility of chemical in water

NA = Not available

Table 3. Well and Boring Data - Shell-branded Service Station - SAP Code 135676, 230 W. MacArthur Boulevard, Oakland, California

Boring ID	Type	Date Installed	TOC (ft msl)	Total Depth (fbg)	Soil Sample Interval (ft)	First Encountered GW Depth (fbg)	First Encountered GW Elev (ft msl)	Screen Diam. (in)	Slot Size (in.)	Screen Depth (fbg) Top	Screen Depth (fbg) Bottom	Comments
SB-4	5" HSA Boring	4/5/2006	—	50	continuous	15.5-16.5	—	—	—	—	—	
SB-5	Airknife boring	4/4/2006	—	4	continuous	—	—	—	—	—	—	
SB-6	5" HSA Boring	4/6/2006	—	16	continuous	13.5	—	—	—	—	—	
SB-7	2" Direct Push	4/6/2006	—	48	continuous	16	—	—	—	—	—	
SB-8	2" Direct Push	4/6/2006	—	48	continuous	15	—	—	—	—	—	SB-8 converted into well MW-5
MW-5	10" HSA Boring	4/6/2006	—	25	none	15	61.97	4"	0.010	10	25	

Abbreviations and Notes:

HSA = Hollow-stem auger

DP = Direct Push

TOC = Top of casing elevation

ft msl = Feet referenced to mean sea level

fbg = Feet below grade

— = not applicable