CAMBRIA

#3646

ENVIRONMENTAL PROTECTION

November 9, 1998

98 NOV 13 PM 3:08

Mr. Barney Chan
Alameda County Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: **Well Installation Report**
Shell-branded Service Station
540 Hegenberger Road
Oakland, California
WIC #204-5508-5900
Cambria Project #240-0414-013

Dear Mr. Chan:

On behalf of Equiva Services LLC (Equiva), Cambria Environmental Technology, Inc. (Cambria) is submitting the results of the subsurface investigation and monitoring well installation conducted on July 14 and 15, 1998 at the above-referenced site. The objective of this investigation was to characterize petroleum hydrocarbons in soil and ground water, as requested by the Alameda County Health Care Services Agency Department of Environmental Health (ACDEH) in the April 23, 1998 letter to Shell Oil Products Company (Shell). The investigation was conducted in accordance with Cambria's May 14, 1998 *Investigation Work Plan*, which was approved in the May 26, 1998 ACDEH letter to Shell. Presented below are the site background, investigation procedures, investigation results, and our recommendations.

BACKGROUND

Site Description: The site is located at the intersection of Hegenberger Road and Edes Avenue, in a commercially-zoned area in Oakland, California. Highway 880 runs near the southern boundary of the site. The site is an active service station with three gasoline underground storage tanks (USTs) and one diesel UST.

Oakland, CA
Sonoma, CA
Portland, OR
Seattle, WA

Cambria Environmental Technology, Inc.

1144 65th Street
Suite B
Oakland, CA 94608
Tel (510) 420-0700
Fax (510) 420-9170

August 1996 Piping Repair: On August 8, 1996, Cambria collected a soil sample beneath the piping at Dispenser 1, located on the northwest dispenser island, which was being repaired (Figure 1). The hydrocarbon concentrations were 3,400 milligrams per kilogram (mg/kg) total petroleum hydrocarbons as gasoline (TPHg), 17 mg/kg benzene, and 720 mg/kg methyl tert-butyl ether (MTBE) in this sample.

1998 Station Upgrade: In January and February 1998, Paradiso Mechanical of San Leandro, California (Paradiso) added secondary containment underneath the existing dispensers and submersible turbine pumps and Cambria collected soil samples. The highest TPHg and benzene concentrations were detected in soil samples collected from beneath the northwest dispenser island, at 340 mg/kg and 3.7 mg/kg, respectively. During the line tightness test on February 6, 1998, Paradiso discovered a leak in the piping between the USTs and the northwest dispenser island, which was repaired on the same day (Figure 1).

1998 Soil Borings: On March 6, 1998, Cambria installed five soil borings on site. The highest hydrocarbon concentrations were detected in the area of the northwest dispenser island at 3,400 mg/kg TPHg, 39 mg/kg benzene, and 170 mg/kg MTBE in soil at 6.0 feet below ground surface (ft bgs); and 200,000 micrograms per liter (μg/L) TPHg, 11,000 μg/L benzene, and 1,300,000 μg/L MTBE in ground water.

Ground Water Depth: Depth to ground water on site is approximately 6 to 12 ft bgs.

Lithology: The site subsurface consists primarily of silty clay and clayey silt of very low estimated permeability, interbedded with sandy silty clay, silty sand, and silty gravelly sand of low to moderate estimated permeability to the maximum depth explored of 25 ft bgs. Foreign objects, such as pieces of glass and cinders, found in previous borings suggest that approximately the first 6 ft of soil beneath the site is comprised of mainly fill material.

INVESTIGATION PROCEDURES

The procedures for this subsurface investigation, described in Cambria's approved work plan, are summarized below. Well locations are shown on Figure 1. Analytical results for soil and ground water are summarized in Tables 1 and 2, respectively, and physical parameters are summarized in Table 3. Laboratory reports are presented as Attachment A. Boring logs and Cambria's *Standard Field Procedures for Monitoring Well Installation* are presented in Attachments B and C, respectively.

Personnel Present: Maureen Feineman, Staff Geologist, of Cambria.

Permits: Alameda County Public Works Agency Drilling Permit #98WR266 (Attachment D).

Drilling Company: Gregg Drilling of Martinez, California (C-57 License #485165).

Drilling Dates: July 14 and 15, 1998.

Drilling Method: Hollow-Stem Auger.

Number of Borings: Four (SB-A through SB-D).

Boring Depths: 16-25 ft bgs.

Well Specifications: Well MW-1 was installed to 25 ft bgs in boring SB-A, well MW-2 was installed to 20 ft bgs in boring SB-B, and well MW-3 was installed to 20 ft bgs in boring SB-C (Figure 1). The wells are two-inch diameter schedule 40 PVC, with 0.010-inch slotted screen. Well MW-1 is screened from 10 to 25 ft bgs, and wells MW-2 and MW-3 are screened from 5 to 20 ft bgs.

Ground Water Depths: Static water levels in the monitoring wells ranged from 4.75 to 8.70 ft bgs.

Sediment Lithology: The site subsurface consists primarily of clayey silt, silty clay, sandy silt, sandy clayey silt, and gravelly sandy silt, all of low to moderate estimated permeability. Borings SB-A and SB-C contained fill material consisting primarily of sand and gravel of high estimated permeability to approximately three ft bgs. Borings SB-A and SB-B contained a layer of silty sand of high estimated permeability from approximately 4.5 to 6 ft bgs. Boring logs are included as Attachment B.

Chemical Analyses: One or two soil samples from each boring were analyzed for:

- TPHg by modified EPA Method 8015; and
- MTBE and benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8020.

Additional soil samples from boring SB-D were analyzed for:

- dry bulk density;
- porosity;
- fraction organic carbon; and
- moisture content.

One grab water sample from each monitoring well and one grab water sample from the tank backfill well were analyzed for:

- TPHg by modified EPA Method 8015; and
- MTBE and BTEX by EPA Method 8020.

The highest MTBE concentration in ground water was confirmed by EPA Method 8260. No water sample was collected from boring SB-D because the boring collapsed prior to sampling.

Soil Disposal: As approved by Equilon, on August 17, 1998, Manley and Sons Trucking, Inc. of Sacramento, California transported 1.43 tons of soil generated from the soil borings to Forward Landfill in Manteca, California for disposal under approval number 733722 (Attachment E).

INVESTIGATION RESULTS

Hydrocarbon Distribution in Soil: The maximum hydrocarbon concentrations in soil were 460 mg/kg TPHg, 4.7 mg/kg benzene, and 240 mg/kg MTBE in boring SB-D at 5.5 ft bgs. Hydrocarbon concentrations decrease to near or below detection limits at 10.5 ft bgs in the same boring.

Hydrocarbon Distribution in Ground Water: The maximum hydrocarbon concentrations in water were 190 μg/L benzene in well MW-3 (boring SB-C) and 31,000 μg/L MTBE in the tank backfill well. No TPHg was detected in the water samples.

RECOMMENDATIONS

Monitoring wells MW-1, MW-2, and MW-3 were included in a quarterly monitoring program. Blaine Tech Services of San Jose, California developed the wells on August 20, 1998 and sampled the wells on August 26, 1998. Based on the January 31, 1997 San Francisco Bay Regional Water Quality Control Board letter entitled *Utilization of Non-Purge Approach for Sampling of Monitoring Wells Impacted by Petroleum Hydrocarbons, BTEX, and MTBE*, the first ground water monitoring event included sampling by both purging and non-purging sampling methods. Sampling included measurements of dissolved oxygen, specific conductance, pH, and temperature prior to and during purging. These activities will be summarized in our upcoming *Third Quarter 1998 Monitoring Report.* Provided that no separate-phase hydrocarbons (SPH) are detected in the wells and all wells have exposed screen intervals, the wells will be sampled using the non-purge approach for subsequent monitoring events. Any SPH detected in the wells will be manually bailed and returned to the Shell manufacturing facility in Martinez, California for recycling.

CLOSING

We appreciate your continued assistance with this project. Please call Darryk Ataide at (510) 420-3339 if you have any questions or comments.

Sincerely,
Cambria Environmental Technology, Inc.

Darryk Ataide
Project Environmental Scientist

Diane M. Lundquist, P.E.
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
DIANE M. LUNDQUIST
NO. C46725
CIVIL
STATE OF CALIFORNIA

Attachments:
A - Analytical Reports for Soil and Ground Water
B - Soil Boring Logs
C - Standard Field Procedures for Monitoring Well Installation
D - Permits
E - Disposal Confirmation Facsimile

cc: Karen Petryna, Equiva Services LLC, P.O. Box 6249, Carson, California 90749-6249

G:\OAK540\Reports\WellInst_Rpt.wpd

G:\OAK540\FIGURES\WELL-LOC2.DWG

Shell-branded Service Station

540 Hegenberger Road

Oakland, California

WIC #204-5508-5900

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Monitoring Well and Sample Location Map

July 14, 1998

EXPLANATION

- MW-1 — Monitoring Well Location
- SB-D — Soil Boring Location
- BFW-1 — Tank Backfill Well Sample Location
- Underground Storage Tank Backfill Wells

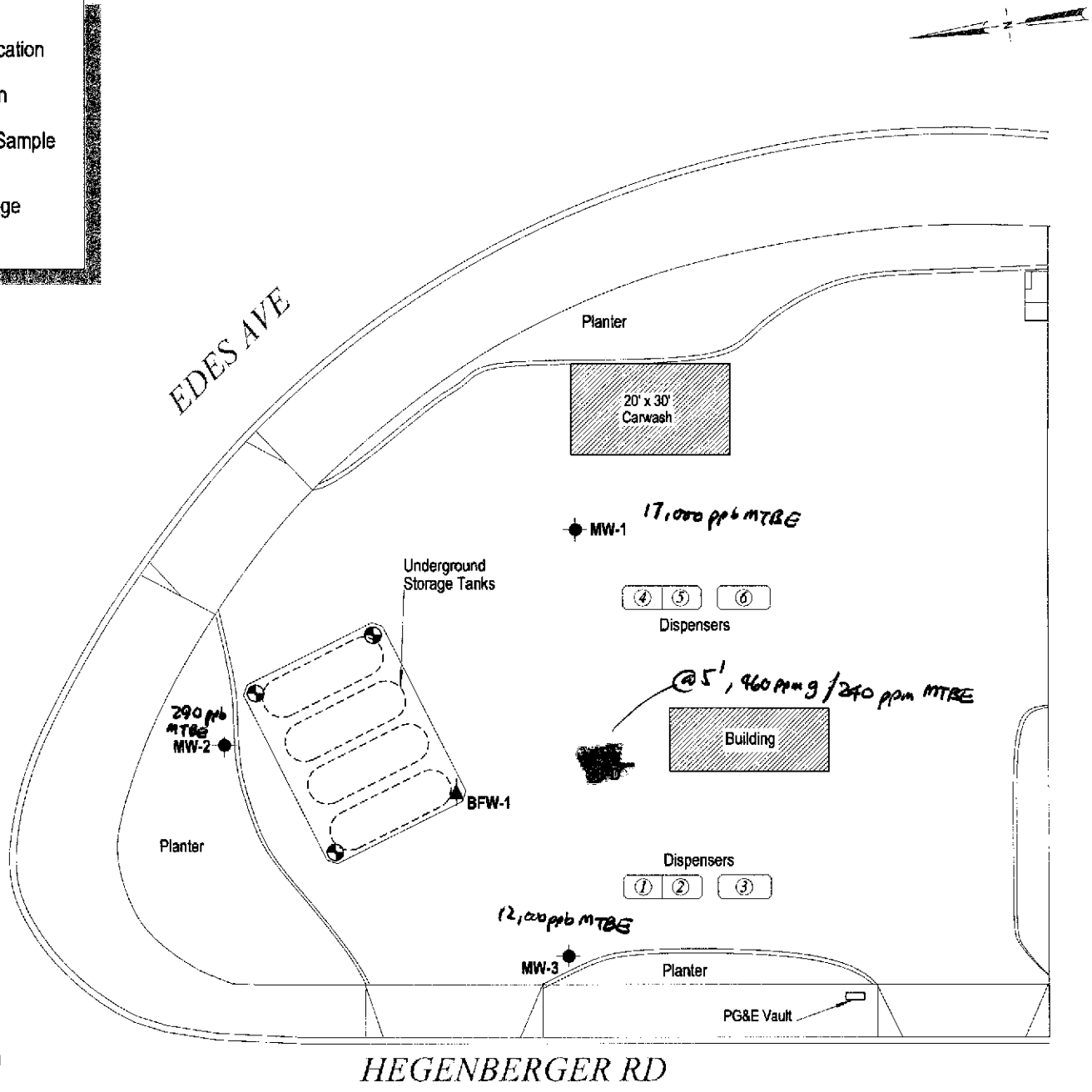

FIGURE **1**

0 15 30

Scale (ft)

Base Map by R.H. Lee & Assoc.

10/21/98

Table 1. Soil Analytical Data - Petroleum Hydrocarbons - Shell-branded Service Station, WIC# 204-5508-5900, 540 Hegenberger Road, Oakland, California

Sample ID	Date Sampled	TPHg	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes
		← mg/kg →					
MW-1 SB-A-5.0'	7/14/98	82	10	2.1	2.4	0.34	1.4
SB-A-9.5'	7/14/98	<2.5	15	0.060	<0.012	0.013	0.027
MW-2 SB-B-5.0'	7/15/98	<1.0	1.2	<0.0050	<0.0050	<0.0050	<0.0050
MW-3 SB-C-9.5'	7/14/98	<1.0	0.33	<0.0050	0.0056	<0.0050	<0.0050
SB-D-5.5'	7/14/98	460	240	4.7	35	8.5	55
SB-D-10.5'	7/14/98	<1.0	0.44	<0.0050	<0.0050	<0.0050	<0.0050

Notes and Abbreviations:

mg/kg = Milligrams per kilogram
TPHg = Total petroleum hydrocarbons as gasoline by modified EPA Method 8015
MTBE = Methyl tert-butyl ether by EPA Method 8020
<n = Below detection limit of n mg/kg
Benzene, toluene, ethylbenzene, and xylenes by EPA Method 8020

Table 2. Ground Water Analytical Data - Shell-branded Service Station, WIC# 204-5508-5900, 540 Hegenberger Road, Oakland, California

Sample ID	Date Sampled	TPHg	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes
		← µg/L →					
MW-1	7/15/98	<10,000	17,000	<100	<100	<100	<100
MW-2	7/15/98	<50	290	<0.50	<0.50	<0.50	<0.50
MW-3	7/15/98	<10,000	12,000	190	940	170	890
BFW-1	7/15/98	<10,000	30,000 (31,000)	<100	<100	<100	<100

Backfill

Notes and Abbreviations:

µg/L = Micrograms per liter

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

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

<n = Below detection limit of n µg/L

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

Table 3. Soil Analytical Data - Physical Parameters - Shell-branded Service Station, WIC# 204-5508-5900, 540 Hegenberger Road, Oakland, California

Sample ID	Date Sampled	Soil Type	Porosity (Percent)	Fraction Organic Carbon (Percent)	Moisture Content (Percent)	Dry Bulk Density (g/cc)
SB-D-5.0'	7/14/98	brown very clayey silt	42.2	0.79	22	1.49
SB-D-10.0'	7/14/98	brown very clayey silt	44.3	0.48	---	1.49

Notes and Abbreviations:

g/cc = grams per cubic centimeter

--- = Not analyzed

Attachment A

Analytical Reports for Soil and Ground Water

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (650) 364-9600, FAX (650) 364-9233
404 N. Wiget Lane, Walnut Creek, CA 94598, (925) 988-9600, FAX (925) 988-9673
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100
1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Cambria
1144 65th St. Suite C
Oakland, CA 94608
Attention: Maureen Feineman

Project: Shell 540 Hegenberger

Enclosed are the results from samples received at Sequoia Analytical on July 15, 1998. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE COLLECTED	TEST METHOD
9807900 -01	SOLID, SB-A-5.0'	07/14/98	Purgeable TPH/BTEX/MTBE
9807900 -02	SOLID, SB-A-9.5'	07/14/98	Purgeable TPH/BTEX/MTBE
9807900 -03	SOLID, SB-C-9.5'	07/14/98	Purgeable TPH/BTEX/MTBE
9807900 -04	SOLID, SB-D-5.0'	07/14/98	Fraction Organic Carbon
9807900 -04	SOLID, SB-D-5.0'	07/14/98	Moisture, Percent
9807900 -04	SOLID, SB-D-5.0'	07/14/98	Bulk Density
9807900 -04	SOLID, SB-D-5.0'	07/14/98	Porosity
9807900 -05	SOLID, SB-D-5.5'	07/14/98	Purgeable TPH/BTEX/MTBE
9807900 -06	SOLID, SB-D-10.0'	07/14/98	Fraction Organic Carbon
9807900 -06	SOLID, SB-D-10.0'	07/14/98	Bulk Density
9807900 -06	SOLID, SB-D-10.0'	07/14/98	Porosity
9807900 -07	SOLID, SB-D-10.5'	07/14/98	Purgeable TPH/BTEX/MTBE
9807900 -08	SOLID, SB-B-5.5'	07/14/98	Purgeable TPH/BTEX/MTBE
9807900 -09	SOLID, SB-A-15.0'	07/14/98	TPHG_S Purgeable TPH

SEQUOIA ANALYTICAL

Sequoia Analytical

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SAMPLE #	SAMPLE DESCRIPTION	DATE COLLECTED	TEST METHOD
9807900 -10	SOLID, SB-C-14.5'	07/14/98	TPHG_S Purgeable TPH
9807900 -11	SOLID, SB-D-9.5'	07/14/98	TPHG_S Purgeable TPH
9807900 -12	SOLID, SB-B-10.0'	07/15/98	TPHG_S Purgeable TPH
9807900 -13	SOLID, SB-(A,C,D,B)-15' Comp	07/14/98	BTEX_S Distinction
9807900 -13	SOLID, SB-(A,C,D,B)-15' Comp	07/14/98	ISTLCS Title 22: Metals, S
9807900 -13	SOLID, SB-(A,C,D,B)-15' Comp	07/14/98	ITTLCS Title 22: Metals, T

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Peggy Penner
Project Manager

Sequoia Analytical

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Cambria
1144 65th St. Suite C
Oakland, CA 94608

Attention: Maureen Feineman

Client Proj. ID: Shell 540 Hegenberger

Lab Proj. ID: 9807900

Sampled: 07/14/98
Received: 07/15/98
Analyzed: see below

Reported: 08/03/98

LABORATORY ANALYSIS

Analyte	Units	Date Analyzed	Detection Limit	Sample Results
Lab No: 9807900-04				
Sample Desc : **SOLID,SB-D-5.0'**				
Bulk Density	**mg/L**			**Attached**
Fraction Organic Carbon	**%**	**07/21/98**	**0.020**	**0.79**
Moisture, Percent	**%**	**07/21/98**	**1.0**	**22**
Porosity	**-**			**Attached**
Lab No: 9807900-06				
Sample Desc : **SOLID,SB-D-10.0'**				
Bulk Density	**mg/L**			**Attached**
Fraction Organic Carbon	**%**	**07/21/98**	**0.020**	**0.48**
Porosity	**-**			**Attached**

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Peggy Penner
Project Manager

Sequoia Analytical

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Cambria	Client Proj. ID: Shell 540 Hegenberger	Sampled: 07/14/98
1144 65th St. Suite C	Sample Descript: SB-A-5.0'	Received: 07/15/98
Oakland, CA 94608	Matrix: SOLID	Extracted: 07/27/98
	Analysis Method: 8015Mod/8020	Analyzed: 07/27/98
Attention: Maureen Feineman	Lab Number: 9807900-01	Reported: 08/03/98

QC Batch Number: GC072798BTEXEXA
Instrument ID: GCHP22

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	**10**	**82**
Methyl t-Butyl Ether	**0.25**	**10**
Benzene	**0.050**	**2.1**
Toluene	**0.050**	**2.4**
Ethyl Benzene	**0.050**	**0.34**
Xylenes (Total)	**0.050**	**1.4**
Chromatogram Pattern:		**C6-C12**

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	219 Q
4-Bromofluorobenzene	60	140	30 Q

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Peggy Penner
Project Manager

Sequoia Analytical

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1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Cambria	Client Proj. ID: Shell 540 Hegenberger	Sampled: 07/14/98
1144 65th St. Suite C	Sample Descript: SB-A-9.5'	Received: 07/15/98
Oakland, CA 94608	Matrix: SOLID	Extracted: 07/27/98
	Analysis Method: 8015Mod/8020	Analyzed: 07/28/98
Attention: Maureen Feineman	Lab Number: 9807900-02	Reported: 08/03/98

QC Batch Number: GC072798BTEXEXA
Instrument ID: GCHP07

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	2.5	N.D.
Methyl t-Butyl Ether	**0.062**	**15**
Benzene	**0.012**	**0.060**
Toluene	0.012	N.D.
Ethyl Benzene	**0.012**	**0.013**
Xylenes (Total)	**0.012**	**0.027**
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	85
4-Bromofluorobenzene	60	140	22 Q

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Peggy Penner
Project Manager

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Cambria	Client Proj. ID: Shell 540 Hegenberger	Sampled: 07/14/98
1144 65th St. Suite C	Sample Descript: SB-C-9.5'	Received: 07/15/98
Oakland, CA 94608	Matrix: SOLID	Extracted: 07/27/98
	Analysis Method: 8015Mod/8020	Analyzed: 07/28/98
Attention: Maureen Feineman	Lab Number: 9807900-03	Reported: 08/03/98

QC Batch Number: GC072798BTEXEXA
Instrument ID: GCHP07

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	1.0	N.D.
Methyl t-Butyl Ether	**0.025**	**0.33**
Benzene	0.0050	N.D.
Toluene	**0.0050**	**0.0056**
Ethyl Benzene	0.0050	N.D.
Xylenes (Total)	0.0050	N.D.
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	89
4-Bromofluorobenzene	60	140	80

Analytes reported as N.D. were not present above the stated limit of detection.

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Peggy Penner
Project Manager

Sequoia Analytical

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Cambria	Client Proj. ID: Shell 540 Hegenberger	Sampled: 07/14/98
1144 65th St. Suite C	Sample Descript: SB-D-5.5'	Received: 07/15/98
Oakland, CA 94608	Matrix: SOLID	Extracted: 07/27/98
	Analysis Method: 8015Mod/8020	Analyzed: 07/27/98
Attention: Maureen Feineman	Lab Number: 9807900-05	Reported: 08/03/98

QC Batch Number: GC072798BTEXEXA
Instrument ID: GCHP07

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	**50**	**460**
Methyl t-Butyl Ether	**1.2**	**240**
Benzene	**0.25**	**4.7**
Toluene	**0.25**	**35**
Ethyl Benzene	**0.25**	**8.5**
Xylenes (Total)	**0.25**	**55**
Chromatogram Pattern:		**C6-C12**

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	93
4-Bromofluorobenzene	60	140	5 Q

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Peggy Penner
Project Manager

Sequoia Analytical

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Cambria	Client Proj. ID: Shell 540 Hegenberger	Sampled: 07/14/98
1144 65th St. Suite C	Sample Descript: SB-D-10.5'	Received: 07/15/98
Oakland, CA 94608	Matrix: SOLID	Extracted: 07/27/98
	Analysis Method: 8015Mod/8020	Analyzed: 07/28/98
Attention: Maureen Feineman	Lab Number: 9807900-07	Reported: 08/03/98

QC Batch Number: GC072798BTEXEXA
nstrument ID: GCHP07

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	1.0	N.D.
Methyl t-Butyl Ether	**0.025**	**0.44**
Benzene	0.0050	N.D.
Toluene	0.0050	N.D.
Ethyl Benzene	0.0050	N.D.
Xylenes (Total)	0.0050	N.D.
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	93
4-Bromofluorobenzene	60	140	78

nalytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

eggy Penner
roject Manager

Sequoia Analytical

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1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Cambria	Client Proj. ID: Shell 540 Hegenberger	Sampled: 07/14/98
1144 65th St. Suite C	Sample Descript: SB-B-5.5'	Received: 07/15/98
Oakland, CA 94608	Matrix: SOLID	Extracted: 07/27/98
	Analysis Method: 8015Mod/8020	Analyzed: 07/28/98
Attention: Maureen Feineman	Lab Number: 9807900-08	Reported: 08/03/98

QC Batch Number: GC072798BTEXEXA
Instrument ID: GCHP07

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	1.0	N.D.
Methyl t-Butyl Ether	**0.025**	**1.2**
Benzene	0.0050	N.D.
Toluene	0.0050	N.D.
Ethyl Benzene	0.0050	N.D.
Xylenes (Total)	0.0050	N.D.
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	80
4-Bromofluorobenzene	60	140	72

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Peggy Penner
Project Manager

Sequoia Analytical

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Cambria	Client Proj. ID: Shell 540 Hegenberger	Sampled: 07/14/98
1144 65th St. Suite C	Sample Descript: SB-A-15.0'	Received: 07/15/98
Oakland, CA 94608	Matrix: SOLID	Extracted: 07/27/98
	Analysis Method: EPA 8015 Mod	Analyzed: 07/27/98
Attention: Maureen Feineman	Lab Number: 9807900-09	Reported: 08/03/98

QC Batch Number: GC072798BTEXEXA
Instrument ID: GCHP01

Total Purgeable Petroleum Hydrocarbons (TPPH)

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	**1.0**	**2.1**
Chromatogram Pattern:		**>C10**

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	82
4-Bromofluorobenzene	60	140	91

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Peggy Penner
Project Manager

Sequoia Analytical

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Cambria	Client Proj. ID: Shell 540 Hegenberger	Sampled: 07/14/98
1144 65th St. Suite C	Sample Descript: SB-C-14.5'	Received: 07/15/98
Oakland, CA 94608	Matrix: SOLID	Extracted: 07/27/98
	Analysis Method: EPA 8015 Mod	Analyzed: 07/27/98
Attention: Maureen Feineman	Lab Number: 9807900-10	Reported: 08/03/98

QC Batch Number: GC072798BTEXEXA
Instrument ID: GCHP01

Total Purgeable Petroleum Hydrocarbons (TPPH)

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	1.0	N.D.
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	104
4-Bromofluorobenzene	60	140	95

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Peggy Perrner
Project Manager

Sequoia Analytical

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Cambria	Client Proj. ID: Shell 540 Hegenberger	Sampled: 07/14/98
1144 65th St. Suite C	Sample Descript: SB-D-9.5'	Received: 07/15/98
Oakland, CA 94608	Matrix: SOLID	Extracted: 07/27/98
	Analysis Method: EPA 8015 Mod	Analyzed: 07/27/98
Attention: Maureen Feineman	Lab Number: 9807900-11	Reported: 08/03/98

QC Batch Number: GC072798BTEXEXA
Instrument ID: GCHP18

Total Purgeable Petroleum Hydrocarbons (TPPH)

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	5.0	N.D.
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	89
4-Bromofluorobenzene	60	140	23 Q

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Peggy Renner
Project Manager

Sequoia Analytical

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Cambria	Client Proj. ID: Shell 540 Hegenberger	Sampled: 07/15/98
1144 65th St. Suite C	Sample Descript: SB-B-10.0'	Received: 07/15/98
Oakland, CA 94608	Matrix: SOLID	Extracted: 07/27/98
	Analysis Method: EPA 8015 Mod	Analyzed: 07/27/98
Attention: Maureen Feineman	Lab Number: 9807900-12	Reported: 08/03/98

QC Batch Number: GC072798BTEXEXA
Instrument ID: GCHP01

Total Purgeable Petroleum Hydrocarbons (TPPH)

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	1.0	N.D.
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	104
4-Bromofluorobenzene	60	140	103

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Peggy Penner
Project Manager

Sequoia Analytical

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Cambria
1144 65th St. Suite C
Oakland, CA 94608

Attention: Maureen Feineman

Client Proj. ID: Shell 540 Hegenberger
Sample Descript: SB-(A,C,D,B)-15' Comp
Matrix: SOLID
Analysis Method: EPA 8020
Lab Number: 9807900-13

Sampled: 07/14/98
Received: 07/15/98
Extracted: 07/27/98
Analyzed: 07/27/98
Reported: 08/03/98

QC Batch Number: GC072798BTEXEXA
Instrument ID: GCHP01

BTEX Distinction

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
Benzene	**0.0050**	**0.011**
Toluene	**0.0050**	**0.048**
Ethyl benzene	**0.0050**	**0.020**
Xylenes (Total)	**0.0050**	**0.096**

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	94
4-Bromofluorobenzene	60	140	97

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Peggy Penner
Project Manager

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Cambria	Client Proj. ID: Shell 540 Hegenberger	Sampled: 07/14/98
1144 65th St. Suite C	Sample Descript: SB-(A,C,D,B)-15' Comp	Received: 07/15/98
Oakland, CA 94608	Matrix: SOLID	Extracted: 07/23/98
	Analysis Method: Title 22	Analyzed: 07/23/98
Attention: Maureen Feineman	Lab Number: 9807900-13	Reported: 08/03/98

QC Batch Number: ME07239860l0MDA
Instrument ID: MTJA-5

Inorganic Persistent and Bioaccumulative Toxic Substances : STLC

Analyte	Max. Limit mg/L	Detection Limit mg/L	Sample Results mg/L
Chromium, Cr	**560**	**0.010**	**0.062**

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Peggy Penner
Project Manager

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Cambria	Client Proj. ID: Shell 540 Hegenberger	Sampled: 07/14/98
1144 65th St. Suite C	Sample Descript: SB-(A,C,D,B)-15' Comp	Received: 07/15/98
Oakland, CA 94608	Matrix: SOLID	Extracted: 07/22/98
	Analysis Method: Title 22	Analyzed: 07/22/98
Attention: Maureen Feineman	Lab Number: 9807900-13	Reported: 08/03/98

QC Batch Number: ME0722986010MDF
nstrument ID: MTJA-5

Inorganic Persistent and Bioaccumulative Toxic Substances : TTLC

Analyte	Max. Limit mg/kg	Detection Limit mg/kg	Sample Results mg/kg
Antimony, Sb	500	5.0	N.D.
Arsenic, As	500	5.0	N.D.
Barium, Ba	**10000**	**5.0**	**130**
Beryllium, Be	**75**	**0.50**	**0.54**
Cadmium, Cd	100	0.50	N.D.
Chromium, Cr	**2500**	**0.50**	**53**
Cobalt, Co	**8000**	**2.5**	**10**
Copper, Cu	**2500**	**0.50**	**24**
Lead, Pb	**1000**	**5.0**	**8.8**
Mercury, Hg	**20**	**0.020**	**0.72**
Molybdenum, Mo	3500	2.5	N.D.
Nickel, Ni	**2000**	**2.5**	**53**
Selenium, Se	100	5.0	N.D.
Silver, Ag	500	0.50	N.D.
Thallium, Tl	**700**	**5.0**	**12**
Vanadium, V	**2400**	**2.5**	**40**
Zinc, Zn	**5000**	**0.50**	**56**

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Peggy Penner
Project Manager

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Cambria
1144 65th St., Ste. C
Oakland, CA 94608
Attention: Maureen Feineman

Client Project ID: Shell 540 Hagenberger

QC Sample Group: 9807900-01-13

Reported: Aug 3, 1998

QUALITY CONTROL DATA REPORT

Matrix: Solid
Method: EPA 8020
Analyst: G. PESHINA

ANALYTE	Benzene	Toluene	Ethylbenzene	Xylenes
QC Batch #:	GC072798BTEXEXA			
Sample No.:	GS9807900-12			
Date Prepared:	7/27/98	7/27/98	7/27/98	7/27/98
Date Analyzed:	7/27/98	7/27/98	7/27/98	7/27/98
Instrument I.D.#:	GCHP22	GCHP22	GCHP22	GCHP22
ample Conc., mg/Kg:	N.D.	N.D.	N.D.	N.D.
Conc. Spiked, mg/Kg:	0.20	0.20	0.20	0.60
Matrix Spike, mg/Kg:	0.21	0.22	0.22	0.67
% Recovery:	105	110	110	112
Matrix ike Duplicate, mg/Kg:	0.21	0.21	0.22	0.66
% Recovery:	105	105	110	110
elative % Difference:	0.0	4.7	0.0	1.8
RPD Control Limits:	0-25	0-25	0-25	0-25

LCS Batch#:	GSBLK072798A			
Date Prepared:	7/27/98	7/27/98	7/27/98	7/27/98
Date Analyzed:	7/27/98	7/27/98	7/27/98	7/27/98
Instrument I.D.#:	GCHP22	GCHP22	GCHP22	GCHP22
Conc. Spiked, mg/Kg:	0.20	0.20	0.20	0.60
Recovery, mg/Kg:	0.20	0.20	0.20	0.62
LCS % Recovery:	100.0	100.0	100.0	103

Percent Recovery Control Limits:

MS/MSD	60-140	60-140	60-140	60-140
LCS	70-130	70-130	70-130	70-130

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Peggy Penner
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

Sequoia Analytical

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Cambria Environmental	Client Project ID:	Shell 540 Hegenberger		
1144 65th St., Ste. C	Matrix:	Solid		
Oakland, CA 94608				
Attention: Maureen Feineman	Work Order #:	9807900	-13	Reported: Aug 4, 1998

QUALITY CONTROL DATA REPORT

Analyte:	Mercury
QC Batch#:	ME0716987471M4
Analy. Method:	EPA 7471
Prep. Method:	EPA 7471
Analyst:	B. Entenmann
MS/MSD #:	980782103
Sample Conc.:	0.36
Prepared Date:	7/16/98
Analyzed Date:	7/17/98
Instrument I.D.#:	MPE4
Conc. Spiked:	2.0 mg/Kg
Result:	2.2
MS % Recovery:	90
Dup. Result:	0.1
MSD % Recov.:	85
RPD:	182.6
RPD Limit:	0-20

LCS #:	BLK071798
Prepared Date:	7/16/98
Analyzed Date:	7/17/98
Instrument I.D.#:	MPE4
Conc. Spiked:	0.0080 mg/Kg
LCS Result:	0.0074
LCS % Recov.:	93

MS/MSD	75-125
LCS	75-125
Control Limits	

SEQUOIA ANALYTICAL

Reggy Penner
Project Manager

Please Note:
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** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

Sequoia Analytical

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Cambria Environmental	Client Project ID:	Shell 540 Hegenberger	
1144 65th St., Ste. C	Matrix:	Solid	
Oakland, CA 94608			
Attention: Maureen Feineman	Work Order #:	9807900-13	Reported: Aug 4, 1998

QUALITY CONTROL DATA REPORT

Analyte:	Beryllium	Cadmium	Chromium	Nickel
QC Batch#:	ME0722986010MDF	ME0722986010MDF	ME0722986010MDF	ME0722986010MDF
Analy. Method:	EPA 6010	EPA 6010	EPA 6010	EPA 6010
Prep. Method:	EPA 3050	EPA 3050	EPA 3050	EPA 3050
Analyst:	C. Caoile	C. Caoile	C. Caoile	C. Caoile
MS/MSD #:	9807B6301	9807B6301	9807B6301	9807B6301
Sample Conc.:	N.D.	N.D.	14	13
Prepared Date:	7/22/98	7/22/98	7/22/98	7/22/98
Analyzed Date:	7/22/98	7/22/98	7/22/98	7/22/98
Instrument I.D.#:	MTJA5	MTJA5	MTJA5	MTJA5
Conc. Spiked:	50 mg/Kg	50 mg/Kg	50 mg/Kg	50 mg/Kg
Result:	47	48	59	57
MS % Recovery:	94	96	90	88
Dup. Result:	45	46	58	56
MSD % Recov.:	90	92	88	86
RPD:	4.3	4.3	1.7	1.8
RPD Limit:	0-20	0-20	0-20	0-20
LCS #:	BLK072298	BLK072298	BLK072298	BLK072298
Prepared Date:	7/22/98	7/22/98	7/22/98	7/22/98
Analyzed Date:	7/22/98	7/22/98	7/22/98	7/22/98
Instrument I.D.#:	MTJA5	MTJA5	MTJA5	MTJA5
Conc. Spiked:	50 mg/Kg	50 mg/Kg	50 mg/Kg	50 mg/Kg
LCS Result:	50	49	48	48
LCS % Recov.:	100	98	96	96
MS/MSD Control Limits	80-120	80-120	80-120	80-120
LCS Control Limits	80-120	80-120	80-120	80-120

SEQUOIA ANALYTICAL

Peggy Penner
Project Manager

Please Note:
The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

** MS=Matrix Spike; MSD=MS Duplicate, RPD=Relative % Difference

Sequoia Analytical

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Cambria Environmental	Client Project ID:	Shell 540 Hegenberger	
1144 65th St., Ste. C	Matrix:	Liquid	
Oakland, CA 94608			
Attention: Maureen Feineman	Work Order #:	9807900-13	Reported: Aug 4, 1998

QUALITY CONTROL DATA REPORT

	STLC
Analyte:	Chromium
QC Batch#:	ME072398601OMDA
Analy. Method:	EPA 6010
Prep. Method:	EPA 3010
Analyst:	C. Caoile
MS/MSD #:	9807D0401
Sample Conc.:	N.D.
Prepared Date:	7/23/98
Analyzed Date:	7/23/98
Instrument I.D.#:	MTJA5
Conc. Spiked:	1.0 mg/L
Result:	0.99
MS % Recovery:	99
Dup. Result:	1.0
MSD % Recov.:	100
RPD:	1.0
RPD Limit:	0-20

LCS #:	BLK072398
Prepared Date:	7/23/98
Analyzed Date:	7/23/98
Instrument I.D.#:	MTJA5
Conc. Spiked:	1.0 mg/L
LCS Result:	0.99
LCS % Recov.:	99

MS/MSD	75-125
LCS	80-120
Control Limits	

SEQUOIA ANALYTICAL

Peggy Penner
Project Manager

Please Note:
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** MS=Matrix Spike, MSD=MS Duplicate, RPD=Relative % Difference

Sequoia Analytical

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Cambria Environmental	Client Project ID:	Shell 540 Hegenberger	
1144 65th St., Ste. C	Matrix:	Solid	
Oakland, CA 94608			
Attention: Maureen Feineman	Work Order #:	9807900-04	Reported: Aug 4, 1998

QUALITY CONTROL DATA REPORT

Analyte:	% Moisture
QC Batch:	IN072198160300A
Analy. Method:	EPA 160.3
Prep Method:	N.A.

Analyst:	R. Dave
Duplicate Sample #:	980754202
Prepared Date:	7/21/98
Analyzed Date:	7/22/98
Instrument I.D.#:	MANUAL
Sample Concentration:	99
Dup. Sample Concentration:	99
RPD:	0.0
RPD Limit:	0-20

SEQUOIA ANALYTICAL

Peggy Penner
Project Manager

** RPD = Relative % Difference

Sequoia Analytical

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Cambria Environmental	Client Project ID:	Shell 540 Hegenberger	
1144 65th St., Ste. C	Matrix:	Liquid	
Oakland, CA 94608			
Attention: Maureen Feineman	Work Order #:	9807900-04, 06	Reported: Aug 4, 1998

QUALITY CONTROL DATA REPORT

Analyte:	Fractional Organic Carbon
QC Batch:	IN072198WALK00A
Analy. Method:	WALKLEY-BLACK
Prep Method:	N.A.

Analyst:	K. Cesar
Duplicate Sample #:	980787201
Prepared Date:	7/21/98
Analyzed Date:	7/21/98
Instrument I.D.#:	MANUAL
Sample Concentration:	0.024
Dup. Sample Concentration:	0.028
RPD:	15
RPD Limit:	0-20

SEQUOIA ANALYTICAL

Peggy Penner
Project Manager

** RPD = Relative % Difference

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (650) 364-9600, FAX (650) 364-9233
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1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Cambria	Client Proj. ID: Shell 540 Hegenberger	Received: 07/15/98
1144 65th St. Suite C		
Oakland, CA 94608	Lab Proj. ID: 9807900	Reported: 08/03/98
Attention: Maureen Feineman		

LABORATORY NARRATIVE

In order to properly interpret this report, it must be reproduced in its entirety. This report contains a total of 25 pages including the laboratory narrative, sample results, quality control, and related documents as required (cover page, COC, raw data, etc.).

SEQUOIA ANALYTICAL

Peggy Penner
Project Manager

SHELL OIL COMPANY
RETAIL ENVIRONMENTAL ENGINEERING - WEST

CHAIN OF CUSTODY RECORD
Serial No: 07

Date: 7/14/98 Page of

SAME DAY CHARGE

LAB: Sequoia

Site Address: 540 Hegenberger, Oakland

WIC#: 204-5508-5900

Shell Engineer: Alex Perez — Phone No.: 510 335-5027 Fax #: 335-5029

Consultant Name & Address: CAMBRIA ENVIRONMENTAL 1144 65th St. Suite C, Oakland, CA 94608

Consultant Contact: Maureen Feineman — Phone No.: 510 420-0700 Fax #: 420-9170

Comments:

Sampled by: Maureen Feineman

Printed Name: Maureen Feineman

Analysis Required — 9807900

CHECK ONE (1) BOX ONLY | CI/DI | TURN AROUND TIME

- G.W. Monitoring [ ] 4461 — 24 hours [ ]
- Site Investigation [X] 4461 — 48 hours [ ]
- Soil Classify/Disposal [ ] 4462 — 96 days [X] (Normal)
- Water Classify/Disposal [ ] 4463 — Other [ ]
- Soil/Air Rem. or Sys. O & M [ ] 4452
- Water Rem. or Sys. O & M [ ] 4453
- Other [ ]

NOTE: Notify Lab as soon as Possible of 24/48 hr. TAT.

UST AGENCY: Alameda

Sample ID	Date	Sludge	Soil	Water	Air	No. of conts.	TPH (EPA 8015 Mod. Gas)	TPH (EPA 8015 Mod. Diesel)	BTEX (EPA 8020/602)	Volatile Organics (EPA 8240)	Test for Disposal	Combination TPH 8015 & BTEX 8020 + MTBE 8020	fraction organic carbon, porosity, dry bulk density	moisture content	Asbestos	Container Size	Preparation Used	Composite Y/N	MATERIAL DESCRIPTION	SAMPLE CONDITION/ COMMENTS
SB-A-5.0'	7/14		X			1						X							~~Confirm Highest~~	
SB-A-9.5'	7/14		X			1						X							~~MTBE by 8260~~	
SB-C-9.5'	7/14		X			1						X								
SB-D-5.0'	7/14		X			1							X	X						
SB-D-5.5'	7/14		X			1						X								
SB-D-10.0'	7/14		X			1							X							
SB-D-10.5'	7/14		X			1						X								
SB-B-5.0'	7/14		X			1						X								

Relinquished By (signature): Maureen Feineman — Printed Name: Maureen Feineman — Date: 7/15/98 Time: 4:01

Relinquished By (signature): — Printed Name: JOHN FRICK — Date: 7/15/98 Time:

Relinquished By (signature): — Printed Name: — Date: Time:

Received (signature): — Printed Name: — Date: 7/15/98 Time: 4:01

Received (signature): — Printed Name: — Date: Time:

Received (signature): Ana DeMarco — Printed Name: Ana DeMarco — Date: 7/15/98 Time: 1707

THE LABORATORY MUST PROVIDE A COPY OF THIS CHAIN-OF-CUSTODY WITH INVOICE AND RESULTS

SHELL OIL COMPANY
RETAIL ENVIRONMENTAL ENGINEERING - WEST

CHAIN OF CUSTODY RECORD
Serial No: 9907900

SAME DAY CHARGE

Date: 7/14/98
Page of

Site Address: 540 Hegenberger, Oakland
WIC#: 204-5508-5900

Shell Engineer: Alex Perez
Phone No.:
Fax #:

Consultant Name & Address: CAMBRIA ENVIRONMENTAL
1144 65th St. Suite C, Oakland, CA 94608

Consultant Contact: Maureen Feineman
Phone No.: 510-420-0700
Fax #: 420-9170

Comments:

Sampled by: Maureen Feineman
Printed Name: Maureen Feineman

LAB: Sequoia

Analysis Required

Sample ID	Date	Sludge	Soil	Water	Air	No. of conts.	TPH (EPA 8015 Mod. Gas)	TPH (EPA 8015 Mod. Diesel)	BTEX (EPA 8020/602)	Volatile Organics (EPA 8240)	Test for Disposal	Combination TPH 8015 & BTEX 8020	Asbestos	Container Size	Preparation Used	Composite Y/N	MATERIAL DESCRIPTION	SAMPLE CONDITION/ COMMENTS
SB-A-15.0'	7/14		X			1					X					X	4:1 Composite (except TPHg) Follow attached waste disposal protocol for GASOLINE	
SB-C-14.5'	7/14		X			1					X					X		
SB-D-9.5'	7/14		X			1					X					X		
SB-B-10.0'	7/15		X			1					X					X		

CHECK ONE (1) BOX ONLY — CT/DI

G.W. Monitoring	☐	4441
Site Investigation	☐	4441
Soil Classify/Disposal	☒	4442
Water Classify/Disposal	☐	4443
Soil/Air Remt. or Sys. O & M	☐	4452
Water Remt. or Sys. O & M	☐	4453
Other	☐	

TURN AROUND TIME

24 hours	☐
48 hours	☐
96 days	☒ (Normal)
Other	☐ .....

NOTE: Notify Lab as soon as Possible of 24/48 hr. TAT.

UST AGENCY: Alameda

Relinquished By (signature):	Printed Name:	Date: 7/15/98 Time: 9:02
Maureen Feineman	Maureen Feineman	
Relinquished By (signature):	Printed Name: JOHN FRICK	Date: 7/15 Time:
John Frick		
Relinquished By (signature):	Printed Name:	Date: Time:

Received (signature):	Printed Name: JOHN FRICK	Date: 7/15/98 Time: 4:02
	Printed Name:	Date: Time:
Received (signature): Anna DeMare	Printed Name: Anna DeMare	Date: 7/15/98 Time: 1701

THE LABORATORY MUST PROVIDE A COPY OF THIS CHAIN-OF-CUSTODY WITH INVOICE AND RESULTS

White Copy to Laboratory

CORE LAB

CORE LABORATORIES

Ms Peggy Penner
Sequoia Analytical
680 Chesapeake Dr.
Redwood City, CA 94063

July 27, 1998

Subject : Transmittal of Geotechnical Analysis Data
SA Workorder # 9807900
Core Lab File No. 57111-98190

Dear Ms Penner

Two soil samples were submitted to our Bakersfield laboratory for geotechnical analysis. Determinations of bulk density and total porosity were requested. Bulk densities and total porosities were measured and calculated as described in **API RP-40**, API Recommended Practice for Core-Analysis Procedure, 1960. Accompanying this letter please find the results of this study.

Grain and pore volumes used for the porosity determinations were measured by Boyles Law double-cell methods utilizing an extended range helium porosimeter.

We appreciate this opportunity to be of service to you and to Sequoia Analytical. Should you have any questions, or if we may be of further help in the future, please do not hesitate to contact us.

Very truly yours,

Jeffry L. Smith
Laboratory Supervisor - Rock Properties

JLS:nw
1 original report, 1 cc report: Addressee

CORE LAB

Sequoia Analytical
(Redwood City)
9807900

C.L. File: 57111-98190

Sample Fraction	Sample Desc.	Sample Date	Sample Density			Total Porosity %	Description	Method
			Dry Bulk g/cc	Natural Bulk g/cc	Matrix g/cc			
4	SB-D- 5.0'	14-Jul-98	1.49	1.91	2.58	42.2	Brown v clayey silt	API RP-40
6	SB-D-10.0'	14-Jul-98	1.49	1.93	2.67	44.3	Brown v clayey silt	API RP-40

7/27/98

Sequoia Analytical

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Cambria
1144 65th St. Suite C
Oakland, CA 94608
Attention: Maureen Feineman

Project: Shell 540 Hegenberger

Enclosed are the results from samples received at Sequoia Analytical on July 15, 1998. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE COLLECTED	TEST METHOD
9807A50 -01	LIQUID, BFW-1	07/15/98	Purgeable TPH/BTEX/MTBE
9807A50 -01	LIQUID, BFW-1	07/15/98	MTBE by 8260
9807A50 -02	LIQUID, MW-3	07/15/98	Purgeable TPH/BTEX/MTBE
9807A50 -03	LIQUID, MW-2	07/15/98	Purgeable TPH/BTEX/MTBE
9807A50 -04	LIQUID, MW-1	07/15/98	Purgeable TPH/BTEX/MTBE

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Peggy Penner
Project Manager

Sequoia Analytical

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1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Cambria	Client Proj. ID: Shell 540 Hegenberger	Sampled: 07/15/98
1144 65th St. Suite C	Sample Descript: BFW-1	Received: 07/15/98
Oakland, CA 94608	Matrix: LIQUID	
	Analysis Method: 8015Mod/8020	Analyzed: 07/29/98
Attention: Maureen Feineman	Lab Number: 9807A50-01	Reported: 08/04/98

QC Batch Number: GC072998BTEX17A
Instrument ID: GCHP17

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	10000	N.D.
Methyl t-Butyl Ether	**500**	**30000**
Benzene	100	N.D.
Toluene	100	N.D.
Ethyl Benzene	100	N.D.
Xylenes (Total)	100	N.D.
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	93

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Peggy Penner
Project Manager

Sequoia Analytical

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1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Cambria	Client Proj. ID: Shell 540 Hegenberger	Sampled: 07/15/98
1144 65th St. Suite C	Sample Descript: BFW-1	Received: 07/15/98
Oakland, CA 94608	Matrix: LIQUID	
	Analysis Method: EPA 8260	Analyzed: 08/01/98
Attention: Maureen Feineman	Lab Number: 9807A50-01	Reported: 08/04/98

QC Batch Number: MS080198MTBEH6A
Instrument ID: H6

Methyl t-Butyl Ether (MTBE)

Analyte	Detection Limit ug/L	Sample Results ug/L
Methyl t-Butyl Ether	**500**	**31000**

Surrogates	Control Limits %		% Recovery
1,2-Dichloroethane-d4	76	114	99

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Peggy Penner
Project Manager

Sequoia Analytical

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1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Cambria	Client Proj. ID: Shell 540 Hegenberger	Sampled: 07/15/98
1144 65th St. Suite C	Sample Descript: MW-3	Received: 07/15/98
Oakland, CA 94608	Matrix: LIQUID	
	Analysis Method: 8015Mod/8020	Analyzed: 07/29/98
Attention: Maureen Feineman	Lab Number: 9807A50-02	Reported: 08/04/98

QC Batch Number: GC072998BTEX17A
Instrument ID: GCHP17

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	10000	N.D.
Methyl t-Butyl Ether	**500**	**12000**
Benzene	**100**	**190**
Toluene	**100**	**940**
Ethyl Benzene	**100**	**170**
Xylenes (Total)	**100**	**890**
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	77

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Peggy Penner
Project Manager

Sequoia Analytical

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1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Cambria	Client Proj. ID: Shell 540 Hegenberger	Sampled: 07/15/98
1144 65th St. Suite C	Sample Descript: MW-2	Received: 07/15/98
Oakland, CA 94608	Matrix: LIQUID	
	Analysis Method: 8015Mod/8020	Analyzed: 07/29/98
Attention: Maureen Feineman	Lab Number: 9807A50-03	Reported: 08/04/98

QC Batch Number: GC072998BTEX17A
Instrument ID: GCHP17

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	50	N.D.
Methyl t-Butyl Ether	**2.5**	**290**
Benzene	0.50	N.D.
Toluene	0.50	N.D.
Ethyl Benzene	0.50	N.D.
Xylenes (Total)	0.50	N.D.
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	90

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Peggy Penner
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (650) 364-9600, FAX (650) 364-9233
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1455 McDowell Blvd. North, Ste. D, Petaluma, CA 94954, (707) 792-1865, FAX (707) 792-0342

Cambria	Client Proj. ID: Shell 540 Hegenberger	Sampled: 07/15/98
1144 65th St. Suite C	Sample Descript: MW-1	Received: 07/15/98
Oakland, CA 94608	Matrix: LIQUID	
	Analysis Method: 8015Mod/8020	Analyzed: 07/29/98
Attention: Maureen Feineman	Lab Number: 9807A50-04	Reported: 08/04/98

QC Batch Number: GC072998BTEX17A
Instrument ID: GCHP17

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	10000	N.D.
Methyl t-Butyl Ether	**500**	**17000**
Benzene	100	N.D.
Toluene	100	N.D.
Ethyl Benzene	100	N.D.
Xylenes (Total)	100	N.D.
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	92

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Peggy Penner
Project Manager

Sequoia Analytical

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Cambria
1144 65th St., Ste. C
Oakland, CA 94608
Attention: Maureen Feineman

Client Project ID: Shell 540 Hegenberger

QC Sample Group: 9807A50-01-04

Reported: Aug 4, 1998

QUALITY CONTROL DATA REPORT

Matrix:	Liquid
Method:	EPA 8015
Analyst:	
ANALYTE	Gasoline

QC Batch #: GC072998BTEX17A

Sample No.:	GW9807E66-02
Date Prepared:	7/29/98
Date Analyzed:	7/29/98
Instrument I.D.#:	GCHP17
Sample Conc., ug/L:	N.D.
Conc. Spiked, ug/L:	250
Matrix Spike, ug/L:	280
% Recovery:	112
Matrix pike Duplicate, ug/L:	260
% Recovery:	104
elative % Difference:	7.4
RPD Control Limits:	0-25

LCS Batch#: GWBLK072998AS

Date Prepared:	7/29/98
Date Analyzed:	7/29/98
Instrument I.D.#:	GCHP17
Conc. Spiked, ug/L:	250
LCS Recovery, ug/L:	270
LCS % Recovery:	108

Percent Recovery Control Limits:

MS/MSD	60-140
LCS	70-130

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Peggy Penner
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

Sequoia Analytical

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Cambria Environmental	Client Project ID:	Shell 540 Hegenberger		
1144 65th St., Ste. C	Matrix:	Liquid		
Oakland, CA 94608				
Attention: Maureen Feineman	Work Order #:	9807A50	-01	Reported: Aug 6, 1998

QUALITY CONTROL DATA REPORT

Analyte:	MTBE
QC Batch#:	MS080198MTBEH6A
Analy. Method:	EPA 8260
Prep. Method:	N.A.
Analyst:	M. Williams
MS/MSD #:	9807H8706
Sample Conc.:	N.D.
Prepared Date:	8/1/98
Analyzed Date:	8/1/98
Instrument I.D.#:	H6
Conc. Spiked:	50 µg/L
Result:	49
MS % Recovery:	98
Dup. Result:	49
MSD % Recov.:	98
RPD:	0.0
RPD Limit:	0-25

LCS #:	LCS080198
Prepared Date:	8/1/98
Analyzed Date:	8/1/98
Instrument I.D.#:	H6
Conc. Spiked:	50 µg/L
LCS Result:	47
LCS % Recov.:	94

MS/MSD	60-140
LCS	70-130
Control Limits	

SEQUOIA ANALYTICAL

Peggy Penner
Project Manager

Please Note:
The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

SHELL OIL COMPANY
RETAIL ENVIRONMENTAL ENGINEERING - WEST

CHAIN OF CUSTODY RECORD
Serial No: 507

Date: 7/14/98
Page of

SAME DAY CHARGE

Site Address: 510 Hegenberger, Oakland
WIC#: 204-5508-5900

Shell Engineer: Alex Perez
Phone No.:
Fax #:

Consultant Name & Address: CAMBRIA ENVIRONMENTAL
1144 65th St, Suite C, Oakland, CA 94608

Consultant Contact: Maureen Feineman
Phone No.: 510 420-0700
Fax #: 510 420-9170

Comments:

Sampled by: Maureen Feineman
Printed Name: Maureen Feineman

Analysis Required

Sample ID	Date	Sludge	Soil	Water	Air	No. of conts.	TPH (EPA 8015 Mod. Gas)	TPH (EPA 8015 Mod. Diesel)	BTEX (EPA 8020/602)	Volatile Organics (EPA 8240)	Test for Disposal	Combination TPH 8015 & BTEX 8020 + MTBE 8030	Asbestos	Container Size	Preparation Used	Composite Y/N	MATERIAL DESCRIPTION	SAMPLE CONDITION/ COMMENTS
BFW-1	7/15	10:30		X		3VOA						X					Confirm highest MTBE by EPA Method 8260	
MW-3	7/15	11:00		X		3VOA						X						
MW-2	7/15	11:15		X		3VOA						X						
MW-1	7/15	11:30		X		3VOA						X						

LAB: [illegible]

CHECK ONE (1) BOX ONLY	C7/01
G.W. Monitoring	4461
Site Investigation	X 4441
Soil Classify/Disposal	4442
Water Classify/Disposal	4443
Soil/Air Rem. or Sys. O & M	4452
Water Rem. or Sys. O & M	4453
Other	

TURN AROUND TIME
24 hours
48 hours
14 days (X) (Normal)
Other

NOTE: Notify Lab as soon as Possible of 24/48 hrs. TAT.

UST AGENCY: Alameda County

Relinquished By (signature):	Printed Name:	Date: 7/15/98	Received (signature):	Printed Name:	Date: 7/15/98
Maureen Feineman	Maureen Feineman	Time: 4:03		JOHN FRICK	Time: 4:03
Relinquished By (signature):	Printed Name: JOHN FRICK	Date: 7/15/98	Received (signature):	Printed Name:	Date:
		Time:			Time:
Relinquished By (signature):	Printed Name:	Date:	Received (signature):	Printed Name:	Date:
		Time:			Time:

THE LABORATORY MUST PROVIDE A COPY OF THIS CHAIN-OF-CUSTODY WITH INVOICE AND RESULTS

Sequoia Analytical

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Cambria	Client Proj. ID: Shell 540 Hegenberger	Received: 07/15/98
1144 65th St. Suite C		
Oakland, CA 94608	Lab Proj. ID: 9807A50	Reported: 08/04/98
Attention: Maureen Feineman		

LABORATORY NARRATIVE

In order to properly interpret this report, it must be reproduced in its entirety. This report contains a total of 9 pages including the laboratory narrative, sample results, quality control, and related documents as required (cover page, COC, raw data, etc.).

SEQUOIA ANALYTICAL

Peggy Penner
Project Manager

Attachment B

Soil Boring Logs

DRILLING LOG

Client: **Equilon Enterprises LLC**

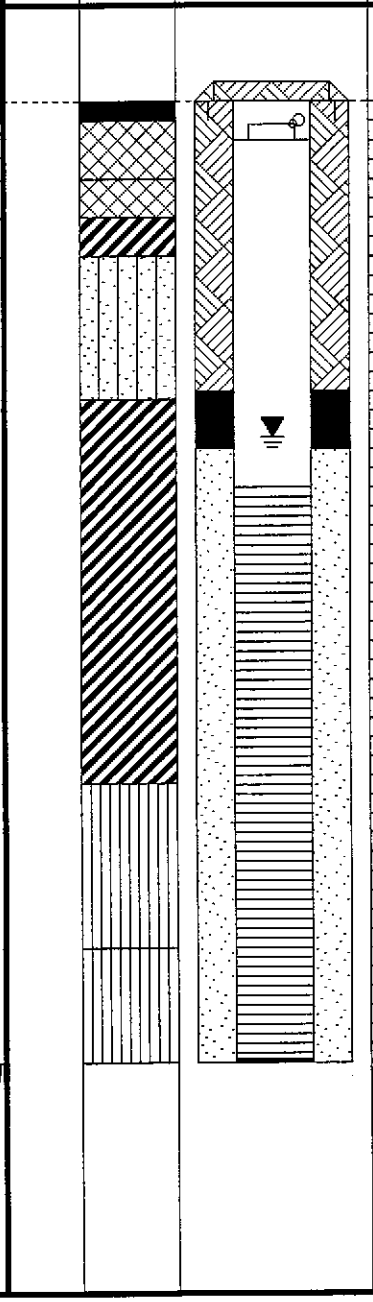
Project No: **240-0414** Phase Task012

Well ID **MW-1** Boring ID **SB-A**

Location **540 Hegenberger Road, Oakland**

Surface Elev. **NA ft,** Page **1** of **1**

Depth (feet)	Blow Count	Sample	% Rec	Lithologic Description
0	Ground Surface			
				Asphalt
				Sandy GRAVEL, FILL: (FILL); brown; loose; dry to damp; 10% silt, 20% sand, 70% gravel; no plasticity; high estimated permeability.
				Gravelly SAND, FILL: (FILL); green; loose; dry to damp; 10% silt, 50% sand, 40% gravel; no plasticity; high estimated permeability.
5	7 13 10/6"			**Silty CLAY;** (CH); black; medium stiff; dry to damp; 70% clay, 30% silt; high plasticity; very low estimated permeability.
				Silty SAND; (SM); black; loose; dry to damp; 20% silt, 80% very fine sand with chunks of rock and slag; no plasticity; high estimated permeability.
10	4 8 10/6"			**Silty CLAY;** (CH); grey; medium stiff; damp; 70% clay, 30% silt; high plasticity; very low estimated permeability.
15	4 8 10/6"			moist.
20				**Sandy, Clayey SILT;** (ML); brown; soft; wet; 30% clay, 40% silt, 30% sand; low plasticity; moderate estimated permeability.
25				**Clayey SILT;** (ML); grey; medium stiff; moist; 40% clay, 60% silt; medium plasticity; low to moderate estimated permeability.
30				



T.O.C. Elev. NA

Static water level @ 8.7 ft.

Water encountered @ 14 ft.

Bottom of well and boring @ 25 ft.

Driller	**Gregg Drilling**	Development Yield	**NA**	Bentonite Seal	**7.5' to 9'**
Logged By	**Maureen Feineman**	Well Casing	**2"** Dia. **0'** to **10'**	Sand Pack	**9' to 25'**
Drilling Started	**7/14/98**	Casing Type	**Schedule 40 PVC**	Sand Pack Type	**Monterey Sand #2-12**
Drilling Completed	**7/14/98**	Well Screen	**2"** Dia. **10'** to **25'**	Static Water Level	**8.70** ft Depth
Construction Completed	**07/14/98**	Screen Type	**Slotted Schedule 40 PVC**	Date	**7/15/98**
Development Completed	**NA**	Slot Size	**0.010"**	Notes:	**10 feet west of car wash.**
Water Bearing Zones	**NA**	Drilling Mud	**NA**		
		Grout Type	**Portland Type I/II**		

WELL 24414 7/27/98

Cambria Environmental Technology, Inc.

DRILLING LOG

Client: **Equilon Enterprises LLC**

Project No: **240-0414** Phase Task012

Well ID **MW-2** Boring ID **SB-B**

Location **540 Hegenberger Road, Oakland**

Surface Elev. **NA ft,** Page **1** of **1**

Depth (feet)	Blow Count	Sample	% Rec	Lithologic Description
0	Ground Surface			
				Sandy SILT; (ML); black; soft; moist; 10% clay, 75% silt, 15% fine sand; low plasticity; moderate estimated permeabilty.
5	3 3 6/6"			**Silty SAND**; (SM); black; loose; wet; 20% silt, 80% fine sand; no plasticity; high estimated permeability.
				Clayey SILT; (ML); black; medium stiff; wet; 40% clay, 60% silt; medium plasticity; low estimated permeability.
10	3 5 9/6"			grey; stiff.
15	5 7 8/6"			grey to brown.
20				
25				
30				

TPHg (ppm)	Graphic Log	Well Construction Graphics	Depth (feet)	Well Construction Details
			0	T.O.C. Elev. NA
			5	Static water level @ 4.75 ft. Water encountered @ 5 ft.
			10	
			15	
			20	Bottom of well and boring @ 20 ft.
			25	
			30	

Driller **Gregg Drilling**	Development Yield **NA**	Bentonite Seal **1.5' to 3'**
Logged By **Maureen Feineman**	Well Casing **2"** Dia. **0'** to **5'**	Sand Pack **3' to 20'**
Drilling Started **7/15/98**	Casing Type **Schedule 40 PVC**	Sand Pack Type **Monterey Sand #2-12**
Drilling Completed **7/15/98**	Well Screen **2"** Dia.**5'** to **20'**	Static Water Level **4.75** ft Depth
Construction Completed **07/15/98**	Screen Type **Slotted Schedule 40 PVC**	Date **07/15/98**
Development Completed **NA**	Slot Size **0.010"**	Notes: **Northern planter.**
Water Bearing Zones **NA**	Drilling Mud **NA**	
	Grout Type **Portland Type I/II**	

WELL 24414 7/27/98

Cambria Environmental Technology, Inc.

DRILLING LOG

Client: **Equilon Enterprises LLC**

Project No: **240-0414** Phase Task012

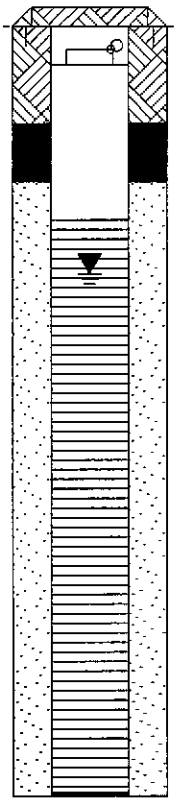
Well ID **MW-3** Boring ID **SB-C**

Location **540 Hegenberger Road, Oakland**

Surface Elev. **NA ft,** Page **1** of **1**

Depth (feet)	Blow Count	Sample	% Rec	Lithologic Description
0	Ground Surface			
				Asphalt
				Gravelly SAND, FILL: (FILL); brown; loose; dry; 10% silt, 70% sand, 20% gravel; no plasticity; high estimated permeability.
				Clayey SILT; (ML); dark grey; medium stiff; damp; 40% clay, 60% silt; medium plasticity; low estimated permeablity.
				Gravelly, Sandy SILT; (ML); black; medium stiff; wet; 10% clay, 40% silt, 20% sand, 30% gravel; low plasticity; moderate estimated permeability.
				brown; stiff; dry.
10	3 5 7/6"			**Clayey SILT;** (ML); dark grey; stiff; moist; 40% clay, 60% silt; medium plasticity; moderate estimated permeability.
15	5 7 9/6"			wet.
20				grey.
25				
30				

TPHg (ppm) | Graphic Log | Well Construction Graphics



Depth (feet)	Well Construction Details
	T.O.C. Elev. NA
0	
5	
	Static water level @ 6.4 ft.
10	
	Water encountered @ 10 ft.
15	
20	
	Bottom of well and boring @ 20 ft.
25	
30	

Driller **Gregg Drilling**

Logged By **Maureen Feineman**

Drilling Started **7/14/98**

Drilling Completed **7/14/98**

Construction Completed **07/14/98**

Development Completed **NA**

Water Bearing Zones **NA**

Development Yield **NA**

Well Casing **2"** Dia. **0'** to **5'**

Casing Type **Schedule 40 PVC**

Well Screen **2"** Dia.**5'** to **20'**

Screen Type **Slotted Schedule 40 PVC**

Slot Size **0.010"**

Drilling Mud **NA**

Grout Type **Portland Type I/II**

Bentonite Seal **2.5' to 4'**

Sand Pack **4' to 20'**

Sand Pack Type **Monterey Sand #2-12**

Static Water Level **6.40** ft Depth

Date **07/15/98**

Notes: **Adjacent to north end of western planter.**

Cambria Environmental Technology, Inc.

BORING LOG

Client: **Equilon Enterprises LLC**

Project No: **240-0414** Phase Task **012**

Boring ID **SB-D**

Location **540 Hegenberger Road, Oakland**

Surface Elev. **NA ft,** Page **1** of **1**

Depth (feet)	Blow Count	Sample	Interval	Lithologic Description
0	Ground Surface			
				Asphalt
				Clayey SILT; (ML); brown to black; medium stiff; damp; 40% clay, 60% silt; medium plasticity; low to moderate estimated permeability.
				Gravelly, Sandy SILT; (ML); black; medium stiff; damp; 10% clay, 40% silt, 30% sand, 30% gravel; low plasticity; moderate estimated permeability.
5	3 5 7/6"			**Clayey SILT**; (ML); dark grey; medium stiff; damp; 40% clay, 60% silt; medium plasticity; low estimated permeability.
10	7 9 10/6"			stiff.
15	3 7 9/6"			grey; wet
20				
25				
30				

TPHg (ppm) | Graphic Log | Boring Completion Graphics

Depth (feet): 0, 5, 10, 15, 20, 25, 30

Additional Comments:

- Water encountered @ 14 ft.
- Bottom of boring @ 16 ft.

Driller **Gregg Drilling**	Drilling Started **7/14/98**	Notes: **18 feet north of station**
Logged By **Maureen Feineman**	Drilling Completed **7/14/98**	**building.**
Water-Bearing Zones **NA**	Grout Type **Portland Type I/II**	

BOR 24414 7/27/98

Cambria Environmental Technology, Inc.

Attachment C

Standard Field Procedures for Monitoring Well Installation

CAMBRIA

STANDARD FIELD PROCEDURES FOR MONITORING WELL INSTALLATION

This document presents standard field methods for drilling and sampling soil borings and installing, developing and sampling ground water monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

SOIL BORINGS

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and to collect samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of a California Registered Geologist (RG).

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or direct-push technologies such as the Geoprobe®. Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. Additional soil samples are collected near the water table and at lithologic changes. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments at the bottom of the borehole.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Analysis

Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4° C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable volatile vapor analyzer measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. Volatile vapor analyzer measurements are used along with the field observations, odors, stratigraphy and ground water depth to select soil samples for analysis.

Water Sampling

Water samples, if they are collected from the boring, are either collected using a driven Hydropunch® type sampler or are collected from the open borehole using bailers. The ground water samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Well Construction and Surveying

Ground water monitoring wells are installed to monitor ground water quality and determine the ground water elevation, flow direction and gradient. Well depths and screen lengths are based on ground water depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 ft below and 5 ft above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three ft thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two ft above the well screen. A two ft thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of Portland type I,II cement.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security.

The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

Well Development

Wells are generally developed using a combination of ground water surging and extraction. Surging agitates the ground water and dislodges fine sediments from the sand pack. After about ten minutes of surging, ground water is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of ground water are extracted and the sediment volume in the ground water is negligible. This process usually occurs prior to installing the sanitary surface seal to ensure sand pack stabilization. If development occurs after surface seal installation, then development occurs 24 to 72 hours after seal installation to ensure that the Portland cement has set up correctly.

All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

Ground Water Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of ground water are purged prior to sampling. Purging continues until ground water pH, conductivity, and temperature have stabilized. Ground water samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

F:\TEMPLATE\SOPS\WELLS-GW.WPD

ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
951 TURNER COURT, SUITE 300, HAYWARD, CA 94545-2651
PHONE (510) 670-5575 ANDREAS GODFREY FAX (510) 670-5262
(510) 670-5248 ALVIN KAN

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 540 Hegenberger Rd. Oakland, CA

California Coordinates Source _____ ft. Accuracy ± ___ ft.
CCN _____ ft. CCE _____ ft.
APN _____

CLIENT
Name Equilon Enterprises LLC
Address PO Box 8080 Phone (510) 420-5027
City Martinez Zip 94553

APPLICANT
Name Cambria Environmental Technology
Fax (510) 420-9170
Address 1144 65th St. Phone (510) 420-3319
City Oakland Zip 94608

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	☐	General	☐
Water Supply	☐	Contamination	
Monitoring	☒	Well Destruction	☐

PROPOSED WATER SUPPLY WELL USE

New Domestic	☐	Replacement Domestic	☐
Municipal	☐	Irrigation	☐
Industrial	☐	Other _____	☐

DRILLING METHOD:

Mud Rotary	☐	Air Rotary	☐	Auger	☒
Cable	☐	Other	☐		

DRILLER'S LICENSE NO. _____

WELL PROJECTS
Drill Hole Diameter 8" in. Maximum
Casing Diameter 2" in. Depth 20 ft.
Surface Seal Depth 3-5 ft. Number 3

GEOTECHNICAL PROJECTS
Number of Borings 1 Maximum
Hole Diameter 8" in. Depth _____ ft.

ESTIMATED STARTING DATE 7/14/98
ESTIMATED COMPLETION DATE 7/14/98

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Maureen Feeney DATE 6/23/98

FOR OFFICE USE

PERMIT NUMBER 98WR266
WELL NUMBER _____
APN _____

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) **GENERAL**
1. A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
(2.) Submit to ACPWA within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
(3.) Permit is void if project not begun within 90 days of approval date.

B. **WATER SUPPLY WELLS**
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.

(C.) **GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS**
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

D. **GEOTECHNICAL**
Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

E. **CATHODIC**
Fill hole above anode zone with concrete placed by tremie.

F. **WELL DESTRUCTION**
See attached.

G. **SPECIAL CONDITIONS**

APPROVED Alvin Kan DATE 7/2/98

Attachment E

Disposal Confirmation Facsimile

DISPOSAL CONFIRMATION

Consultant:	CAMBRIA ENVIRONMENTAL
Contact:	AUBREY K. COOL
Phone/Fax:	(510) 420-0700 FAX (510) 420-9170
Client:	EQUILON ENTERPRISE - KAREN PETRYNA
Station #/Wic #:	204-5508-5900
Site Address:	540 HEGENBERGER RD
City/State:	OAKLAND, CA
Estimated YD/Ton:	2 YARDS
Actual YD/Ton:	1.43 TONS
Disposal Facility:	FORWARD LANDFILL
Disposal Date:	AUGUST 17, 1998
Contact:	BRAD BONNER
Phone #:	(800) 204-4242
Hauler:	MANLEY & SONS TRUCKING, INC.
Contact:	TIM A. MANLEY
Phone #:	(916) 381-6864
Fax #:	(916) 381-1573

7621

Date & Time Faxed

8/31/98