CAMBRIA

November 12, 2001

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

5110 / RO
113 / 415

NOV 15 2001

Re: **Corrective Action Plan**
Shell-branded Service Station
4411 Foothill Boulevard
Oakland, California
Incident #98995756
Cambria Project #243-0897

Dear Mr. Chan,

Cambria Environmental Technology, Inc. (Cambria) is submitting this corrective action plan (CAP) for the referenced site on behalf of Equiva Services LLC (Equiva). In a phone conversation on October 18, 2001, the Alameda County Health Care Services Agency (ACHCSA) concurred with Cambria's recommendation to submit a CAP in preparation for impending site demolition and fueling facility removal. According to current plans, the site will be sold to the Oakland School District and used by the adjacent high school as a parking lot. Presented below are summaries of the site background and site characteristics, a discussion of remedial-alternatives, and Cambria's recommendations for remedial action.

SITE BACKGROUND

Site Description: The site is an active Shell-branded service station located on the southwest corner of the intersection of Foothill Boulevard and High Street in Oakland California (Figures 1 and 2). The neighborhood in the immediate vicinity of the site is mixed commercial and residential, with gasoline service stations occupying the northeastern and northwestern corners of the intersection. Fremont High School is located on the southeastern intersection corner.

1992 Waste Oil Tank Removal: The environmental investigation at the Shell-branded site was initiated in November 1992, following the removal of an underground waste-oil tank. A soil sample was collected at the bottom of the excavation at a depth of approximately 11 feet below grade (fbg). No total petroleum hydrocarbons as gasoline (TPHg), diesel (TPHd), benzene, toluene, ethylbenzene, xylenes (BTEX), oil and grease, halogentated volatile organics compounds

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or metals were detected in the sample. Total lead was detected at 6.7 parts per million (ppm), which likely represents the background concentration in the local soil. Details of the waste oil tank removal and sampling activities are presented in the GeoStrategies' Inc. report dated March 26, 1992.

1992 Monitoring Well Installation: A single monitoring well (S-1) was installed in the vicinity of the waste-oil tank location. Details of the monitoring well installation are presented in GeoStrategies' *Monitoring Well Installation Report* dated January 19, 1993.

1993 Monitoring Well Installations: Monitoring wells S-2 and S-3 were installed by Hydro Environmental Technologies Inc. (HETI) on May 21, 1993. Details of the well installations are presented in HETI's report dated July 22, 1993.

1995 Soil and Groundwater Investigation: Pacific Environmental Group of San Jose, California (PEG) conducted a geoprobe investigation in June 1995. The investigation consisted of advancing eight onsite soil borings and two offsite borings for the collection of soil and groundwater samples. Details of the PEG investigation are presented in PEG's *Site Investigation* report dated September 12, 1995.

1998 Product Equipment Upgrades: Paradiso Mechanical (Paradiso) of San Leandro, California upgraded the service station in November 1998 by adding secondary containment to the gasoline turbines and dispensers. Details of dispenser upgrade and sampling activities are presented in Cambria's *Dispenser Soil Sampling Report* dated November 30, 1998.

January 1999 Letter Response and Work Plan: In response to the ACHCSA letter to Equiva dated December 7, 1998, Cambria prepared a *Letter Response and Work Plan* dated January 11, 1999. In the January 1999 work plan, Cambria proposed an additional onsite groundwater monitoring well (S-4) and enhanced groundwater oxygenation via hydrogen peroxide injection into existing site wells.

March 1999 Work Plan Addendum: Additional information regarding the location of proposed well S-4 and the use of hydrogen peroxide was requested by the AHCSA in a phone conversation with Cambria on February 1, 1999. As a result, Cambria submitted a *Work Plan Addendum* dated March 18, 1999. In the March 1999 addendum, Cambria proposed that well S-4 be located between the station building and the nearest dispenser-island to the north. Cambria also proposed the application of oxygen releasing compound (ORC) in lieu of hydrogen peroxide, due to the lack of requested response from the Hayward Fire Department on the safety of hydrogen peroxide use.

April 1999 ACHCSA Letter: In an April 30, 1999 letter to Equiva. ACHCSA requested further information regarding the application of ORC. In addition, the ACHCSA requested Cambria

perform a feasibility study to evaluate preventative alternatives to the migration of methyl tert butyl ether (MTBE). Cambria provided the requested information in the *Letter Response* dated June 15, 1999. Subsequently, in September 1999 ORC's were installed in wells S-1, S-2, and BW-A.

December 1999 Letter Response, Work Plan and Conduit Study: In a letter dated November 10, 1999, the ACHCSA requested a site conceptual model and work plan be prepared for the site. Cambria submitted a *Letter Response and Work Plan* dated December 13, 1999. In that work plan, Cambria presented findings of a subsurface conduit study. Several conduits, which may provide limited preferential groundwater flow at times of high groundwater elevations, were identified.

Approximate depths to local sewer and storm drain conduit flowlines are shown on Figure 3 in Attachment A. The deepest conduits located near the site are sanitary sewer pipelines with flowlines ranging from approximately 6 to 11 fbg. Although the depth to water in wells S-2 and S-3 along the western perimeter of the site has ranged from approximately 6 to 10.5 fbg, the depth to water is typically 8 to 9 fbg. Therefore, only the deepest sanitary sewer conduit trench has the potential to cause preferential flow of impacted groundwater. However, given that only a small portion of the trench backfill typically intersects groundwater and the fact that gravel lenses exist locally from 10 to 13 fbg, the potential for significant preferential groundwater flow in the utility trench is considered to be low.

January 2000 Site Investigation: Cambria conducted a site investigation in January 2000. Per the ACHCSA request, well S-4 was proposed between the station building and southeastern dispenser island. However, a conduit was encountered while drilling boring SB-4, and the boring was relocated approximately 50 feet southeast. The second boring, SB-4B, was located adjacent to the southeast corner of the station building, and well S-4 was installed in boring SB-4B to a depth of 20 fbg. In boring SB-4B, the maximum concentrations of TPHd and TPHg were detected in sample SB-4B-5.5 at 27.2 ppm and 28.2 ppm, respectively. The maximum concentration of benzene was detected in sample SB-4B-10.5 at 0.0696 ppm. The maximum concentration of MTBE by EPA Method 8020 was reported in sample SB-4B-19.0 at 0.233 ppm. MTBE was confirmed by EPA Method 8260 in sample SB-4B-19.0 at a concentration of 0.0549 ppm.

Maps showing soil sample and boring locations are presented with analytical summary tables in Attachment A. Cumulative groundwater monitoring results are presented in Attachment B.

SITE CHARACTERISTICS

Groundwater Characteristics and Monitoring Results: Groundwater has been monitored at the site since December 1992. Since that time, groundwater depth has ranged from approximately 6 to 12 fbg. The calculated groundwater gradient typically trends to the south-southwest at 0.12. Cumulative groundwater monitoring results are presented as Attachment B.

The groundwater elevation contour map from the *Second Quarter 2001 Monitoring Report* is presented as Figure 2. As shown on the map, the groundwater flow direction, using data from wells associated with the two nearby service stations, was toward the southwest. However, local gradient variations may exist, which may explain elevated analyte concentrations in wells S-2 and S-4 located cross-gradient and upgradient of known potential source areas.

The site appears to be located in the Oakland sub-area of the East Bay Plain Groundwater Basin.[1] As indicated by the California Regional Water Quality Control Board (RWQCB), there are no well-defined aquitards in the sub-area. The Oakland sub-area has existing beneficial uses for municipal, domestic, agricultural, industrial service and industrial procedure water supply. The surface water closest to the site is Oakland's Peralta Creek, located approximately 3,800 feet northwest or crossgradient of the site.

Sediment Lithology: Sandy clay underlies the site from approximately 6 to 10 fbg. Clayey sand with lenses of gravel underlies the sandy clay from approximately 10 to 13 fbg. Sandy clay underlies the clayey sand to the maximum onsite explored depth of 26 fbg.

Chemical Distribution in Soil: Previous subsurface investigations at the site have identified gasoline hydrocarbons and MTBE in areas adjacent to, east, and west of the underground storage tanks (USTs). No significant chemical concentrations have been identified in other areas of the site. Maps and tabulated analytical data for soil samples from investigations performed after 1996 are presented in Attachment A.

The highest TPHg, benzene and MTBE concentrations detected in soil onsite were 1,500 ppm, 9.2 ppm and 2.5 ppm (by EPA method 8020 for TPHg and benzene, and by 8260B for MTBE), respectively, in dispenser samples D-2(2.0) and D-1(2.0) respectively, collected from the eastern dispenser islands on August 26, 1998. Data from previous investigations suggest release sources from the eastern and western dispenser islands and the USTs. TPHg concentrations of 1,300 ppm, but no benzene, have been detected in soil samples collected 11 fbg from the

[1] California Regional Water Quality Control Board (CRWQCB), San Francisco Bay Region, Groundwater Committee, July 1999, *East Bay Plain Groundwater Basin Beneficial Use Evaluation Report.*

downgradient samples ~~were~~ collected in 1993 site well S-3. Soil samples from S-3 were not analyzed for MTBE when the

Chemical Distribution in Groundwater: Elevated concentrations of gasoline hydrocarbons and oxygenates are present in groundwater at the site. ~~During the September 12, 2001 monitoring event, the highest~~ TPHg ~~concentration detected was~~ 32,000 parts per billion (ppb) in S-3. The highest benzene concentration detected during that event was 790 ppb in S-3. ~~The highest MTBE concentration detected at that time was 13,000 ppb MTBE by EPA Method 8260 in tank backfill well BW-~~A. These recent elevated concentrations are higher than previous concentrations in site wells. Cumulative groundwater monitoring results are presented in Attachment B.

Figures 4, 5, 6 and 7 present graphs of MTBE, benzene, and TPHg concentrations in groundwater versus time for wells S-1, S-2, S-3, and S-4, respectively. As well BW-A has only been sampled since 2001, a graph of concentrations versus time is not prepared. Since groundwater monitoring was initiated in 1992, TPHg, BTEX, and MTBE concentrations in site wells have fluctuated. However, short-term concentration trends in S-1 S-2 and S-4, and long-term concentration trends in S-3 have decreased. The ~~current elevated~~ TPHg and MTBE concentrations detected at S-2, S-3, S-4, and BW-A suggest sources from the USTs, eastern dispenser islands, and western dispenser islands (Figure 2).

BP

Coordinated groundwater monitoring and assessment data from the neighboring ~~76 Service Station~~ upgradient of the site, indicates low MTBE concentrations in groundwater up and cross gradient of the 76 Service Station (Figure 2). Coordinated groundwater monitoring and assessment data from the neighboring Chevron service station crossgradient of the site indicate low MTBE concentrations in groundwater downgradient of the site, extending beneath High Street and the adjacent properties southwest of Bond Street. The highest second quarter 2001 concentration of MTBE in a downgradient offsite well was 100 ppb in Chevron's well, C-6. Non detections of MTBE in downgradient Chevron wells C-8 and C-9 demonstrate downgradient definition in groundwater. ? or preferential pathway

REMEDIAL ALTERNATIVES DISCUSSION AND APPROACH

Remedial Objectives

MTBE and gasoline hydrocarbons, including BTEX compounds, are the only known chemicals of concern (COCs) at this site. As discussed above, likely source areas for these COCs include both dispenser island areas and the USTs, since MTBE- and hydrocarbon-impacted soil has been encountered in and around those areas. Groundwater monitoring has shown that the COCs have migrated offsite, although offsite concentrations are relatively low and the downgradient extent of

the COCs has been defined. Given the surface impediments downgradient of the station and the relatively low COC concentrations, capture and remediation of offsite impacted groundwater is not considered practical or necessary. If the fueling equipment and secondary soil sources are removed or substantially mitigated, offsite COC migration will cease and the residual COCs in groundwater will naturally degrade. Therefore, we believe that the primary remedial objective for the site should be to remove or otherwise mitigate the residual COCs in onsite soil and groundwater.

Previous Remedial Approaches

Soil Excavation and Confirmation Sampling: In February 1992, Delta/Bay Builders of Antioch, California removed a waste-oil UST and approximately 62 cubic yards of impacted soil surrounding the UST. No residual analytes, except for low concentrations of lead, were detected in a confirmation soil sample collected at approximately 11 fbg. No significant impediments, adverse soil conditions, or difficulties during excavation were reported.

Soil excavation following underground and aboveground fueling facility removal is a common remedial approach. Removal of accessible impacted soil provides immediate source removal. When groundwater is encountered, a limited quantity of impacted groundwater can also be removed from the subsurface. Since the station will be demolished in its entirety, excavation access to soil in the identified potential source areas is expected to be relatively unhindered. If residual soil impact extends toward the perimeter of the property, a limited amount of source would be left in place so that the stability of adjacent structures is not jeopardized.

ORC Use: Studies have shown that enhanced oxygen availability using ORC can assist the biological degradation of dissolved MTBE in groundwater[2]. Beginning in September 1999, ORC socks were installed in wells S-1, S-2, and BW-A, and have since been exchanged quarterly. The dissolved oxygen released from the ORC socks may have contributed to decreased concentrations of MTBE and benzene in well S-4. However, given the current elevated COC concentrations and the likelihood of secondary sources in the dispenser and UST areas, ORC alone is not considered to be an economically feasible remedial alternative.

Dual-Phase Vapor Extraction (DVE): DVE is the process of applying high vacuum through an airtight well seal to simultaneously extract soil vapors from the vadose zone and enhance groundwater extraction from the saturated zone. The vacuum created by DVE can increase the groundwater yield from wells completed in low permeability formations. In addition, residual

[2] Methyl tert-Butyl Ether Biodegradation by Indigenous Aquifer Microorganisms under Natural and Artificial Oxic Conditions" Landmeyer, J., Chapelle,F., Herlong, H., and Bradley, P; Environmental Science and Technology Volume 35, No. 6, 2001, American Chemical Society.

MTBE vapors in soil within the influence of the vacuum will be removed. Mobile DVE uses a vacuum truck to create the vacuum and contain extracted fluids.

Between April 2001 and September 2001, monthly mobile DVE was performed at the site using well S-2 and backfill well BW-A. After extracting groundwater and vapors from S-2 for the majority of each 8-hour event, the remaining capacity of the truck was typically filled with groundwater from well BW-A. DVE efforts have extracted approximately 10,898 gallons of groundwater from wells S-2 and BW-A, removing an estimated 9.02 pounds of TPHg and 0.79 pounds of MTBE (Tables 1 and 2).

As indicated on Figure 5, TPHg, benzene, and MTBE concentrations in S-2 decreased following commencement of DVE at the site. However, TPHg and MTBE concentrations remain elevated in S-2. This may be due to the lack of observed radius of influence from S-2 to outlying site wells, caused by low permeability sediments, and/or the likely persistence of residual COCs in soil. Given these observations, neither mobile nor fixed-system DVE is considered to be a viable remedial alternative for the site.

RECOMMENDATIONS FOR REMEDIAL ACTION

Paradiso is scheduled to remove all site equipment and facilities in November of 2001. Following removal of the underground facilities, Cambria recommends additional onsite over-excavation to substantially remove residual impacted soils from within the property boundaries. Over-excavation should be guided by field observations of soil conditions (soil discoloration, sheen on moist soil, odor) and by field screening using a photo-ionization detector (PID) or equivalent instrument.

Groundwater will likely be encountered during over-excavation activities. As much as is practical, we recommend the groundwater be removed from the excavation and ultimately disposed of offsite.

Based on previous site assessment data, possible limits of the excavation bottom are shown on Figure 3. Cambria proposes continuing excavation activities until field screening of in-situ soils indicates less than 1,000 ppm TPHg as measured by the PID or until physical constraints require excavation termination. Confirmation soil samples will be collected when excavation of an area is complete. Soil and groundwater samples will be collected according to Cambria's "Standard Operating Procedures for Tank Removal and Excavation Sampling" (Attachment C).

Impacted soil will be stockpiled and covered with visqueen from the time it is over-excavated until it is removed for disposal. The construction contractor, Paradiso, will be responsible for

maintaining the cover over the stockpiled soil and re-covering if necessary. It is expected that the stockpiled soil will ultimately be transported to Forward landfill of Manteca, California for proper disposal.

Once excavation activities have ceased, Cambria recommends placing ORC at the base of the excavation to enhance biological degradation of residual COCs in soil and groundwater. Clean backfill will be placed back in the excavation and compacted.

Finally, we recommend that continued quarterly groundwater monitoring track the subsequent natural attenuation process. A report providing details of the UST and fueling facility removal and over-excavation activities will be provided following completion of the site work.

Proposed Cleanup Levels

Proposed cleanup levels are included in this CAP as required by Section 2725(d)(3) and (g)(1) of California's Underground Storage Tank Regulations. As stated above, the primary COCs at the site are TPHg, BTEX and MTBE. As established by the San Francisco Bay RWQCB *Water Quality Control Plan* (June 21, 1995), the current beneficial uses for the groundwater in the site area include municipal/drinking water. Given the established beneficial uses, the proposed cleanup levels for COCs in groundwater at the site are presented in the table below.

drinking water RWQCB 100 not dw = 640

COC	Proposed Cleanup Level	Cleanup Level Source
TPHg	1,000 ppb	per California LUFT manual, October 18, 1989
Benzene	1.0 ppb	Primary MCL per 22 CCR §64444 (1-31-01)
Toluene	150 ppb	Primary MCL per 22 CCR §64444 (1-31-01)
Ethylbenzene	700 ppb	Primary MCL per 22 CCR §64444 (1-31-01)
Xylenes	1,750 ppb	Primary MCL per 22 CCR §64444 (1-31-01)
MTBE	13 ppb	Primary MCL per 22 CCR §64444 (1-31-01)

CCR = California Code of Regulations
ppb = parts per billion
LUFT = Leaking Underground Fuel Tank
MCL = maximum contaminant level
SWRCB = State Water Resources Control Board

The remedial objective stated previously is to remove, or otherwise mitigate, the residual COCs in onsite soil and groundwater. Excavation and de-watering should continue as long as practical until it is determined that offsite migration is substantially mitigated and that residual COCs will not pose a significant risk to potential receptors. However, actively remediating to the cleanup levels presented in the table above is not practical or necessary. When it is determined that no significant risk to receptors exists and that offsite migration is mitigated, excavation and de-

HOLD OUT

watering should cease, and ORC should be placed in the excavation and monitoring wells. Following termination of active remediation, groundwater-monitoring results should be used to estimate the rate of natural attenuation of the COCs and the approximate time when the established cleanup levels will be met.

CLOSING

We appreciate your continued assistance with this project. Please call James Loetterle at (510) 420-3336 if you have any questions or comments.

Sincerely,
Cambria Environmental Technology, Inc.

James Loetterle
Project Geologist

Stephan A. Bork, C.E.G., C.HG.
Associate Hydrogeologist

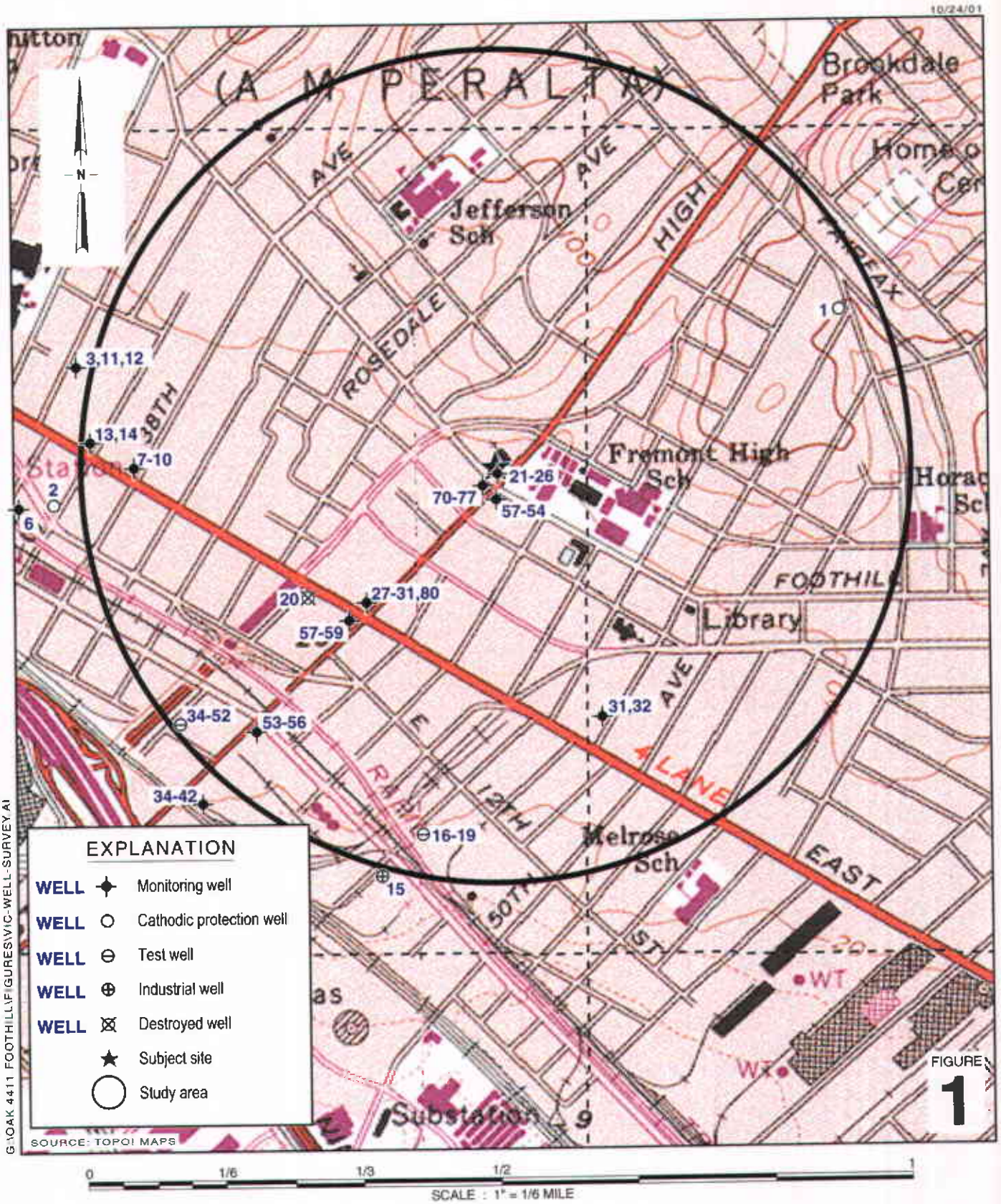
REGISTERED GEOLOGIST
STEPHAN A. BORK
No. EG 2058
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Figures:
1 - Vicinity/Area Well Survey Map
2 - Groundwater Elevation Contour Map
3 - Site Map with Soil Sample and Utility Locations, and Proposed Limits of Excavation
4 - MTBE, Benzene, and TPHg Concentrations vs. Time - Well S-1
5 - MTBE, Benzene, and TPHg Concentrations vs. Time - Well S-2
6 - MTBE, Benzene, and TPHg Concentrations vs. Time - Well S-3
7 - MTBE, Benzene, and TPHg Concentrations vs. Time - Well S-4

Tables:
1 - Groundwater Extraction – Mass Removal Data
2 - Vapor Extraction – Mass Removal Data

Attachments:
A - Cumulative Soil Analytical Data
B - Cumulative Groundwater Monitoring Results
C - Standard Operating Procedures for Tank Removal and Excavation Sampling

cc: Ms. Karen Petryna, Equiva Services LLC, PO Box 7869, Burbank, CA, 91510-7869
Alan Gibbs, Levine Fricke, 4080 Cabitt Stallman South Road, Suite 100, Granite Bay, CA, 95756



Shell-branded Service Station
4411 Foothill Boulevard
Oakland, California
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Vicinity / Area Well Survey Map

(1/2-Mile Radius)

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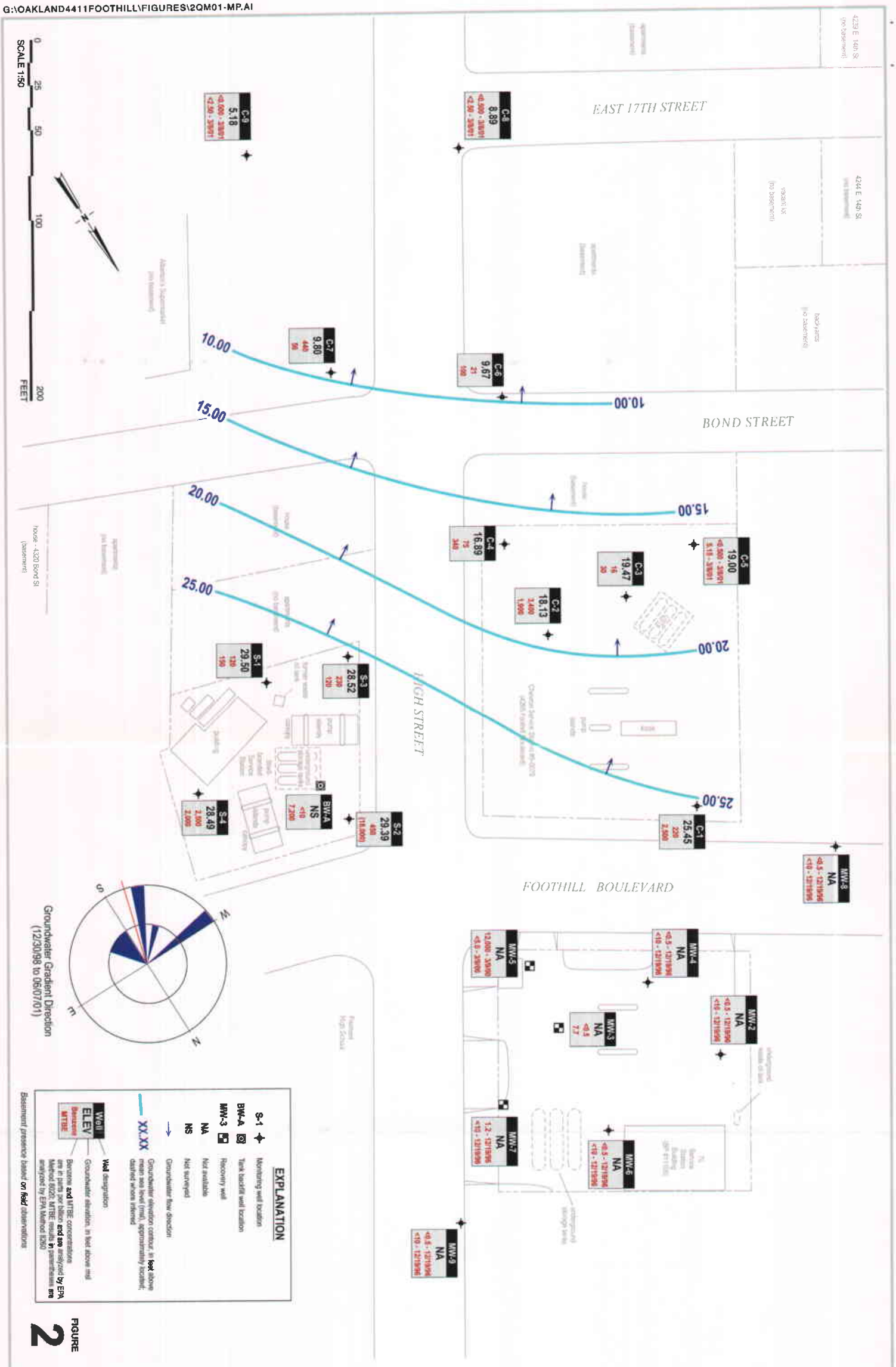

FIGURE 2

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Shell-branded Service Station
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Groundwater Elevation Contour Map

June 7, 2001

10/25/01

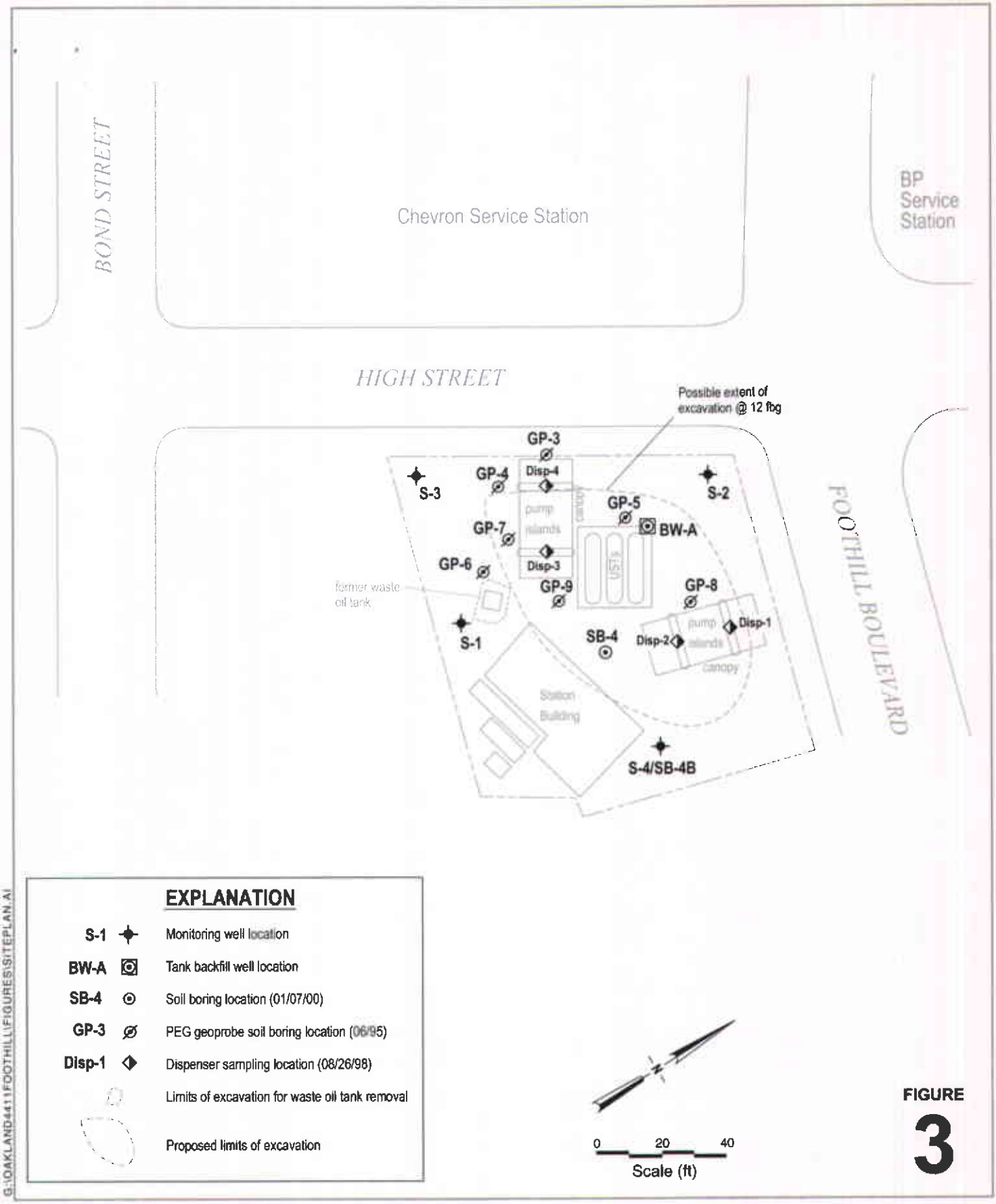

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FIGURE
3

Shell-branded Service Station
4411 Foothill Boulevard
Oakland, California
Incident #98995746

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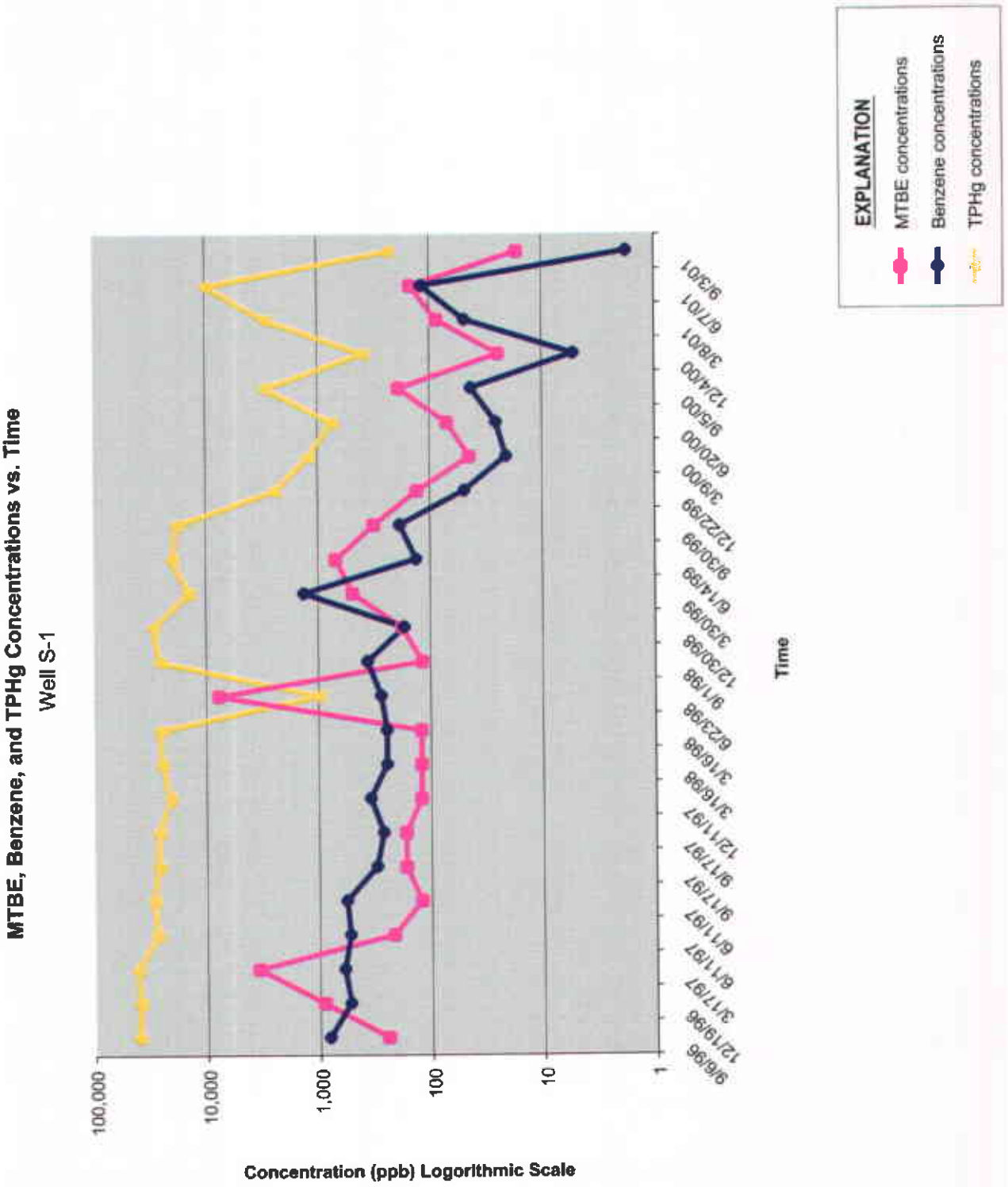
Site Map with Soil Sample and Utility Locations and Proposed Limits of Excavation

10/24/01



FIGURE

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Shell-branded Service Station
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Incident #98995746

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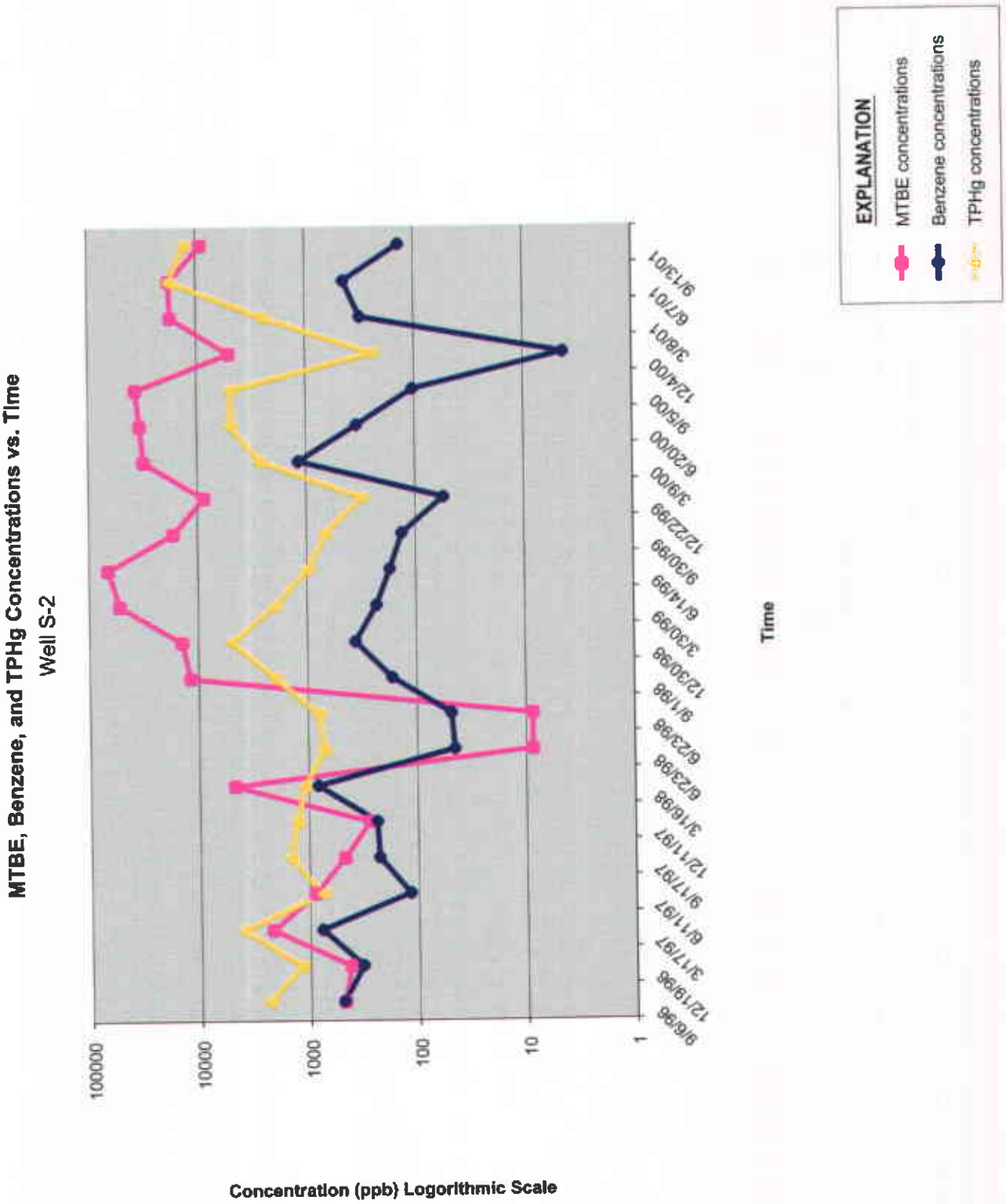
MTBE, Benzene, and TPHg Concentrations vs. Time
Well S-1

10/24/01



FIGURE

5

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Shell-branded Service Station
4411 Foothill Boulevard
Oakland, California
Incident #98995746

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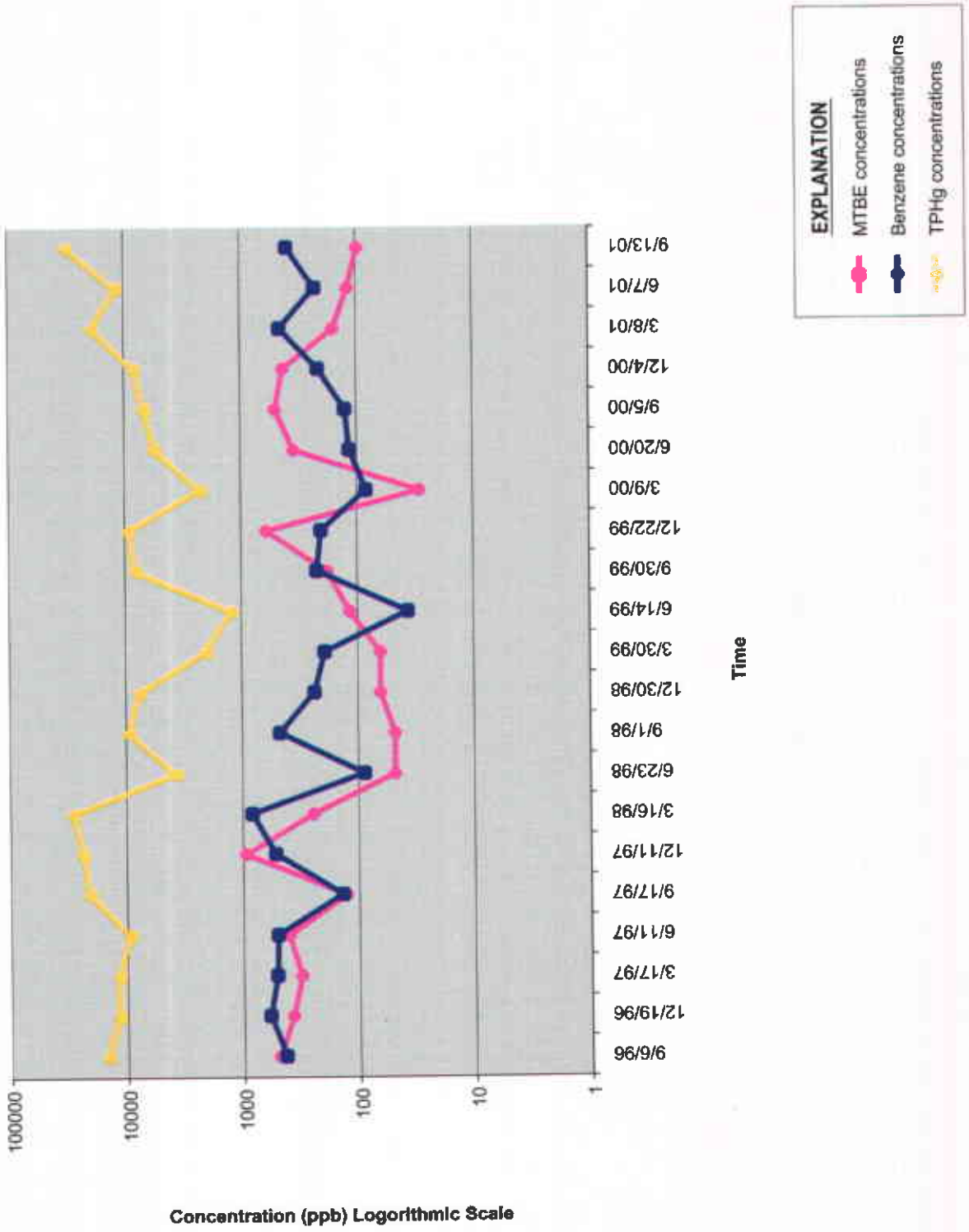
MTBE, Benzene, and TPHg Concentrations vs. Time
Well S-2



FIGURE

6

Shell-branded Service Station
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MTBE, Benzene, and TPHg Concentrations vs. Time
Well S-3

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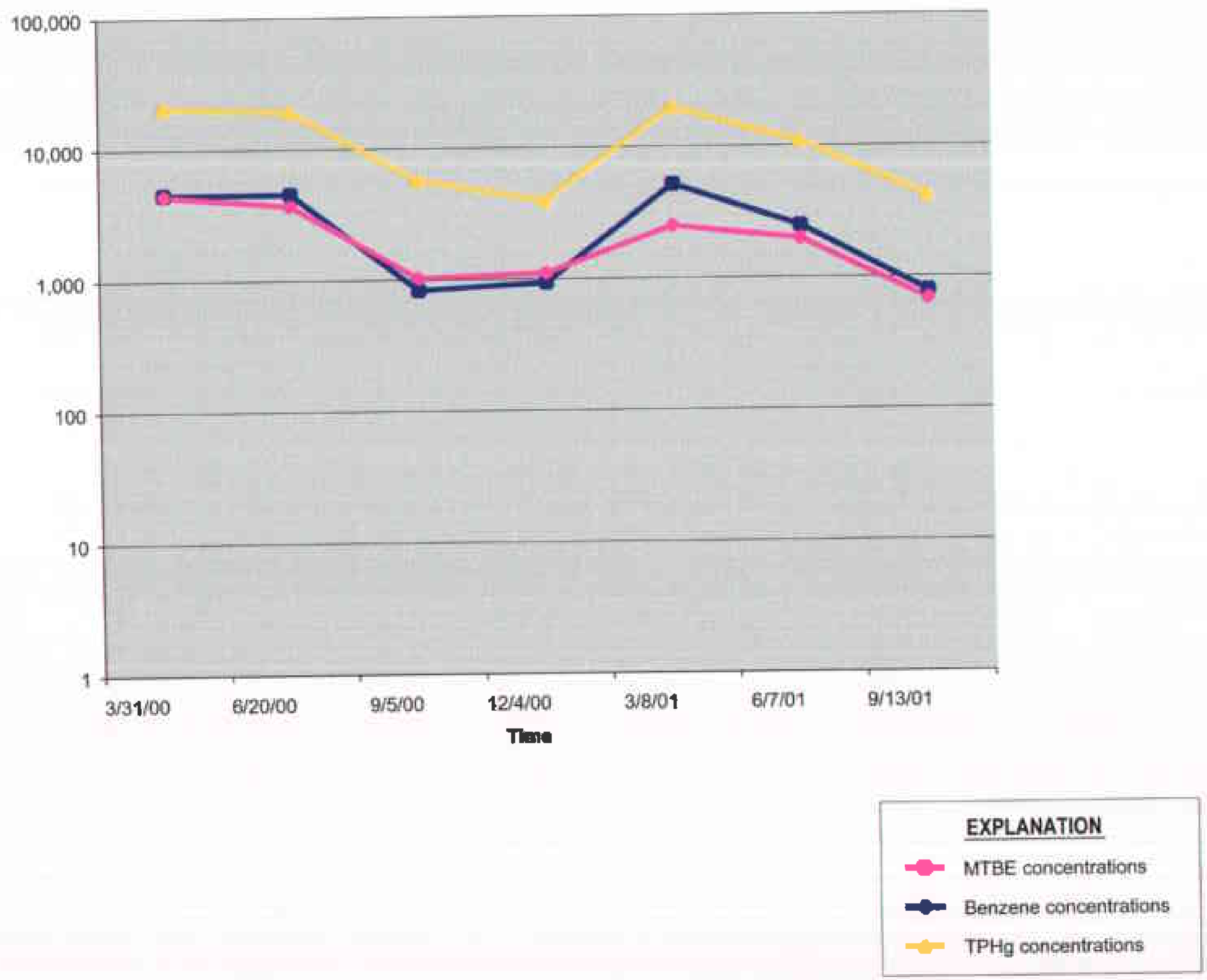
MTBE, Benzene, and TPHg Concentrations vs. Time
Well S-4



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MTBE, Benzene, and TPHg Concentrations vs. Time
Well S-4

FIGURE
7

10/24/01

Table 1: Groundwater Extraction - Mass Removal Data - Shell-branded Service Station, Incident #98995746, 4411 Foothill Boulevard, Oakland, California

Date Purged	Well ID	Volume Pumped (gal)	Cumulative Volume Pumped (gal)	Date Sampled	TPPH Concentration (ppb)	TPPH Removed (pounds)	TPPH Removed To Date (pounds)	Benzene Concentration (ppb)	Benzene Removed (pounds)	Benzene Removed To Date (pounds)	MTBE Concentration (ppb)	MTBE Removed (pounds)	MTBE Removed To Date (pounds)
					TPPH			**Benzene**			**MTBE**		
04/30/01	S-2	300	300	03/08/01	<2,500	0.00313	0.00313	318	0.00080	0.00080	**17,500**	0.04381	0.04381
05/23/01	S-2	400	700	03/08/01	<2,500	0.00417	0.00730	318	0.00106	0.00186	**17,500**	0.05841	0.10222
06/18/01	S-2	475	1,175	06/07/01	18,000	0.07134	0.07865	450	0.00178	0.00364	**18,000**	0.07134	0.17356
07/23/01	S-2	500	1,675	06/07/01	18,000	0.07510	0.15374	450	0.00188	0.00552	**18,000**	0.07510	0.24866
08/20/01	S-2	300	1,975	06/07/01	18,000	0.04506	0.19880	450	0.00113	0.00665	**18,000**	0.04506	0.29372
09/18/01	S-2	500	2,475	06/07/01	18,000	0.07510	0.27390	450	0.00188	0.00852	**18,000**	0.07510	0.36882
04/21/00	BW-A	2,013	2,013	03/08/01	<2,500	0.02100	0.02100	46.6	0.00078	0.00078	**11,700**	0.19653	0.19653
04/28/00	BW-A	2,000	4,013	03/08/01	<2,500	0.02086	0.04186	46.6	0.00078	0.00156	**11,700**	0.19526	0.39179
06/18/01	BW-A	2,000	6,013	06/07/01	1,100	0.01836	0.06021	<10	0.00008	0.00164	7,200	0.12016	0.51194
07/23/01	BW-A	10	6,023	06/07/01	1,100	0.00009	0.06031	<10	0.00000	0.00164	7,200	0.00060	0.51254
08/20/01	BW-A	100	6,123	06/07/01	1,100	0.00092	0.06122	<10	0.00000	0.00165	7,200	0.00601	0.51855
09/18/01	BW-A	2,300	8,423	06/07/01	1,100	0.02111	0.08234	<10	0.00010	0.00174	7,200	0.13818	0.65674
Total Gallons Extracted:			**10,898**		**Total Pounds Removed:**		**0.35624**			**0.01027**			**1.02556**
					Total Gallons Removed:		**0.05840**			**0.00141**			**0.16541**

Abbreviations & Notes:

TPPH = Total purgeable hydrocarbons as gasoline
MtBE = Methyl tert-butyl ether
ppb = Parts per billion
gal = Gallon
Mass removed based on the formula: volume extracted (gal) x Concentration (µg/L) x (g/10^6µg) x (pound/453.6g) x (3.785 L/gal)
Volume removal data based on the formula: density (in gms/cc) x 9.339 (ccxlbs/gmsxgals)
TPPH, benzene analyzed by EPA Method 8015/8020
MTBE analyzed by EPA Method 8260 in bold font, all other MTBE analyzed by EPA Method 8020
Concentrations based on most recent groundwater monitoring results
If concentration is less than the laboratory detection limit, one half of the detection limit concentration is used in the mass removal calculation
Groundwater extracted by vacuum trucks provided by ACTI. Water disposed of at a Martinez Refinery.

Table 2: Vapor Extraction - Mass Removal Data - Shell-branded Service Station, Incident #98995746, 4411 Foothill Boulevard, Oakland, Californ

							TPPH		Benzene		MTBE	
		Interval Hours of	System Flow	Hydrocarbon Concentrations			TPHg Removal	Cumulative TPHg	Benzene Removal	Cumulative Benzene	MTBE Removal	Cumulative MTBE
Date	Well ID	Operation (hours)	Rate (CFM)	TPHg	Benzene	MTBE	Rate (#/hour)	Removed (#)	Rate (#/hour)	Removed (#)	Rate (#/hour)	Removed (#)
				(Concentrations in ppmv)								
04/30/01	S-2	6.50	1.2	2,500	20	120	0.040	0.261	0.000	0.002	0.002	0.013
05/23/01	S-2	7.00	5.0	3,000	60	38	0.201	1.664	0.004	0.027	0.003	0.031
06/18/01	S-2	6.50	2.8	4,400	39	46	0.165	2.735	0.001	0.036	0.002	0.042
07/23/01	S-2	7.00	3.6	4,500	39	34	0.217	4.251	0.002	0.048	0.002	0.054
08/20/01*	S-2	6.75	3.6	610	7.8	7.4	0.029	4.449	0.000	0.050	0.000	0.057
09/18/01	S-2	6.00	8.9	5,900	47	46.0	0.702	8.661	0.005	0.081	0.006	0.090
Total Pounds Removed:							**TPHg =**	**8.661**	**Benzene =**	**0.081**	**MTBE =**	**0.090**

Abbreviations and Notes:

CFM = Cubic feet per minute

TPHg = Total petroleum hydrocarbons as gasoline (C6-C12) by modified EPA Method 8015 in 1 liter tedlar bag samples

ppmv = Parts per million by volume

= Pounds

TPHG, Benzene, and MTBE analyzed by EPA Method8260 in 1 liter tedlar bag samples

TPHg / Benzene / MTBE removal rate = Rate based on Bay Area Air Quality Management District's Manual of Procedures for Soil Vapor Extraction dated July 17, 1991.

(Rate = Concentration (ppmv) x system flow rate (cfm) x (1lb-mole/386ft3) x molecular weight (86 lb/lb-mole for TPHg, 78 lb/lb-mole for benzene, 88 lb/lb-mole for MTBE) x 60 min/hour x 1/1,000,000)

* = System flow rate estimated.

Cumulative TPHg / Benzene / MTBE removal = Previous removal rate multiplied by the hour-interval of operation plus the previous total

If concentration is less than the laboratory detection limit, one half of the detection limit concentration is used in the mass removal calculation.

ATTACHMENT A

Cumulative Soil Analytical Data

Table 1. Soil Analytic Data - Shell-branded Service Station - Incident # 98995744, 4411 Foothill Blvd., Oakland, California

Sample ID	Depth (feet)	TPHd	TPHg	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes
			← (Concentrations reported in mg/kg) →					
January 7, 2000								
SB-4-5.5	5.5	<1.0	<1.0	<0.025	<0.005	<0.005	<0.005	<0.005
SB-4-9.0	9.0	244.0	786	<1.25	2.27	1.68	8.1	26.5
SB-4-16.0	16.0	209.0	294	0.893	1.50	4.35	3.88	15.7
SB-4-19.5	19.5	<1.0	2.08	<0.025	0.212	0.0168	0.0168	0.0167
SB-4-24.5	24.5	<1.0	<1.0	<0.025	0.00724	<0.005	<0.005	<0.005
SB-4B-5.5	5.5	27.2	28.2	0.0603 (0.0345)	0.0176	<0.01	0.0408	0.0738
SB-4B-10.5	10.5	<5.0	6.19	<0.125	0.0696	<0.025	0.0915	<0.025
SB-4B-19.0	19.0	<5.0	<1.0	0.233 (0.0549)	0.0445	<0.005	<0.005	<0.005

Abbreviations and Notes:

TPHg = Total petroleum hydrocarbons as gasoline by modified EPA Method 8015.
TPHd = Total petroleum hydrocarbons as diesel by modified EPA Method 8015.
MTBE = Methyl tert-butyl ether by EPA Method 8020, (0.0345) = MTBE by EPA Method 8260.
Benzene, ethylbenzene, toluene, xylenes by EPA Method 8020.
ppm = parts per million
<n = Below detection limit of n ppm

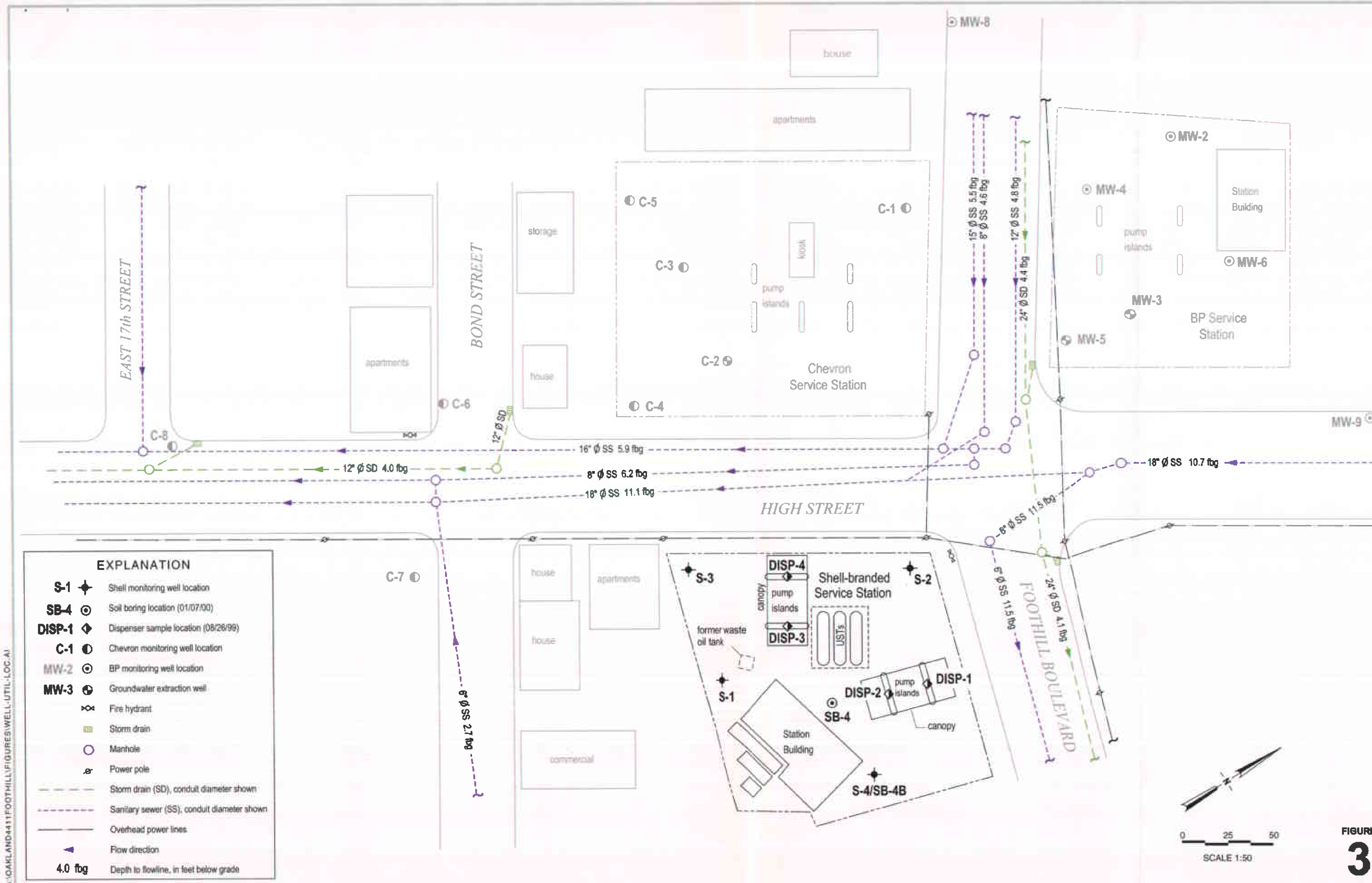


FIGURE
3

Soil Boring, Well, and Utility Location Map

CAMBRIA

Shell-branded Service Station
4411 Foothill Boulevard
Oakland, California
Incident #98995746

Table 1. Dispenser Sample Analytical Data - Shell-branded Service Station - WIC #204-0461-0501, 4411 Foothill Blvd., Oakland, California

Date	Sample ID	Depth (feet)	TPHg	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes
			← (Concentrations reported in milligrams per kilogram) →					
8/26/98	D-1(2.0)	2.0	1,100	13(2.5)	9.2	4.1	15	61
8/26/98	D-2(2.0)	2.0	1,500	<6.2	3.6	4.3	7.1	21
8/26/98	D-3(2.0)	2.0	160	1.4	1.3	0.61	2.9	2.0
8/26/98	D-4(2.0)	2.0	180	0.83	0.29	0.17	0.10	0.43

Abbreviations and Notes:

TPHg = Total petroleum hydrocarbons as gasoline by modified EPA Method 8015.

MTBE = Methyl tert-butyl ether by EPA Method 8020. Result in parentheses represents MTBE by EPA 8260.

Benzene, ethylbenzene, toluene, and total xylenes by EPA Method 8020.

<n= Below detection limit of n milligrams per kilograms

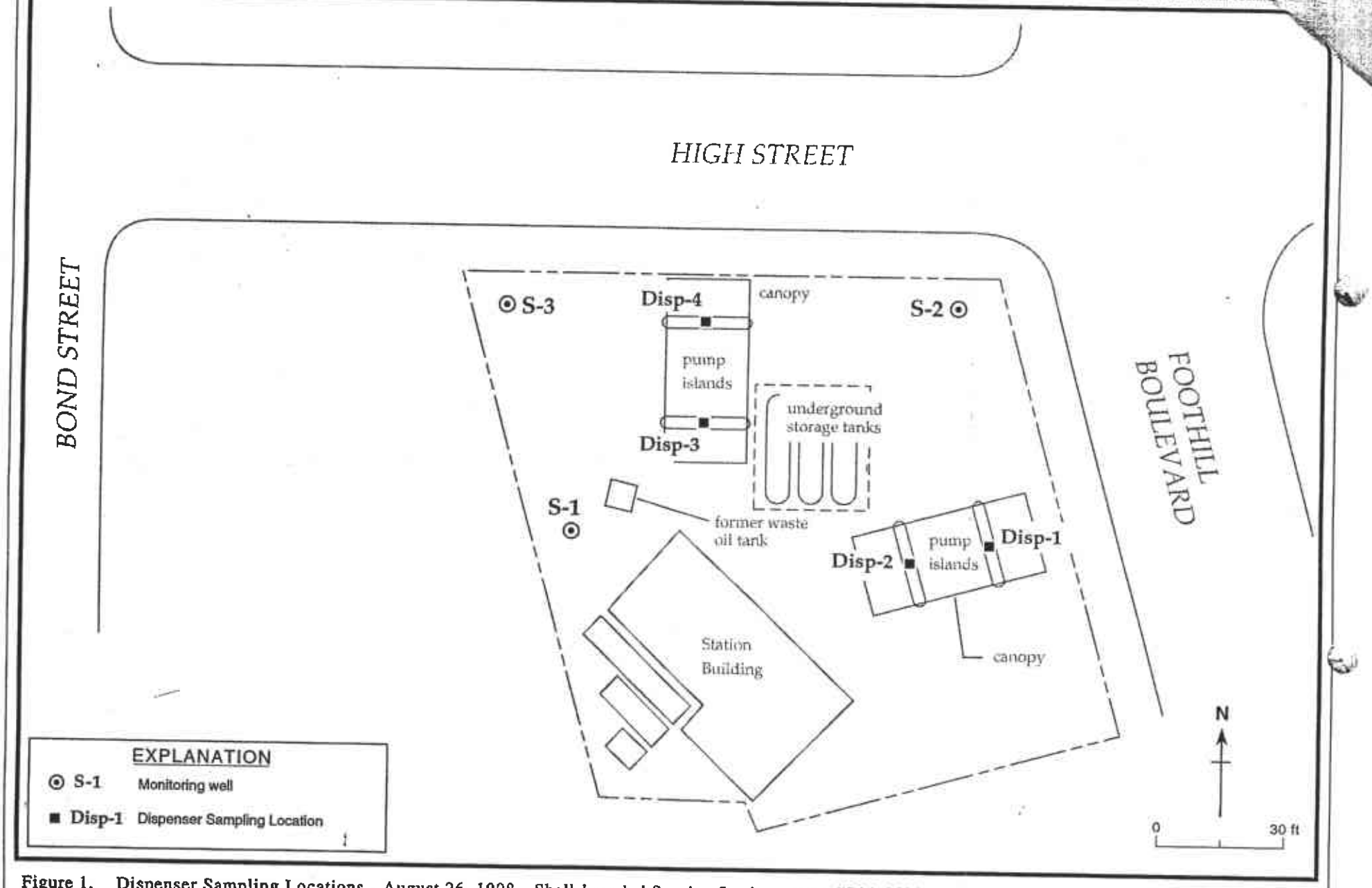


Figure 1. Dispenser Sampling Locations - August 26, 1998 - Shell-branded Service Station - WIC #204-5508-3400, 4411 Foothill Boulevard, Oakland, California

S:\OAK4411\FIGURES\D-SAMP.AI

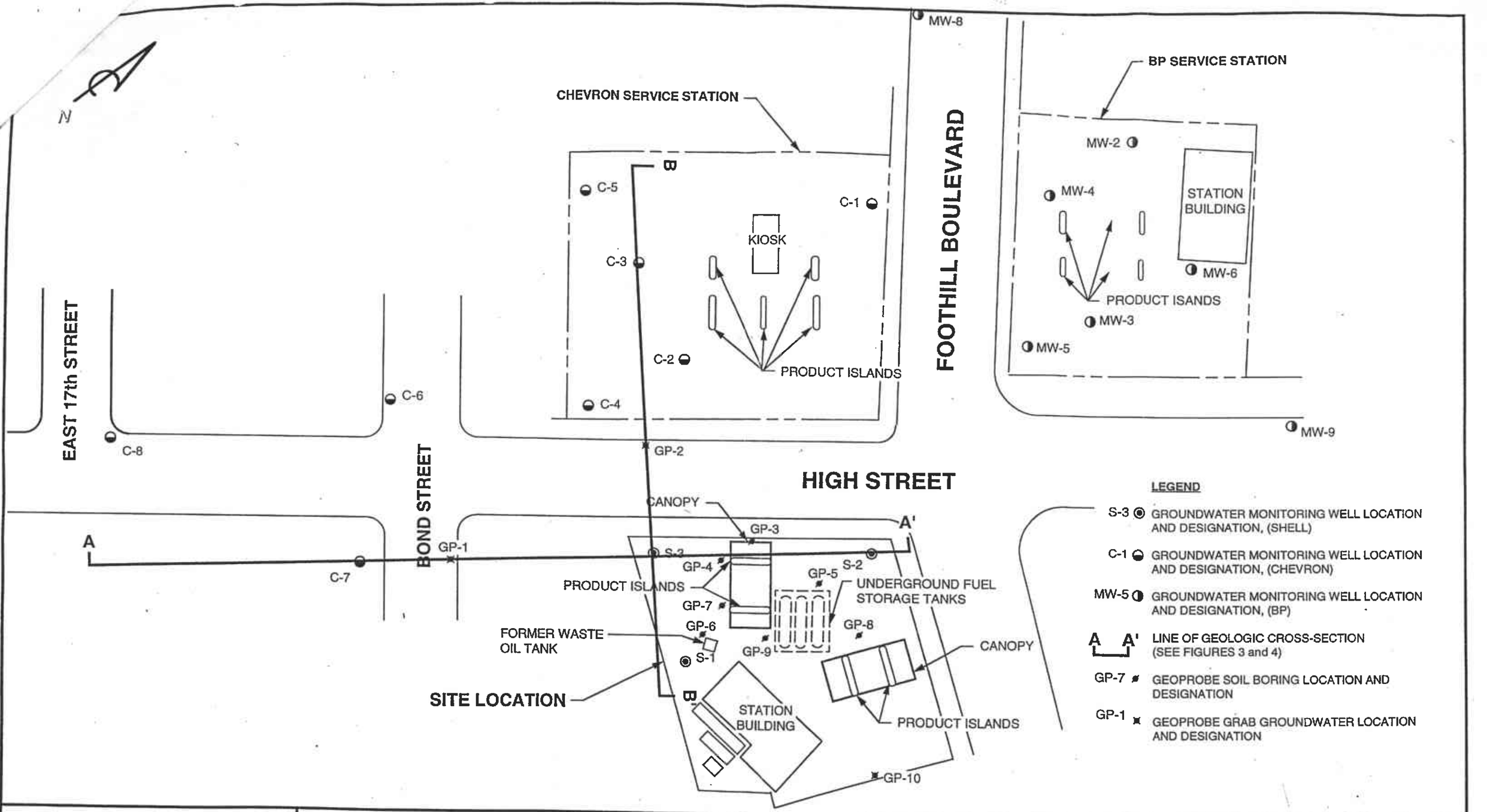
10/20/98

Table 1
Soil Analytical Data
Total Petroleum Hydrocarbons
(TPPH, BTEX Compounds, and TEPH)

Shell Service Station
4411 Foothill Boulevard at High Street
Oakland, California

Sample ID	Sample Depth (feet)	Date Sampled	TPPH (C6-C12) (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-benzene (ppm)	Xylenes (ppm)	TEPH (C9-C24) (ppm)
GP-3	8	06/28/95	ND	0.006	ND	ND	ND	2.0
	12		8.4	0.13	0.029	0.14	0.36	3.7
GP-4	8	06/28/95	7.2	0.098	0.009	0.054	0.13	2.9
	12		280	ND	3.1	3.9	25	46
GP-5	8	06/28/95	ND	ND	ND	ND	ND	ND
	12		ND	ND	ND	ND	ND	1.2
GP-6	8	06/27/95	87	ND	1.3	2.2	6.6	7.3
	12		39	ND	ND	0.14	0.29	5.4
GP-7	9.5	06/27/95	ND	ND	ND	0.15	0.017	180
	12		840	ND	6.0	20	98	43
GP-8	8	06/28/95	ND	ND	ND	ND	ND	ND
	12		86	ND	ND	1.0	2.0	15
GP-9	8	06/28/95	190	ND	ND	3.6	13	380
	12		760	ND	0.71	17	76	41

TPPH = Total purgeable petroleum hydrocarbons
TEPH = Total extractable petroleum hydrocarbons
ppm = Parts per million
ND = Not detected



PACIFIC ENVIRONMENTAL GROUP, INC.

SCALE
0 50 100 FEET

SHELL SERVICE STATION
4411 Foothill Boulevard at High Street
Oakland, California

GEOPROBE LOCATION MAP

FIGURE: 2
PROJECT: 305-131.1B

09/11/95

TABLE 1

SOIL ANALYTICAL DATA

EXCAVATION AND STOCKPILE

SAMPLE #	DEPTH (FT')	SAMPLE DATE	ANALYZED DATE	TPH-G (PPM)	BENZENE (PPM)	TOLUENE (PPM)	ETHYLBENZENE (PPM)	XYLENES (PPM)	TPH-D (PPM)	O&G (PPM)	TOTAL LEAD PPM
SW-1	11	05-Feb-92	21-Feb-92	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<1.0	<30	6.7
SWS-1A-D		05-Feb-92	21-Feb-92	5.2	0.011	0.0080	0.012	0.018	14	130	

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline
TPH-D = Total Petroleum Hydrocarbons calculated as Diesel
O&G = Oil & Grease
PPM = Parts Per Million
SW = Excavation sample
SWS = Stockpile sample

Table 1

SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS

Shell Service Station - WIC#204-6852-1008
4411 Foothill Boulevard, Oakland, California

Well Number	Sample Depth (feet)	Sampling Date	TPHmo (ppm)	TPHd (ppm)	TPHg (ppm)	B (ppm)	T (ppm)	E (ppm)	X (ppm)
S-1	6.0	11/24/92	<1.0	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005
	11.0	11/24/92	390	180	110	0.45	<0.005	2.2	8
	16.0	11/24/92	<1.0	<1.0	2.8	<0.050	0.51	0.097	0.50
	21.0	11/24/92	<1.0	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005
	26.0	11/24/92	<1.0	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005
S-2	6	5/21/93	NT	<10	<0.5	<0.005	<0.005	<0.005	<0.005
	10.5	5/21/93	NT	<10	95	<0.005	<0.005	0.52	0.56
	15	5/21/93	NT	<10	<0.5	<0.005	<0.005	<0.005	0.013
S-3	6.5	5/21/93	NT	<10	<0.5	<0.005	<0.005	<0.005	<0.005
	11	5/21/93	NT	36	1,300	<0.005	<0.005	35	200
	15	5/21/93	NT	<10	<0.5	<0.005	0.019	0.020	0.11

Notes:

TPHd: Total petroleum hydrocarbons as diesel by EPA Method 8015 (modified)
TPHg: Total petroleum hydrocarbons as gasoline by EPA Method 8015 (modified)
BTEX: Benzene, toluene, ethylbenzene and total xylenes by EPA Method 8020 (modified)
NT: Not tested

Table 1

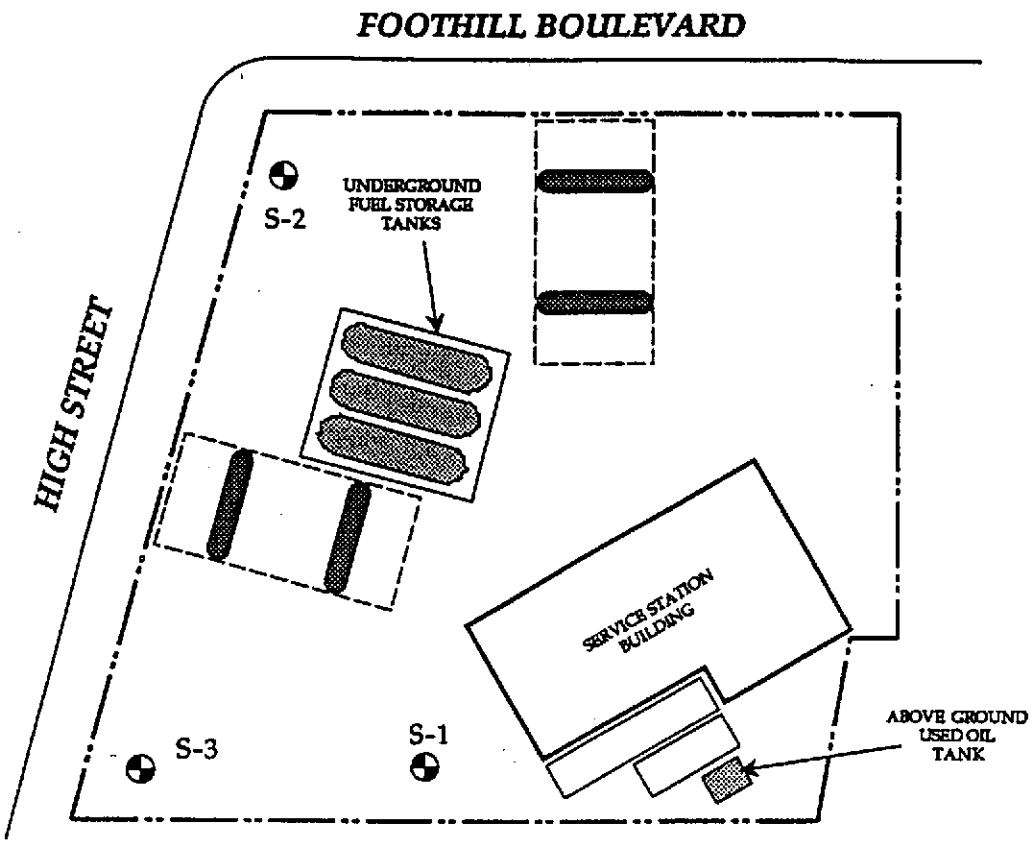
SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS

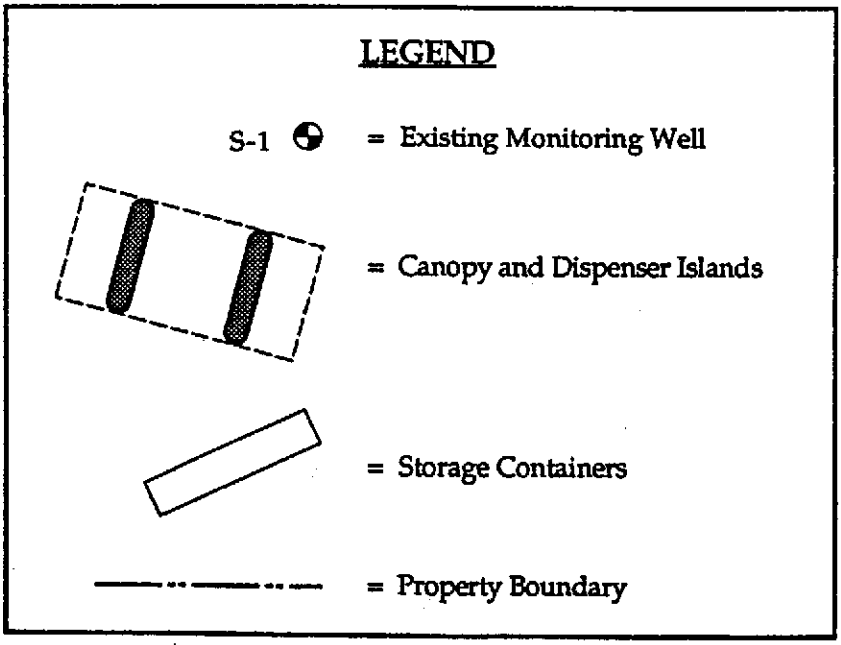
Shell Service Station - WIC#204-6852-1008
4411 Foothill Boulevard, Oakland, California

Well Number	Sample Depth (feet)	Sampling Date	TPHmo (ppm)	TPHd (ppm)	TPHg (ppm)	B (ppm)	T (ppm)	E (ppm)	X (ppm)
S-1	6.0	11/24/92	<1.0	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005
	11.0	11/24/92	390	180	110	0.45	<0.005	2.2	8
	16.0	11/24/92	<1.0	<1.0	2.8	<0.050	0.51	0.097	0.50
	21.0	11/24/92	<1.0	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005
	26.0	11/24/92	<1.0	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005
S-2	6	5/21/93	NT	<10	<0.5	<0.005	<0.005	<0.005	<0.005
	10.5	5/21/93	NT	<10	95	<0.005	<0.005	0.52	0.56
	15	5/21/93	NT	<10	<0.5	<0.005	<0.005	<0.005	0.013
S-3	6.5	5/21/93	NT	<10	<0.5	<0.005	<0.005	<0.005	<0.005
	11	5/21/93	NT	36	1,300	<0.005	<0.005	35	200
	15	5/21/93	NT	<10	<0.5	<0.005	0.019	0.020	0.11

Notes:

TPHd : Total petroleum hydrocarbons as diesel by EPA Method 8015 (modified)
TPHg : Total petroleum hydrocarbons as gasoline by EPA Method 8015 (modified)
BTEX : Benzene, toluene, ethylbenzene and total xylenes by EPA Method 8020 (modified)
NT : Not tested





HYDR-ENVIRONMENTAL TECHNOLOGIES, INC.	**SITE PLAN** Shell Service Station 4411 Foothill Boulevard Oakland, California WIC #204-5508-3400	Figure 2 12-010 6/93

ATTACHMENT B

Cumulative Groundwater Monitoring Results

WELL CONCENTRATIONS
Shell-branded Service Station
4411 Foothill Boulevard
Oakland, CA
Wic #204-5508-3400

Well ID	Date	TPPH (ug/L)	TEPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8020 (ug/L)	MTBE 8260 (ug/L)	TOB (MSL)	Depth to Water (ft.)	GW Elevation (MSL)	DO Reading (ppm)
S-1	12/18/1992	41,000	NA	3,100	1,100	1,200	8,700	NA	NA	38.31	9.06	NA	NA
S-1	05/26/1993	39,000	6,000	1,300	4,700	1,500	7,800	NA	NA	38.31	NA	NA	NA
S-1	05/28/1993	NA	NA	NA	NA	NA	NA	NA	NA	38.31	12.13	26.18	NA
S-1	06/03/1993	NA	NA	NA	NA	NA	NA	NA	NA	38.31	8.89	29.42	NA
S-1	06/08/1993	NA	NA	NA	NA	NA	NA	NA	NA	38.31	8.80	29.51	NA
S-1	09/21/1993	34,000	5,900	480	5,000	3,800	18,000	NA	NA	38.31	10.40	27.91	NA
S-1	12/14/1993	25,000	13,000	1,100	5,000	2,200	11,000	NA	NA	38.31	9.66	28.65	NA
S-1	03/17/1994	57,000	1,600	1,300	5,400	2,100	11,000	NA	NA	38.31	8.20	30.11	NA
S-1	06/16/1994	57,000	3,000	1,600	6,000	2,000	13,000	NA	NA	38.31	9.41	28.90	NA
S-1	09/22/1994	39,000	ND	1,300	2,100	1,500	7,100	NA	NA	38.31	11.13	27.18	NA
S-1 a	12/15/1994	30,000	3,100	1,100	4,700	1,600	10,000	NA	NA	38.31	7.15	31.16	NA
S-1 a, b	03/30/1995	30,000	3,100	1,400	4,000	1,500	11,000	NA	NA	38.31	6.09	32.22	NA
S-1	06/2019/95	28,000	2,100	1,100	2,300	1,100	8,300	NA	NA	38.31	7.30	31.01	NA
S-1	09/20/1995	40,000	2,600	840	3,600	1,300	8,600	NA	NA	38.31	10.02	28.29	NA
S-1 a	12/06/1995	38,000	6,400	920	3,200	1,500	9,400	NA	NA	38.31	11.64	26.67	NA
S-1	03/21/1996	48,000	NA	700	4,200	1,100	8,600	NA	NA	38.31	6.87	31.44	NA
S-1	09/06/1996	41,000	4,100	830	2,600	2,100	12,000	<250	NA	38.31	10.50	27.81	NA
S-1	12/19/1996	40,000	2,500	540	3,100	1,900	9,800	920	NA	38.31	8.24	30.07	NA
S-1	03/17/1997	42,000	4,700	610	2,700	1,700	11,000	3,500	NA	38.31	7.26	31.05	NA
S-1	06/11/1997	28,000	4,000	540	960	1,300	5,300	220	NA	38.31	10.69	27.62	NA
S-1 (D)	06/11/1997	30,000	3,900	580	1,000	1,400	5,400	<125	NA	38.31	10.69	27.62	NA
S-1	09/17/1997	27,000	4,400	310	1,200	1,900	9,000	170	NA	38.31	10.26	28.05	NA
S-1 (D)	09/17/1997	27,000	4,400	270	1,200	1,900	9,000	170	NA	38.31	10.26	28.05	NA
S-1	12/11/1997	21,000	3,400	350	820	1,500	6,500	<125	NA	38.31	6.96	31.35	NA
S-1	03/16/1998	25,000	2,500	250	820	670	5,000	<125	NA	38.31	6.00	32.31	NA
S-1 (D)	03/16/1998	26,000	NA	250	840	720	5,100	<125	NA	38.31	6.00	32.31	5.3/3.7
S-1	06/23/1998	<1,000	230	280	14	23	15	6,100	7,800	38.31	6.31	32.00	3.8/2.4
S-1	09/01/1998	26,000	2,300	370	620	1,300	33	1,400	120	38.31	9.17	29.14	1.4/2.6
S-1	12/30/1998	29,900	1,970	174	732	1,680	5,740	182	NA	38.31	8.99	29.32	1.6/2.0

WELL CONCENTRATIONS
Shell-branded Service Station
4411 Foothill Boulevard
Oakland, CA
Wic #204-5508-3400

Well ID	Date	TPPH (ug/L)	TEPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8020 (ug/L)	MTBE 8260 (ug/L)	TOB (MSL)	Depth to Water (ft.)	GW Elevation (MSL)	DO Reading (ppm)
S-1	03/30/1999	14,200	1,150	1,360	260	1,070	3,580	<500	90.0	38.31	6.10	32.21	1.2/1.8
S-1	03/31/1999	NA	NA	NA	NA	NA	NA	NA	NA	38.31	7.84	30.47	NA
S-1	06/14/1999	20,200	4,280	135	407	825	5,000	705	NA	38.31	7.94	30.37	1.4/2.1
S-1	09/30/1999	18,300	3,120	189	531	1,250	4,740	322	NA	38.31	10.04	28.27	4.3/2.0
S-1	12/22/1999	2,450	444a	50.2	97.5	139	458	133	NA	38.31	9.42	28.89	1.8/2.3
S-1	03/09/2000	1,230d	1,200a	21.2d	115d	116d	411d	45.1d	NA	38.30	6.21	32.09	2.0/2.9
S-1	06/20/2000	755	352a	26.0	48.4	43.1	230	71.5	NA	38.30	9.18	29.12	2.0/2.4
S-1	09/05/2000	2,980	783a	43.5	117	168	871	192	NA	38.30	10.14	28.16	0.6/0.3
S-1	12/04/2000	399	238a	5.34	14.6	36.2	106	24.9	NA	38.30	10.10	28.20	8.6/9.8
S-1	12/12/2000	NA	NA	NA	NA	NA	NA	NA	NA	38.30	9.22	29.08	NA
S-1	03/08/2001	2,940	1,390a	49.6	52.9	21.8	749	87.6	NA	38.30	5.84	32.46	2.7e
S-1	06/07/2001	10,000	1,400	120	370	680	2,400	150	NA	38.30	8.80	29.50	6.2/2.2
S-1	**09/13/2001**	**240**	**<200**	**1.8**	**8.9**	**16**	**53**	**NA**	**17**	**38.30**	**10.25**	**28.05**	**7.8/8.9**
S-2	05/28/1993	NA	NA	NA	NA	NA	NA	NA	NA	38.79	9.51	29.28	NA
S-2	06/03/1993	NA	NA	NA	NA	NA	NA	NA	NA	38.79	9.51	29.28	NA
S-2	06/08/1993	NA	NA	NA	NA	NA	NA	NA	NA	38.79	9.57	29.22	NA
S-2	06/29/1993	1,300	NA	290	35	38	130	NA	NA	38.79	NA	NA	NA
S-2	09/21/1993	3,300	NA	870	24	190	120	NA	NA	38.79	10.54	28.25	NA
S-2	12/14/1993	1,300	NA	400	16	36	27	NA	NA	38.79	9.76	29.03	NA
S-2	03/17/1994	4,500	NA	610	27	92	110	NA	NA	38.79	9.92	28.87	NA
S-2 (D)	03/17/1994	4,000	NA	610	26	93	120	NA	NA	38.79	9.92	28.87	NA
S-2	06/16/1994	2,800	NA	690	45	97	140	NA	NA	38.79	10.11	28.68	NA
S-2	09/22/1994	4,000	NA	630	94	64	230	NA	NA	38.79	10.51	28.28	NA
S-2	12/15/1994	1,600	NA	450	300	67	130	NA	NA	38.79	9.12	29.67	NA
S-2 b	03/30/1995	8,200	NA	2,800	190	240	700	NA	NA	38.79	7.86	30.93	NA
S-2	06/20/1995	9,600	NA	2,600	160	170	500	NA	NA	38.79	9.51	29.28	NA
S-2	09/20/1995	4,200	NA	920	45	98	140	NA	NA	38.79	10.06	28.73	NA
S-2	12/06/1995	<5,000	NA	790	67	64	130	NA	NA	38.79	10.52	28.27	NA

WELL CONCENTRATIONS
Shell-branded Service Station
4411 Foothill Boulevard
Oakland, CA
Wic #204-5508-3400

Well ID	Date	TPPH (ug/L)	TEPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8020 (ug/L)	MTBE 8260 (ug/L)	TOB (MSL)	Depth to Water (ft.)	GW Elevation (MSL)	DO Reading (ppm)
S-2	03/21/1996	3,700	NA	850	45	96	170	NA	NA	38.79	8.60	30.19	NA
S-2	09/06/1996	2,400	NA	500	33	39	84	490	NA	38.79	10.50	28.29	NA
S-2	12/19/1996	1,200	NA	330	15	24	31	430	NA	38.79	9.40	29.39	NA
S-2	03/17/1997	4,100	NA	780	42	110	120	2,200	NA	38.79	9.82	28.97	NA
S-2	06/11/1997	760	NA	120	<5.0	7.0	7.6	900	NA	38.79	10.18	28.61	NA
S-2	09/17/1997	1,500	NA	230	8.6	40	27	480	NA	38.79	9.90	28.89	NA
S-2	12/11/1997	1,300	NA	240	15	33	57	280	NA	38.79	8.27	30.52	NA
S-2	03/16/1998	1,100	NA	830	48	<10	<10	4,700	4,800	38.79	7.97	30.82	7.0/4.3
S-2	06/23/1998	720	NA	46	6.8	50	68	50	8.8	38.79	8.20	30.59	4.2/3.8
S-2 (D)	06/23/1998	810	NA	49	7.1	50	70	49	8.8	38.79	8.20	30.59	4.2/3.8
S-2	09/01/1998	<2,000	NA	170	<20	<20	<20	9,300	12,000	38.79	9.85	28.94	1.9/1.6
S-2	12/30/1998	<5,000	NA	369	<50	<50	<50	14,300	NA	38.79	9.84	28.95	2.0/1.8
S-2	03/30/1999	<2,000	NA	234	<20.0	27.4	36.9	49,200	53,000	38.79	8.41	30.38	2.1/1.8
S-2	03/31/1999	NA	NA	NA	NA	NA	NA	NA	NA	38.79	8.67	30.12	NA
S-2	06/14/1999	<1,000	NA	175	<10.0	<10.0	11.1	67,500	NA	38.79	9.80	28.99	NA
S-2	09/30/1999	678	177a	135	8.22	14.9	25.8	17,100	17,000c	38.79	10.58	28.21	5.1/4.8
S-2	12/22/1999	316	142a	55.8	10.1	5.26	10.4	9,410	8,810	38.79	10.13	28.66	9.6/5.2
S-2	03/09/2000	2,670	630a	1,190d	62.7	84.1	125	29,200d	31,400c	38.78	7.88	30.90	7.6/5.0
S-2	06/20/2000	<5,000	401a	348	<50.0	50.4	127	35,800	33,900c	38.78	10.27	28.51	1.9/2.2
S-2	09/05/2000	<5,000	373a	106	<50.0	<50.0	<50.0	25,800	37,100c	38.78	10.19	28.59	0.5/1.6
S-2	12/04/2000	<250	1,730a	4.37	<2.50	<2.50	<2.50	4,500	5,130c	38.78	10.30	28.48	10.6/9.4
S-2	12/12/2000	NA	NA	NA	NA	NA	NA	NA	NA	38.78	9.66	29.12	NA
S-2	03/08/2001	<2,500	<51.3	318	45.7	53.5	88.5	15,500	17,500	38.78	8.57	30.21	2.7e
S-2	06/07/2001	18,000	11,000	450	170	390	2,200	13,000	18,000	38.78	9.39	29.39	1.1/2.0
S-2	**09/13/2001**	**13,000**	**<5,000**	**140**	**110**	**350**	**1,400**	**NA**	**9,200**	**38.78**	**10.34**	**28.44**	**11.0/4.5**
S-3	05/28/1993	NA	NA	NA	NA	NA	NA	NA	NA	37.33	8.45	28.88	NA
S-3	06/03/1993	NA	NA	NA	NA	NA	NA	NA	NA	37.33	8.36	28.97	NA
S-3	01/19/1900	NA	NA	NA	NA	NA	NA	NA	NA	37.33	8.41	28.92	NA

WELL CONCENTRATIONS
Shell-branded Service Station
4411 Foothill Boulevard
Oakland, CA
Wic #204-5508-3400

Well ID	Date	TPPH (ug/L)	TEPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8020 (ug/L)	MTBE 8260 (ug/L)	TOB (MSL)	Depth to Water (ft.)	GW Elevation (MSL)	DO Reading (ppm)
S-3	06/29/1993	29,000	NA	1,500	1,800	950	6,200	NA	NA	37.33	NA	NA	NA
S-3	09/21/1993	15,000	NA	900	2,200	2,600	11,000	NA	NA	37.33	10.08	27.25	NA
S-3	12/94/1993	20,000	NA	1,100	2,400	1,800	8,500	NA	NA	37.33	8.80	28.53	NA
S-3	03/17/1994	14,000	NA	580	190	750	1,700	NA	NA	37.33	8.34	28.99	NA
S-3	06/16/1994	20,000	NA	700	690	1,400	4,100	NA	NA	37.33	9.12	28.21	NA
S-3 (D)	06/16/1994	19,000	NA	680	560	1,300	3,700	NA	NA	37.33	NA	NA	NA
S-3	09/22/1994	24,000	NA	630	1,100	1,400	5,700	NA	NA	37.33	10.27	27.06	NA
S-3 (D)	09/22/1994	25,000	NA	720	1,100	1,500	6,100	NA	NA	37.33	NA	NA	NA
S-3	12/15/1994	18,000	NA	520	800	1,100	4,200	NA	NA	37.33	7.81	29.52	NA
S-3 (D)	12/15/1994	23,000	NA	1,000	1,900	2,000	8,600	NA	NA	37.33	NA	NA	NA
S-3 b	03/30/1995	8,800	NA	360	730	700	3,700	NA	NA	37.33	7.06	30.27	NA
S-3 (D)	03/30/1995	7,600	NA	330	570	600	2,600	NA	NA	37.33	NA	NA	NA
S-3	06/20/1995	9,600	NA	510	170	960	1,700	NA	NA	37.33	8.15	29.18	NA
S-3 (D)	06/20/1995	9,800	NA	500	170	950	1,700	NA	NA	37.33	NA	NA	NA
S-3	09/20/1995	21,000	NA	400	560	1,300	4,600	NA	NA	37.33	9.32	28.01	NA
S-3	12/06/1995	24,000	NA	630	1,400	1,400	6,000	NA	NA	37.33	10.53	26.80	NA
S-3 (D)	12/06/1995	22,000	NA	630	1,200	1,400	5,500	NA	NA	37.33	NA	NA	NA
S-3	03/21/1996	9,100	NA	290	110	490	1,600	NA	NA	37.33	7.32	30.01	NA
S-3 (D)	03/21/1996	11,000	NA	310	250	540	2,100	NA	NA	37.33	NA	NA	NA
S-3	09/06/1996	15,000	NA	440	300	1,100	3,000	500	NA	37.33	10.10	27.23	NA
S-3 (D)	09/06/1996	11,000	NA	490	170	820	1,500	700	NA	37.33	NA	NA	NA
S-3	12/19/1996	12,000	NA	600	380	850	2,500	380	NA	37.33	8.36	28.97	NA
S-3 (D)	12/19/1996	12,000	NA	590	380	830	2,500	540	NA	37.33	8.36	28.97	NA
S-3	03/17/1997	12,000	NA	520	140	740	1,400	320	NA	37.33	8.57	28.76	NA
S-3 (D)	03/17/1997	9,600	NA	500	100	680	1,100	<250	NA	37.33	8.57	28.76	NA
S-3	06/11/1997	9,600	NA	510	94	740	1,100	410	NA	37.33	9.26	28.07	NA
S-3	09/17/1997	21,000	NA	140	560	1,800	7,200	130	NA	37.33	9.62	27.71	NA
S-3	12/11/1997	24,000	NA	530	970	1,600	6,900	950	NA	37.33	7.34	29.99	NA
S-3 (D)	12/11/1997	29,000	NA	520	1,000	1,600	7,300	970	NA	37.33	7.34	29.99	NA

WELL CONCENTRATIONS
Shell-branded Service Station
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Oakland, CA
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Well ID	Date	TPPH (ug/L)	TEPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8020 (ug/L)	MTBE 8260 (ug/L)	TOB (MSL)	Depth to Water (ft.)	GW Elevation (MSL)	DO Reading (ppm)
S-3	03/16/1998	29,000	NA	840	810	1,700	6,000	<250	NA	37.33	5.75	31.58	3.0/3.4
S-3	06/23/1998	3,800	NA	90	220	240	1,400	<50	NA	37.33	5.98	31.35	4.2/2.0
S-3	09/01/1998	9,600	NA	480	120	870	1,800	490	<50	37.33	8.98	28.35	1.9/2.8
S-3 (D)	09/01/1998	9,200	NA	420	110	800	1,700	110	<50	37.33	8.98	28.35	1.9/2.8
S-3	12/30/1998	7,660	NA	240	103	410	834	64.9	NA	37.33	9.11	28.22	1.8/1.6
S-3	03/30/1999	2,070	NA	195	10.0	<5.00	48.6	354	64.6	37.33	6.95	30.38	1.3/1.5
S-3	03/31/1999	NA	NA	NA	NA	NA	NA	NA	NA	37.33	7.48	29.85	NA
S-3	06/14/1999	1,250	NA	37.4	17.4	110	109	118	NA	37.33	8.85	28.48	NA
S-3	09/30/1999	8,270	2,020a	226	113	686	1,440	184	NA	37.33	9.66	27.67	3.5/2.8
S-3	12/22/1999	9,530	2,270a	207	132	603	1,450	616	NA	37.33	9.50	27.83	0.98/0.8
S-3	03/09/2000	2,290d	1,600a	84.5d	17.0d	104d	105d	29.3d	NA	37.30	6.25	31.05	1.0/1.4
S-3	06/20/2000	5,570	2,900a	117	41.6	395	393	354	NA	37.30	9.67	27.63	1.8/2.0
S-3	09/05/2000	6,930	1,600a	127	85.5	354	535	509	NA	37.30	9.49	27.81	1.1/1.9
S-3	12/04/2000	8,390	1,460a	217	82.4	471	952	436	NA	37.30	9.23	28.07	1.1/1.5
S-3	12/12/2000	NA	NA	NA	NA	NA	NA	NA	NA	37.30	9.23	28.07	NA
S-3	03/08/2001	19,400	1,720a	465	772	1,230	3,830	160	NA	37.30	8.17	29.13	1.1f
S-3	06/07/2001	12,000	1,400	230	110	900	1,100	120	NA	37.30	8.78	28.52	0.8/0.9
S-3	**09/13/2001**	**32,000**	**<2,000**	**400**	**880**	**2,000**	**7,000**	**NA**	**<100**	**37.30**	**9.93**	**27.37**	**3.7/2.9**
S-4	03/29/2000	NA	NA	NA	NA	NA	NA	NA	NA	39.06	8.37	30.69	NA
S-4	03/31/2000	20,900	5,780a	4,570	272	595	997	4,490	4,450c	39.06	8.92	30.14	1.8/1.2
S-4	06/20/2000	19,500	244a	4,590	309	723	1,290	3,740	NA	39.06	8.77	30.29	2.7/2.9
S-4	09/05/2000	5,760	1,670a	841	54.2	162	115	1,040	NA	39.06	10.57	28.49	1.3/0.3
S-4	12/04/2000	3,990	1,050a	949	<10.0	118	48.3	1,120	NA	39.06	10.67	28.39	1.1/1.0
S-4	12/12/2000	NA	NA	NA	NA	NA	NA	NA	NA	39.06	10.64	28.42	NA
S-4	03/08/2001	20,100	5,840a	5,210	105	381	281	2,520	NA	39.06	8.44	30.62	1.0/0.9
S-4	06/07/2001	11,000	3,500	2,500	86	370	170	2,000	NA	39.06	10.57	28.49	0.7/0.6
S-4	**09/13/2001**	**4,200**	**<800**	**790**	**14**	**110**	**48**	**NA**	**690**	**39.06**	**11.27**	**27.79**	**3.8/3.9**

WELL CONCENTRATIONS
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Well ID	Date	TPPH (ug/L)	TEPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8020 (ug/L)	MTBE 8260 (ug/L)	TOB (MSL)	Depth to Water (ft.)	GW Elevation (MSL)	DO Reading (ppm)
BW-A	09/30/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	10.55	NA	2.3
BW-A	12/22/1999	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.52	NA	2.2
BW-A	03/09/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.99	NA	1.5
BW-A	06/20/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.69	NA	2.4
BW-A	09/05/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.43	NA	1.0
BW-A	12/04/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.96	NA	1.3
BW-A	12/12/2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.71	NA	NA
BW-A	03/08/2001	<2,500	1,370a	46.6	<25.0	<25.0	<25.0	10,600	11,700	NA	6.38	NA	0.9/1.4
BW-A	06/07/2001	1,100	960	<10	<10	<10	17	7,200	NA	NA	9.82	NA	3.6/0.8
BW-A	**09/13/2001**	**<2,000**	**460**	**<20**	**<20**	**<20**	**<50**	**NA**	**13,000**	**NA**	**10.49**	**NA**	**3.3/1.7**

Abbreviations:
TPPH = Total petroleum hydrocarbons as gasoline by EPA Method 8260B; prior to September 13, 2001 analyzed by EPA Method 8015.
TEPH = Total petroleum hydrocarbons as diesel by modified EPA Method 8015.
BTEX = benzene, toluene, ethylbenzene, xylenes by EPA Method 8260B; prior to September 13, 2001 analyzed by EPA Method 8020.
MTBE = methyl-tertiary-butyl ether
TOB = Top of Box Elevation
GW = Groundwater
DO = Dissolved Oxygen
ug/L = parts per billion
ppm = parts per million
msl = Mean sea level
ft = Feet
<n = Below detection limit
D = Duplicate sample
n/n = Pre-purge / Post-purge
NA = Not applicable

WELL CONCENTRATIONS
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Oakland, CA
Wic #204-5508-3400

Well ID	Date	TPPH (ug/L)	TEPH (ug/L)	B (ug/L)	T (ug/L)	E (ug/L)	X (ug/L)	MTBE 8020 (ug/L)	MTBE 8260 (ug/L)	TOB (MSL)	Depth to Water (ft.)	GW Elevation (MSL)	DO Reading (ppm)

Notes:

a = Chromatogram pattern indicates an unidentified hydrocarbon.

b = National Environmental Testing, Inc. (NET), analyzed within hold time but further dilutions were required and analyzed out of hold time. NET suggests that these should be considered minimum concentrations.

c = Sample analyzed outside the EPA recommended holding times.

d = Result reported was generated out of hold time.

e = Post-purge DO reading.

f = Pre-purge DO reading.

Wells S-1 through S-4 surveyed February 3, 2000 by Virgil Chavez Land Surveying of Vallejo, California.

ATTACHMENT C

Standard Operating Procedures for Tank Removal and Excavation Sampling

TANK REMOVAL SAMPLING PROCEDURES

This document describes Cambria Environmental Technology's standard operating procedures for collecting soil and ground water samples during underground storage tank removal. These procedures ensure that the samples are collected, handled, and documented in compliance with California Administration Code Title 23: Waters; Chapter 3: Water Resources Control Board; Subchapter 16: Underground Storage Tank Regulations (Title 23). Cambria's sampling procedures are based on guidelines contained in the California State Regional Water Quality Control Board Tri-Regional Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites dated August 10, 1990.

Tank Removal Sampling

The objective of sample collection during routine underground storage tank removals is to determine whether hydrocarbons or other stored chemicals have leaked to the subsurface. If no ground water is encountered within the tank excavation, Cambria will sample native soil 1 to 2 ft beneath the removed tank. Additional soil samples may also be collected at locations of obvious spillage to determine maximum concentrations in the surrounding soils. For underground storage tanks with a capacity of less than 1,000 gallons, one soil sample is collected beneath the fill end of the tank. For tanks with a capacity of between 1,000 and 10,000 gallons, one soil sample is collected beneath each end of the tank. For tanks larger than 10,000 gallons, 3 or more soil samples are collected beneath the removed tank. We also collect one soil sample for every 20 ft of product piping.

In cases where ground water is encountered within underground storage tank excavations, Cambria will collect confirmatory soil samples from the excavation sidewalls just above the soil/ground water interface and a representative ground water sample from the excavation. The excavation is typically purged and allowed to recover prior to collecting the water sample. For tanks with capacities of 10,000 gallons or less, one soil sample is collected from the wall at each end of the tank excavation. For tanks with capacities greater than 10,000 gallons, or tank clusters, at least four soil samples are collected from the excavation walls next to the tank ends. Piping samples are collected in native soil 1 to 2 ft beneath the removed piping. One sample is typically collected for every 20 linear ft of piping unless regulatory agencies approve of different sampling requirements.

The soil samples are collected in steam cleaned brass or steel tubes from either a driven split-spoon type sampler or the bucket of a backhoe. When a backhoe is used, approximately three inches of soil are scraped from the surface and the tube is driven into the exposed soil.

Upon removal from the split-spoon sampler or the backhoe, the samples are trimmed flush, capped with Teflon sheets and plastic end caps, labeled, logged and refrigerated for delivery under chain of custody to a State certified analytic laboratory.

The ground water sample is collected using steam cleaned Teflon or PVC bailers, decanted into a volatile organic analysis (VOA) bottle or other appropriate clean sample container, refrigerated and transported under chain of custody to a State certified analytic laboratory.

EXCAVATION SAMPLING PROCEDURES

Soil excavation is often performed to remove soil contamination that may pose a threat to human health or the environment. Soil samples are routinely collected to monitor the progress of the excavation and to confirm that soils containing contaminants above regulatory limits have been completely removed. Cambria has developed standard operating procedures for collecting soil samples during routine excavation operations to ensure that the samples are collected, handled and documented in compliance with State and local regulatory agency regulations.

Excavation Sampling

Prior to collecting soil samples during excavation operations, Cambria field staff screen the removed soils with a portable photo-ionization detector (PID) to qualitatively assess the presence or absence of volatile hydrocarbons. The removed soil is typically segregated based on hydrocarbon concentration and stockpiled on site on plastic sheeting. When the PID measurements indicate that the hydrocarbon bearing soil has been completely removed, Cambria collects soil samples from the excavation sidewalls and bottom for confirmatory analysis at a State-certified analytic laboratory. PID measurements are not required when metals excavation is conducted and volatile organic compounds are not a concern.

The soil samples are collected in steam cleaned brass or steel tubes from either a driven split-spoon type sampler or the bucket of a backhoe or excavator. When a backhoe or excavator is used, approximately three inches of soil are scraped from the surface and the tube is driven into the exposed soil.

Upon removal from the sampler or the backhoe, the samples are trimmed flush, capped with Teflon tape and plastic end caps, labeled, logged and refrigerated for delivery under chain of custody to a State-certified analytic laboratory.