



Ms. Susan Hugo Alameda County Department of Environmental Health 1131 Harbor Bay Parkway, Suite 250 Alameda, CA 94502

Re: Subsurface Investigation

Richard and Julia Becker 1300 Powell Street Emeryville, CA Cambria Project #950-423

Dear Ms. Hugo:

Cambria Environmental Technology, Inc. (Cambria) is pleased to present the analytic results for the environmental investigation completed on April 25, 1997 at the site referenced above (Figure 1). The Alameda County Department of Environmental Health requested that soil and ground water samples be collected in order to delineate the extent of soil and ground water contamination at this site. Presented below are a brief site history, descriptions of the investigation procedures, analytic results for soil and groundwater, and our conclusions and recommendations.

SITE HISTORY

Cambria

ENVIRONMENTAL

TECHNOLOGY, INC.

1144 65TH STREET,

SUITE B

OAKLAND,

CA 94608

PH: (510) 420-0700

Fax: (510) 420-9170

Site Background: The site is located in a commercial area surrounded by present and former industrial facilities and a railroad line immediately to the west of the site boundary. The site is currently owned by Richard and Julia Becker. Construction Services, the tenant, operates an equipment rental yard at the site. The operations include using above-ground diesel, used oil and hydraulic oil tanks and a self-contained parts cleaning unit.

A Pennzoil bulk oil storage facility operated at the site in the 1920s - 1950s, as stated in an April 13, 1995 Investigation Report prepared by Lush Geosciences (Lush) of Sacramento, California. Sanborn Fire Insurance maps presented in the report showed the Pennzoil facility layout, a Cook Oil Company petroleum storage facility to the west, and Henry Kaiser Motors to the north. Both the Pennzoil and Cook Oil facilities operated numerous above-ground storage tanks. A historical map of the area is attached in Attachment D.

Ms. Susan Hugo July 25, 1997

1995 Subsurface Investigation: In April, 1995 Lush drilled eight soil borings to 5 ft depth and collected and analyzed soil samples. Motor oil and petroleum oil and grease were detected in all of the samples analyzed. Maximum concentrations of 3,200 and 880 parts per million (ppm) petroleum oil and grease (POG) and total petroleum hydrocarbons as motor oil (TPHmo), respectively, were detected. The analytical results of the soil borings are presented in Attachment D.

INVESTIGATION PROCEDURES

Procedures for the subsurface investigation are summarized below. Boring logs are presented as Attachment B. Analytic results for soil and ground water sampling are presented in Tables 1 and 2, respectively, and the analytic reports are presented as Attachment C.

Personnel Present: Hydrogeologist Sam Rangarajan of Cambria collected and logged the soil

samples.

Permits: Cambria obtained Alameda County Flood Control and Water Conservation

District Zone 7 Boring Permit #97262, which is included as Attachment A.

Drilling Dates: April 24, 1997.

Drilling Contractor: Vironex of Hayward, California.

Drilling Methods: Geoprobe 5400/4220 subsurface sampling system using 2-inch diameter hollow

rods.

Asphalt Thickness: 4 inches.

Ground Water Depth: Varied from one foot to approximately twelve feet.

Number of Borings: Twelve (Figure 1).

Boring Depths: Up to 12 ft below grade (Attachment B).

Ms. Susan Hugo July 25, 1997

Boring Locations:

Cambria drilled 12 soil borings on site at 1300 Powell Street (Figure 1). The locations were selected to assess whether any additional areas of the property contained hydrocarbons in soil, and to define the extent of the hydrocarbons detected during Lush's 1995 investigation.

Soil Sampling Method:

The samples were collected by driving washed samplers lined with new brass or acetate tubes.

Soil Sample Locations:

Soil samples were collected at 1, 3, 5, and 8 ft depth for most borings.

Sediment Lithology:

The sediments encountered consist primarily of clayey silts, silty sands, and gravelly sands. Many samples appeared to consist of fill. Based on regional geology, this is likely to be underlain by bay mud. The boring logs are included as Attachment B.

Soil Analyses:

Legend Analytical Services (Legend), a California-certified environmental laboratory, analyzed an initial soil sample (CB-4-5.0) from an area that showed field hydrocarbon indications for total petroleum hydrocarbons as gasoline (TPHg), diesel (TPHd), motor oil (TPHmo), creosote (TPHc), and kerosene (TPHk) by Modified EPA Method 8015; benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8020; petroleum (non-polar) oil and grease (POG) by SMWW Method 5520E/F; volatile organic compounds (VOCs) by EPA Method 8240, cadmium, chromium, nickel, lead, and zinc by EPA Method 6010, and polynuclear aromatic hydrocarbons (PNAs) by EPA Method 8270.

Because only TPHd and POG were detected in this initial sample, the subsequent samples were analyzed only for these analytes and TPHmo.

Global GeoChemistry Corporation (Global), also a California-certified environmental laboratory, analyzed one soil sample to characterize the hydrocarbons and to estimate the residence time of the hydrocarbons in the environment. Three samples were extracted with methylene chloride, and the extract of one sample (sample CB-12-3.0) was analyzed by gas chromatographymass spectrometry (GC/MS) in full scan mode. The analytical results are summarized in Table 1. Global also analyzed a grab ground water sample (CB-7) by EPA Method 8015 and quantified the results as TPHd. Analytic reports for both sets of analyses are presented in Attachment C.

Ms. Susan Hugo July 25, 1997

Soil Disposal:

The Geoprobe drilling method does not generate cuttings, therefore no soil

disposal was necessary.

Temporary Wells:

Cambria installed temporary, 1" diameter PVC well casings in the borings since water did not enter many of the borings on April 24, 1997. Cambria returned to the site on the morning of April 25, 1997 and collected grab ground water samples from the wells that contained water. The PVC piping was then removed

and the borings were grouted to the surface.

Water Sampling Method: Water samples were collected from CB-1, CB-3, CB-6, CB-7, and CB-10 using

a peristaltic pump or a polyethylene bailer. No water entered the remaining

borings.

Water Analyses:

Legend analyzed the water samples from CB-1, CB-3, and CB-10 for TPHd, TPHmo, and POG. Global extracted the water sample from CB-7, and analyzed the extract by EPA Method 8015 for TPHd. The ground water sample results are summarized in Table 2, and the analytical reports are presented in Attachment C.

HYDROCARBON DISTRIBUTION IN SOIL

The broad range of analyses conducted on sample CB-4-5.0 indicated that the constituents of concern in the onsite soils are heavier, long-chain hydrocarbons, such as TPHd, TPHmo, and POG. The analytical results for soil showed that the extent of hydrocarbons in soil is defined to below 1,000 ppm POG along the southern, eastern, western, and most of the northern site boundary. Cambria was not able to place additional borings along the northern boundary due to access problems. The hydrocarbon concentrations in soil appear to decrease toward the property boundaries.

The Global analyses indicated that the hydrocarbons detected in the sample were moderately degraded and not from a recent release.

HYDROCARBON DISTRIBUTION IN GROUND WATER

The regional ground water direction pattern is toward the west. Therefore, the downgradient extent of hydrocarbons in ground water is not defined to concentrations below detection limits. However, grab ground water samples collected from open borings often show much higher hydrocarbon concentrations than samples collected from traditional monitoring wells after proper purging.

CONCLUSIONS AND RECOMMENDATIONS

Cambria recommends regulatory case closure for this site based on the following rationale:

- Hydrocarbon concentrations in soil are defined to within 1,000 ppm, a common regulatory
 guideline, to the east, west, south, and most of the northern property line;
- The constituents of concern consist of POG, TPHd, and TPHmo. These hydrocarbons
 present very little risk to human health and the environment due to their low mobility, low
 volatility, and low toxicity;
- The site is located in an industrial area;
- It is very unlikely that any remedial effort would be feasible to address the low hydrocarbon concentrations besides natural hydrocarbon biodegradation;
- The forensic analysis indicates that hydrocarbon biodegradation is occurring, indicating that hydrocarbon concentrations should diminish over time; and
- The affected ground water does not have a present or known future beneficial use.

CAMBRIA

We appreciate this opportunity to provide environmental consulting services to Richard and Julia Becker. Please call us with any questions or comments.

Sincerely,

Cambria Environmental Technology, Inc.

Daniel Mis

David Elias, RG Project Geologist

Attachments:

A - Permits

B - Boring Logs

C - Analytic Results

D - Lush GeoSciences Figure and Table

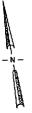
E - Standard Field Procedures

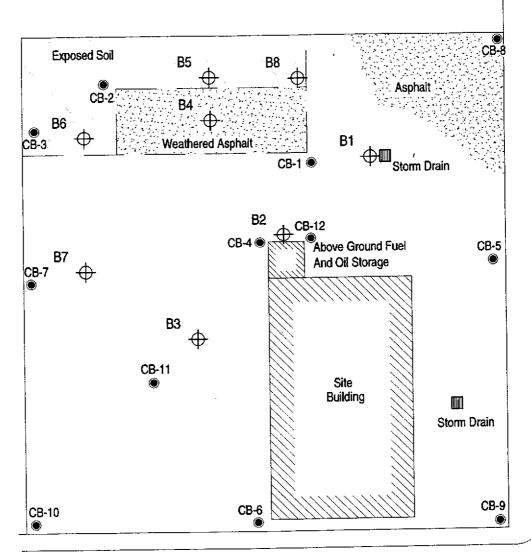
cc:

Richard Becker, 1300 Powell Street, Emeryville, CA 94608

Julie Rose, Randick & O'Dea, 1800 Harrison Street, Suite 2350, Oakland, CA 94612

F:\PROJECT\CONSERV\REPORT.WPD

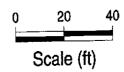




POWELL STREET

EXPLANATION

- Soil Boring Locations April 24,1997
- Previously Drilled Soil Boring



Cambria

Environmental Technology, Inc.

Construction Services Facility 1300 Powell Street Emeryville, CA

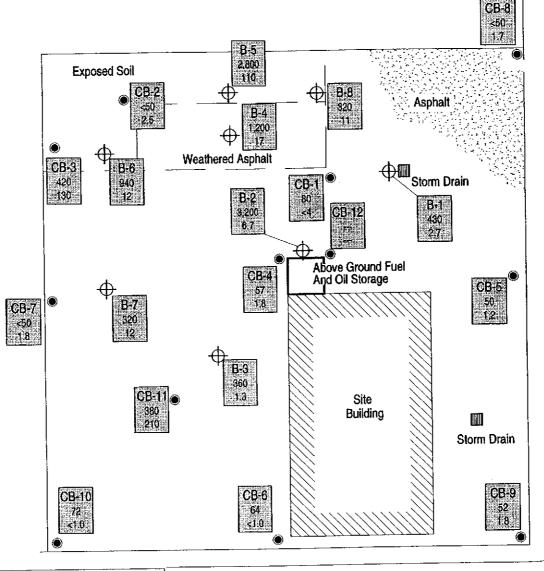
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Soil Boring Locations

FIGURE

1

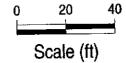




EXPLANATION

- Soil Boring Locations April 24, 1997
- Previously Drilled Soil Broing
- Analyzed for Forensic Analyses Only
- 1. Boring ID
 - 2. Petroleum Oil and Grease (mg/kg)
- TPHe 2. Petroleum OII and Great (....)
 TPHE 3. Total Petroleum Hydrocarbons as Diesel (mg/kg)

POWELL STREET



AMBRIA

Environmental Technology, Inc.

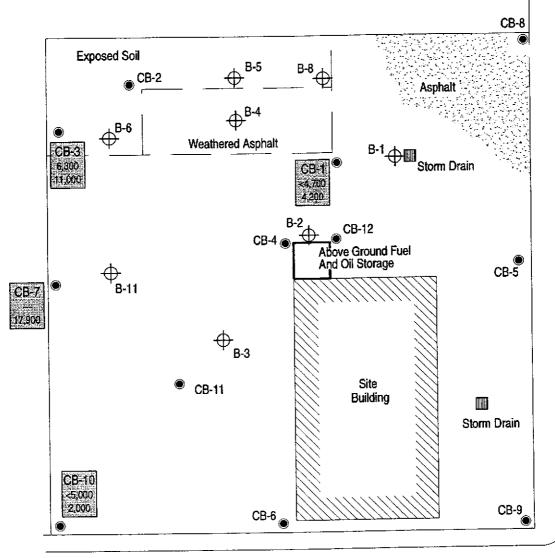
Construction Services Facility 1300 Powell Street Emeryville, CA

F:\PROJECT\MISC\CNSTRSVS\SOIL-CON.DWG

Maximum Petroleum Oil and Grease and TPHd Concentrations in Soil

FIGURE





EXPLANATION

- Soil Boring Locations April 24, 1997
 - Previously Drilled Soil Broing
- D 1. Boring ID POG 2. Pertroleur TPHd 3. Total Petr
 - 2. Pertroleum Oil and Grease (µg/kg)
 - Total Petroleum Hydrocarbons as Diesel (μg/kg)

POWELL STREET





Environmental Technology, Inc.

Construction Services Facility 1300 Powell Street Emeryville, CA

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Maximum Petroleum Oil and Grease and TPHd Concentrations in Ground Water FIGURE

3

Table 1. Soil Analytic Data - Construction Services, 1300 Powell Street, Emeryville, CA

Boring ID	Date Sampled	Sample Depth (ft)	TPHg	TPHd	TPHmo	ТРНс	TPHk	NPOG	Metals (Concentrati	Benzene ons in mg/kg)	Toluene	Ethylbenzene	Xylenes	VOC _s	PNAs
CB-1	4/24/97	5.0		<4	71*			80		_			•		
CB-2	4/24/97	3.0 6.0		2.2 ^b 2.5 ^b	<10 <10	<u>-</u>	,,,,,,	<50 <50			<u>-</u>	مين	_		
CB-3	4/24/97 4/24/97	3.5	_	130	210		<u></u>	420			_		_		
CB-4	4/24/97	5.0	<1.0	1.8 ^b	<10	<10	<1.0	57	c	<0.0025	<0.0025	<0.0025	<0.0025	đ	<0.33
СВ-5	4/24/97	3.0		1.2°	<10			50	-		_	***	_		
CB-6	4/24/97	3.0		<1.0	14	_		64							-
CB-7	4/24/97	3.0	_	1.8 ^b	<10			<50	_		_			***	ber-
CB-8	4/24/97	5.0		1.7 ⁵	<10			<50			_				
CB-9	4/24/97	5.0		1.8 ^b	<10			52		_		***			_
CB-10	4/24/97	3.0		<1.0	11 ^R		_	72		_	***	-			
CB-11	4/24/97	5.0	==-	210	450		_	380	_			_		_	
CB-12	4/24/97	3.0	840 ^f							<0.25	<0.25	2.0	6.2		

Table 1. Soil Analytic Data - Construction Services, 1300 Powell Street, Emeryville, CA

																
Sampled Derth (ft) (Concentrations in me/kg)	Boring ID	Date	Sample	TPHg	TPHd	TPHmo	TPHc	TPHk	NPOG	Metals	Benzene	Toluene	Ethylbenzene	Xylenes	VOCs	PNAs
Outspeed Departed	Sampled Depth (ft) (Concentrations in mg/kg)															

Abbreviations:

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

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

TPHd = Total petroleum hydrocarbons as diesel by Modified EPA Method 8015

TPHmo = Total petroleum hydrocarbons as motor oil by Modified EPA Method 8015

TPHc = Total petroleum hydrocarbons as creosote by Modified EPA Method 8015

TPHk = Total petroleum hydrocarbons as kerosene by Modified EPA Method 8015

POG = Petroleum (non-polar) oil and grease by SMWW Method 5520E/F

Metals = Cadmium, chromium, lead, nickel, and zinc by EPA Method 6010

VOCs = Volatile organic vompounds by EPA Method 8240

PNAs = Polynuclear aromatic hydrocarbons by EPA Method 8270

mg/kg = Milligrams per kilogram, which is equivalent to parts per million

--- = Not analyzed

Notes:

- a = Peaks detected within the quantitation range do not match the standard used.
- b = Result has an atyical pattern for diesel analysis
- c = 35 mg/kg chromium, 26 mg/kg nickel, 31 mg/kg zinc, other metals below detection limits. Analytic Laboratory noted that the matrix spike for zinc exceeded established QC limits, post digestion spike was in control.
- d = 0.011 mg/kg acetone found in sample. 0.006 mg/kg acetone also found in Method Blank. All other VOCs below detection limits.
- e = Result appears to be a heavier hydrocarbon than diesel
- f = Result appears to be a heavier hydrocarbon than gasoline.
- g = Laboratory noted that method blank contained 68 mg/kg total oil and grease. The laboratory believes this to be due to point source contamination. Control spikes were within acceptable limits.

Table 2. Ground Water Analytic Data - Construction Services, 1300 Powell Street, Emeryville, CA

Boring ID	Date Sampled	ТРН	TPHmo (concentrations in μg/L)	POG
СВ-1	4/24/97	4,200°	15,000	<4,700
CB-3	4/24/97	11,000*	24,000 ^b	6,300
CB-7	4/24/97	17,900°		
CB-10	4/24/97	2,000°	3,300 ^b	<5,000

Abbreviations and Notes:

TPHd = Total petroleum hydrocarbons as diesel by Modified EPA Method 8015

TPHmo = Total petroleum hydrocarbons as motor oil by Modified EPA Method 8015

TOG = Total oil and grease by SMWW Method 5520B

POG = Petroleum (non-polar) oil and grease by SMWW Method 5520B/F

mg/L = Milligrams per liter which is equivalent to parts per million

--- = Not analyzed

a = Result appears to be a heavier hydrocarbon than diesel

b = Peaks detected within the quantitation range do not match the standard used.

c = Analysis by Global Geochemistry Corporation

Analyses by Legend Analytical Services unless otherwise noted.

CAMBRIA

ATTACHMENT A

PERMITS

Apr-23-97 02:38P

P.01



ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94588 VOICE (510) 484-2600 FAX (510) 462-3914

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE	FOA OFFICE USE
	PERMIT NUMBER 97262
LOCATION OF PROJECT 1300 POWELL ST.	LOCATION NUMBER
EMERGUILLE, CALIE.	LOCATION
CLIENT Name RICHARD & JULIA BECKER	PERMIT CONDITIONS
Address 1300 Perseul Voice 510 - 652-6800 City EMERTYILLE CA Zp	Circled Parmit Requirements Apply
APPLICANT Name Cambera Environmenta - Vector Daved Eura T Fax Blb-420-9170 Address IN4 65 57 Bre B Voice 510-420-3301 City Daved AND CR Zip G V 608 Type OF PROJECT Well Construction General Callodic Protection General Water Supply Contamination X Moritoring Well Destruction PROPOSED WATER SUPPLY WELL USE	Zone 7 office five days prior to proposed starting date. 2. Submit to Zone 7 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 WELLS, INCLUDING PIEZOMETERS 1. Minimum surface seal thickness is two inches of gement grout
Domestic Industrial Other Municipal Infigation DRILLING METHOD:	paced by territor. 2. Minimum seal depth is 50 fact for municipal and industrial wells. 2. Winimum seal depth is 50 fact for municipal and industrial wells. 2. Vicinity approved. Minimum seal depth for depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 fact.
Mud Rotary Air Rotary Auger	C. GEOTECHNICAL. Backfill bore hole with compacted statings of
Cable Comer HyDRAULIE PLSH	teavy bentonite and upper two feet with compacted material. In sreas of known or suspected contamination, tremied cement grout
DRILLER'S LICENSE NO. VIRONE 4 705 927	shall be used in place of compacted cuttings. D. CATHODIC. Fill hole above anode zone with concrete placed by
WEUL PROJECTS Drill Hole Diameter in. Maximum Casing Diameter in. Depth ft. Surface Seal Depth tt. Number	tramis. E. WELL DESTRUCTION. See anached.
GEOTECHNICAL PROJECTS Number of Borings 8-12 Maximum Hole Diameter 7 in. Depth 10-15 ft.	
ESTIMATED STARTING DATE 4/24/94 ESTIMATED COMPLETION DATE 4/24/54 I hereby agree to comply with all requirements of this permit and Alameda	Approved Wyman Hong Date 29 Apr 97
County Ordinance No. 73-68.	V
APPLICANTS Warn of this Date 4/24	154

	BORING LOG Client: Becker							Boring ID CB-1					
	nt: Becker ect No: 95-42	3		Phase	Task	005		on 130 e Elev. I		well St.		Page 1 of 1	
Depth (feet)		Sample	Interval		Lithologic Description		TPHg (mdd)	Graphic Log		Boring mpletion raphics	Depth (feet)		
5	Ground Surface	X			(MŁ); black to grey; clay, 75% silt, 10% no plasticity; moder rmeability. 20% clay, 70% silt, e sand; low plasticit rate estimated						5		
10		X									10	Bottom of boring @ 12 ft.	
Dri	ller <u>Vironex</u>				Drilling Started 4	/24/9	7		N	otes: See	site r	nap.	
Log	gged By SR				Drilling Completed	4/24	1/97		-				
Wa	ster-Bearing Zon	es	NA		Grout Type Por	rtland	Туре	1/11	_ .				

CAMBRIA

ATTACHMENT B

BORING LOGS

		SORING LOG				Boring	iD.	CB-2
Client: Becker Project No: 95-4	23	Phase	Task 005		on 130 :e Elev. N	0 Powell St.		Page 1 of 1
Conut Blow	Sample Interval		nologic cription	TPHg (ppm)		Boring Completion Graphics	Depth (feet)	
O Ground Surf		ASPHALT Clayey SiLT; (ML clay, 70% silt, 10 low plasticity; low estimated permeasured permeasured) light brown to graph 25% clay, 65% sand; medium platestimated permeasured	ey; damp to moist; silt, 10% very fine sand; w to moderate ability. ey; damp to moist; silt, 10% very fine asticity; low ability. SAVEL (GC); light moist; 20% clay, parse sand, 55% lity; moderate to high		9		5	Bottom of boring @ 10 ft.
Driller Virone Logged By SF Water-Bearing Zo		Dr	illing Started 4/24/5 illing Completed 4/2 out Type Portland	4/97	1/11	Notes: See	site r	nap.

			ВО	RING LOG					Boring	ID	CB-3
Clier	nt: Becker						Location	on 130	0 Powell St.		
Proje	ect No: 95-42	3		Phase	Tá	ask 005	Surfac	e Elev. N	IA ft,		Page 1 of 1
Depth (feet)	Blow Count	Sample	Interval	1	Lithologic Description		TPHg (ppm)	Graphic Log	Boring Completion Graphics	Depth (feet)	Additional Comments
0	Ground Surfac	e_							- TR///1847//54776	o	
				ASPHALT Clayey SILT; (damp; 25 % cl sand; medium estimated per	MH); dark brod lay, 65% silt, o to high plastic meability.	wn; 10% city; low			***************************************	-	Water level @ 1 ft.
5		X								5	Bottom of boring @ 5 ft.
- -											
10										10	
	iller <u>VIRONE</u>	X			Drilling Starte				Notes: See	site r	nap.
Lo	gged By SR				Drilling Comp	leted <u>4/2</u>	4/97				
w	ater-Bearing Zon	es	NA		Grout Type	Potland	Type	/11			

			ВО	RING LOG					Во	oring	łD	CB-4
Clier									Powell St	. .		
Proje	ect No: 95-42	3	r	Phase	Tas	k 00 5	Surfac	e Elev. N	A ft,	" T		Page 1 of 1
Depth (feet)	Blow Count	Sample	Interval		ithologic escription		TPHg (ppm)	Graphic Log	Boring Completic Graphics	on S	Depth (feet)	Additional Comments
0	Ground Surface			ASPHALT Clayey, Sandy damp; 15% cli coarse sand; lo moderate estin	SiLT; (ML); bla ay, 50% silt; 35 bw plasticity; lo nated permeabi 15% clay, 109 and, 25% grave estimated perm	w to lity. C); light 4 silt		5			5	Bottom of boring @ 8 ft.
D	riller VIRONE	X			Drilling Started	4/24/9	97		Notes: _	See	site :	map.
Lo	ogged By SR				Drilling Compl	eted <u>4/2</u>	4/97					
W	ater-Bearing Zor	nes	NA		Grout Type	Portland	Type	1/0				

BORING LOG		Boring ID CB-5					
Client: Becker Project No: 95-423 Phase		.ocation 1300 Surface Elev. N .			Page 1 of 1		
Connt Sample Interval		(ppm) Graphic Log	Boring Completion Graphics	Depth (feet)	Additional Comments		
Ground Surface ASPHALT Silty GRAV damp; 307w to high esti Sandy GRA grey; damp medium sar plasticity; h permeability	EL; (GM); black to brown; silt, 10% sand, 60% el; no plasticity; moderate mated permeability. WEL; (GP); light brown to; 5% silt, 35% coarse to ad; 60% coarse gravel; no igh estimated /.			5	Bottom of boring @ 8 ft.		
Driller VIRONEX Logged By SR Water-Bearing Zones NA	Drilling Started 4/24/97 Drilling Completed 4/24/9 Grout Type Portland T	97	Notes: See	site r	nap.		

B	ORING LOG	Boring ID CB-6					
Client: Becker Project No: 95-423	Phase Task 005	Location 1300 Powell St. Surface Elev. NA ft,					
Depth (feet) (feet) Anno Sample Interval	Lithologic Description	Graphics Graphics					
Ground Surface	ASPHALT Silty SAND; (SM); black to brown; damp; 5% clay, 25% silt, 60% coarse sand, 10% gravel; no plasticity; moderate estimated permeability. moist; 10% clay, 25% silt; 65% coarse sand; low plasticity; moderate estimated permeability.		Water level @ 4.25 ft. Bottom of boring @ 8 ft.				
Driller VIRONEX Logged By SR	Drilling Started 4/24/5 Drilling Completed 4/2	4/97	See site map.				
Water-Bearing Zones NA	Grout Type Portland	Type I/II					

	BORING LOG								Boring	ID	СВ-7
	t: Becker ct No: 95-42	3		Phase	Task	005		n 1300 e Elev. N	D Powell St. A ft,		Page 1 of 1
Depth (feet)	Blow Count	Sample	interval		ithologic escription		TPHg (mdd)	Graphic Log	Boring Completion Graphics	Depth (feet)	Additional Comments
0	Ground Surfac	e		ASPHALT				o · · · · ·		0	
		X		damp; 12% clasand, 38% graestimated perm	; (SP); black to b ay, 10% silt, 40° wel; no plasticity neability.	rown; % ; high					
=		X						0 0 0 0		_	
5		X		brown; 15% c sand, 35% gra moderate to hi permeability.	lay, 10% silt, 40 wel; low plasticit igh estimated)% : y ;		0 0		5	
- - -								0 0		~	Water level @ 7.33 ft.
- -								0.6			Bottom of boring @ 8 ft.
10	i									10	
										- -	
Dr	iller VIRONE	X			Drilling Started	4/24/	97		Notes: <u>Se</u>	e site	map.
Lo	gged By SR				Drilling Comple	ted <u>4/2</u>	24/97		_		
l w	ater-Bearing Zor	nes	. NA		Grout Type	Portlan	d Type	1/11		•••	

	BORING LOG							Boring ID CB-8					
	t: Becker	_				005			0 Powell St.				
Proje	ct No: 95-42			Phase	Task	005	Surface	Elev. N	iA Π,		Page 1 of 1		
Depth (feet)	Blow	Sample	Interval	L	ithologic		TPHg (ppm)	Graphic Log	Boring Completion Graphics	Depth (feet)	Additional		
De (fe	Count	San	Inte	De	escription		트트	Gra L	Graphics	P F	Comments		
					· · · · • · · · · · · · · · · · · · · ·			-					
(Ground Surfac	a								0			
0	around aunitu			ASPHALT						<u> </u>			
-				Sandy SILT; (No. 1)	AL); black; dry; 15 30% sand, 10% sticity; moderate	5%				h			
		V		gravel; low pla estimated pern	sticity; moderate neability.								
_		_								<u></u>			
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-			:							-			
5			1	brown; 20% c	lay, 40% silt, 30	%				5			
-	· · · · · · · · · · · · · · · · · · ·	M		very fine sand, to medium pla: permeability.	lay, 40% silt, 30° , 10% small grave sticity; low estima	el; low ated				<u> </u>			
_				permeability.									
_										}			
-										<u> </u> -			
_										_			
		M								_	B		
											Bottom of boring @ 8 ft.		
		1											
10										10			
•													
•	-												
-													
	-												
Dr	iller VIRONE	Х			Drilling Started	4/24/9	7		Notes: Sec	e site ı	map.		
Lo	gged By SR				Drilling Complete								
Water-Bearing Zones NA Grout Type Portlan								1/11					

			BO	RING LOG		, ,				Bo	ring	ID	CB-9		· · ·
	t: Becker									D Powell St.					
Proje	ct No: 95-42	3		Phase		Task	005	Surfac	e Elev. N	A ft,	_	,	Page	1 of	1
Depth (feet)	Blow Count	Sample	Interval		ithologic escription			(mdd)	Graphic Log	Boring Completio Graphics	n	Depth (feet)	Add Cor	ditional nments	;
-	Ground Surfac	e		ASPHALT Sandy GRAVEI 10% silt, 30% gravel; no plasi estimated pern	L; (GP); bla sand, 60 9 ticity; mod- neability.	ck; dry, 6 coars erate to	; se o high					0		-	
5		X		Clayey SAND; clay, 10% silt, gravel; low pla moderate estin 20% clay, 10% 0.5° diameter plasticity; low permeability.	sticity; low nated perm	/ to leability	<i>i</i> .					- - 5			
10												10	Bottom of ft.	, of boring	@ 8
D	iller VIRONE	X		Au	Drilling St	arted _	4/24/9	97		Notes: _	See	site ı	map.		
Lc	ogged By SR				Drilling Co	mplete	d 4/2	4/97		_					
w	ater-Bearing Zor	es	<u>NA</u>	·	Grout Typ	e Po	ortland	Type	1/11						

			ВО	RING LOG					Boring	ID	CB-10
	: Becker	_							Powell St.		
Projec	t No: 95-42		:	Phase	Tas	sk 005	Surfac	e Elev. N	A It,		Page 1 of 1
Depth (feet)	Blow Count	Sample	Interval		ithologic escription		(mdd)	Graphic Log	Boring Completion Graphics	Depth (feet)	Additional Comments
0	Ground Surfac	e		ASPHALT Sitty SAND; (S clay, 28% silt, gravel; low pla estimated pern	M); black, dry; 50% sand, 10 sticity; modera neability.	12% 0% site	-			0	
-		X		Sity Grandly	CAMD- (SM/SD						
5		X		Silty, Gravelly brown; dry; 20 sand, 20% coa plasticity; mod permeability.	SAND: (SM/SF) 0% silt, 60% c arse gravel; no erate to high e	oarse estimated				5	
		X									Water level @ 7.25 ft. Bottom of boring @ 8 ft.
10										10	
Dril	ler VIRONE	X			Drilling Starte	d <u>4/24/</u>	97		Notes: Se	e site	map.
11	gged By SR	ıes	NA		Drilling Comp			1/11			

			ВО	RING LOG						Boring	I ID	CB-11
Clien Proje	t: Becker ect No: 95-42	3		Phase		Task	005	i	on 1306 e Elev. N	O Powell St. A ft,		Page 1 of 1
Depth (feet)		Sample	interval		ithologic escription			TPHg (ppm)	Graphic Log	Boring Completion Graphics	Depth (feet)	
<u> </u>	Ground Surfac	e		ASPHALT Gravelly SAND 10% clay, 159 gravel; no plas permeability.); (SP); orang % silt, 45% ticity, high e	ge; dry sand, estima	/; 30% ted				0	,
-5		X		Clayey SILT; (I clay, 70% silt, plasticity; low permeability.		dry; 2 low estim	20% nated				5	
10											10	Bottom of boring @ 8 ft
[Dr	iler <u>VIRONE</u>	X			Drilling Sta	rted _4	1/24/9	7		Notes: Se	e site ı	map.
1	gged By SR				Drilling Cor				·	_		
w	atei-Bearing Zon	es	NA		Grout Type	Po	ortland	Туре	1/11	_		

BORING LOG				Boring	ID	CB-12
Client: Becker	T . 00E	3		O Powell St.		. 4 . 4
Project No: 95-423 Phase Phase Phase Count Phase	Task 005 Lithologic Description	TPHg (mdd)	Graphic Log	Boring Completion Graphics	Depth (feet)	Page 1 of 1 Additional Comments
Gravelly SA damp to mo 40% coarse low to medi	; (ML); black; damp; 15% ilt, 10% medium to; low plasticity; low to stimated permeability. ND; (SP); black to brown; ist; 15% clay, 10% silt, sand, 35% coarse gravel; um plasticity; moderate to ted permeability. Drilling Started 4/24/S			Notes: See	5	Bottom of boring @ 8 ft.
Logged By SR	Drilling Completed 4/2	•				
Water-Bearing Zones NA	Grout Type Portland		1/11			

CAMBRIA

ATTACHMENT C

ANALYTIC RESULTS

LEGEND

Analytical Services

3636 N. Laughlin Road, Suite 110 Santa Rosa, California 95403 707.526.7200 Fax 707.541.2333 E-Mail: info@legendlab.com

David Elias Cambria Env. Technology 1144 65th Street Suite C Oakland, CA 94608 Date: 05/15/1997

LEGEND Client Acct. No: 98900

LEGEND Job No: 97.00840 Received: 04/26/1997

Client Reference Information

Becker/Project No. 950-0423-4

Sample analysis in support of the project referenced above has been completed and results are presented on the following pages. Results apply only to the samples analyzed. Reproduction of this report is permitted only in its entirety. Please refer to the enclosed "Key to Result Flags" for definition of terms. Should you have questions regarding procedures or results, please feel free to call me at (707) 541-2313.

Sample 274962 shows a NAR flag adjacent to the total oil and grease result. The blank value for the total oil and grease came out positive. All other indicators are acceptable. This shows a point source contamination that didn't appear to affect the sample results. The recoverable petroleum hydrocarbon result for the blank was non-detect. The contamination was a polar, biological, source.

Submitted by:

Marty French Project Manager

Enclosure(s)

LEGEND

Analytical Services

3636 N. Laughlin Road, Suite 110 Santa Rosa, California 95403 707.526.7200 Fax 707.541.2333 E-Mail: info@legendlab.com

David Elias Cambria Env. Technology 1144 65th Street Suite C Oakland, CA 94608 Date: 05/15/1997

LEGEND Client Acct. No: 98900

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Submitted by:

Marty French-Project Manager

Enclosure(s)

Client Acct: 98900 LEGEND Job No: 97,00840 Date: 05/15/1997

ELAP Cert: 2193 Page: 3

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-3

Date Taken: 04/24/1997

LEGEND Sample No: 274953				-				Run
			Reporting	3		Date	Date	Batch
<u>Parameter</u>	Results	Flags	Limit	Units	Method	Extracted	Analyzed	No
Oil & Grease (Total)	7.9		5.0	mg/L	5520B		05/08/1997	450
Oil & Grease (Non-Polar)	6.3		5.0	mg/L	5520B/F		05/08/1997	425
M8015 (EXT., Liquid)						05/06/1997		
DILUTION FACTOR*	20						05/08/1997	1329
as Diesel	11 J	DH	1.0	mg/L	3510		05/08/1997	1329
as Motor Oil	24	нх	10	mg/L	3510		05/08/1997	1329
SURROGATE RESULTS							05/08/1997	1329
Ortho-terphenyl (SURR)	144			% Rec.	3510		05/08/1997	1329

Client Acct: 98900 LEGEND Job No: 97.00840 Date: 05/15/1997

ELAP Cert: 2193 Page: 5

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-1-5.0

Date Taken: 04/24/1997

LEGEND Sample No: 274958								Run
			Reporting	ī		Date	Date	Batch
Parameter	Results	Flags	Limit	Units	Method	Extracted	Analyzed	No.
Oil & Grease (Total)	260		50	mg/kg	5520E		05/08/1997	366
Oil & Grease (Non-Polar)	80		50	mg/kg	5520E/F		05/08/1997	364
M8015 (EXT., Solid)						05/07/1997		
DILUTION FACTOR*	4						05/14/1997	1270
as Diesel	ND		4	mg/kg	3550		05/14/1997	1270
as Motor Oil	71	HX	40	mg/kg	3550		05/14/1997	1270
SURROGATE RESULTS							05/14/1997	1270
Ortho-terphenyl (SURR)	74			% Rec.	3550		05/14/1997	1270

Client Acct: 98900 LEGEND Job No: 97.00840 Date: 05/15/1997

ELAP Cert: 2193 Page: 6

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-4-5.0

Date Taken: 04/24/1997

LEGEND Sample No: 274962								Run
			Reporting			Date	Date	Batch
Parameter	Results	Flaqs	Limit	Units	Method	Extracted	Analyzed	Ņo.
Oil & Grease (Total)	99/	NAR	50	mg/kg	5520E		04/30/1997	365
Oil & Grease (Non-Polar)	57 🗸		50	mg/kg	5520E/F		04/30/1997	362
METHOD 6010 (SOLID)							04/30/1997	828
Cadmium (ICP)	ND 🗸		2.0	mg/kg	EPA 6010	04/29/1997	04/30/1997	734
Chromium (ICP)	35√		2.0	mg/kg	EPA 6010	04/29/1997	04/30/1997	745
Lead (ICP)	$_{ extsf{ND}} \lor$		20	mg/kg	EPA 6010	04/29/1997	04/30/1997	608
Nickel (ICP)	26/		5.0	mg/kg	EPA 6010	04/29/1997	04/30/1997	638
Zinc (ICP)	31/	NI3	5.0	mg/kg	EPA 6010	04/29/1997	04/30/1997	683
TPH (Gas/BTXE, Solid)								
5030/M8015							04/29/1997	2133
DILUTION FACTOR*	1						04/29/1997	2133
as Gasoline	ND 🗸		1.0	mg/kg	5030		04/29/1997	2133
8020 (GC,Solid)	,						04/29/1997	2133
Benzene	ND		2.5	ug/kg	8020		04/29/1997	2133
Toluene	ND /		2.5	ug/kg	8020		04/29/1997	2133
Ethylbenzene	ND		2.5	ug/kg	8020		04/29/1997	2133
Xylenes (Total)	ND		2.5	ug/kg	8020		04/29/1997	2133
SURROGATE RESULTS							04/29/1997	2133
Bromofluorobenzene (SURR)	82			% Rec.	5030		04/29/1997	2133
8015M - HEAVY SCAN						05/01/1997		
DILUTION FACTOR*	1.0						05/02/1997	31
as Creosote	ND V		10	mg/kg	M8015		05/02/1997	31
as Diesel	1.8 🗸	D-	1.0	mg/kg	M8015		05/02/1997	31
as Kerosene	ND 🗸		1.0	mg/kg	M8015		05/02/1997	31
as Motor Oil	ND 🎶		10	mg/kg	M8015		05/02/1997	31
SURROGATE RESULTS							05/02/1997	31
Ortho-terphenyl (SURR)	77			% Rec.	M8015		05/02/1997	31

Client Acct: 98900 LEGEND Job No: 97.00840 Date: 05/15/1997

ELAP Cert: 2193 Page: 7

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-4-5.0

Date Taken: 04/24/1997

Time Taken:

LEGEND Sample No: 274962								Run
			Reporting			Date	Date	Batch
Parameter	Results	Flags	Limit	Units	Method	Extracted	Analyzed	No.
8240(GCMS, Solid)								
DILUTION FACTOR*	1						05/01/1997	476
Benzene	ND		5.0	ug/kg	8240		05/01/1997	476
Acetone	11	B-0	10	ug/kg	8240		05/01/1997	476
Bromodichloromethane	ND		5.0	ug/kg	8240		05/01/1997	476
Bromoform	ND		5.0	ug/kg	8240		05/01/1997	476
Bromomethane	ND		5.0	ug/kg	8240		05/01/1997	476
2-Butanone	ND		10	ug/kg	8240		05/01/1997	476
Carbon disulfide	ND		5.0	ug/kg	8240		05/01/1997	476
Carbon tetrachloride	ND		5.0	ug/kg	8240		05/01/1997	476
Chlorobenzene	ND		5.0	ug/kg	8240		05/01/1997	476
Chloroethane	ND		5.0	ug/kg	8240		05/01/1997	476
2-Chloroethyl vinyl ether	ND		10	ug/kg	8240		05/01/1997	476
Chloroform	ND		5.0	ug/kg	8240		05/01/1997	476
Chloromethane	ND		5.0	ug/kg	8240		05/01/1997	476
Dibromochloromethane	ND		5.0	ug/kg	8240		05/01/1997	476
1,2-Dichlorobenzene	ND		5,0	ug/kg	8240		05/01/1997	476
1,3-Dichlorobenzene	ND		5.0	ug/kg	8240		05/01/1997	476
1,4-Dichlorobenzene	ND		5.0	ug/kg	8240		05/01/1997	476
1,1-Dichloroethane	ND		5.0	ug/kg	8240		05/01/1997	476
1,2-Dichloroethane	ND		5.0	ug/kg	8240		05/01/1997	476
1,1-Dichloroethene	ND		5.0	ug/kg	8240		05/01/1997	476
trans-1,2-Dichloroethene	ND		5.0	ug/kg	8240		05/01/1997	476
1,2-Dichloropropane	ND		5.0	ug/kg	8240		05/01/1997	476
cis-1,3-Dichloropropene	ND		5.0	ug/kg	8240		05/01/1997	476
trans-1,3-Dichloropropene	ND		5.0	ug/kg	8240		05/01/1997	476
Ethyl benzene	ND		5.0	ug/kg	8240		05/01/1997	476
Freon 113	ND		0.50	ug/kg	8240		05/01/1997	476
2-Hexanone	ND		10	ug/kg	8240		05/01/1997	476
Methylene chloride	ND		5.0	ug/kg	8240		05/01/1997	476
4-Methyl-2-pentanone	ND		10	ug/kg	8240		05/01/1997	476
Styrene	ND		5.0	ug/kg	B240		05/01/1997	476
1,1,2,2-Tetrachloroethane	ND		5.0	ug/kg	8240		05/01/1997	476
Tetrachloroethene	ND		5.0	ug/kg	8240		05/01/1997	476
Toluene	ND		5.0	ug/kg	8240		05/01/1997	476
1,1,1-Trichloroethane	ND		5.0	ug/kg	8240		05/01/1997	476
1,1,2-Trichloroethane	ND		5.0	ug/kg	8240		05/01/1997	476
Trichloroethene	ND		5.0	ug/kg	8240		05/01/1997	476
Trichlorofluoromethane	ND		5.0	ug/kg	8240		05/01/1997	476
Vinyl acetate	ND		10	ug/kg	8240		05/01/1997	476
Vinyl chloride	ND		5.0	ug/kg	8240		05/01/1997	476
Xylenes (total)	ND		5.0	ug/kg	8240		05/01/1997	476
SURROGATE RESULTS							05/01/1997	476
Toluene-d8 (SURR)	102			% Rec.	8240		05/01/1997	476
Bromofluorobenzene (SURR)	101			% Rec.	8240		05/01/1997	476
1,2-Dichloroethane-d4 (SURR)	85			% Rec.	8240		05/01/1997	476

Date: 05/15/1997

Client Acct: 98900 LEGEND Job No: 97.00840 ELAP Cert: 2193 Page: 8

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-4-5.0

Date Taken: 04/24/1997

LEGEND Sample No: 274962								Run
			Reporting			Date	Date	Batch
Parameter	Results	Flags	Limit	Units	Method	Extracted	Analyzed	No.
8270 (GCMS, Solid, PAH)						04/28/1997		
DILUTION FACTOR*	1						04/29/1997	798
POLYNUCLEAR AROMATIC							04/29/1997	798
HYDROCARBONS							04/29/1997	798
Acenaphthene	ND		330	ug/kg	8270		04/29/1997	798
Acenaphthylene	ND		330	ug/kg	8270		04/29/1997	798
Anthracene	ND		330	ug/kg	B270		04/29/1997	798
Benzo (a) anthracene	ND		330	ug/kg	8270		04/29/1997	798
Benzo(b&k) fluoranthene	ND		330	ug/kg	8270		04/29/1997	798
Benzo(a)pyrene	ND		330	ug/kg	8270		04/29/1997	798
Benzo(g,h,i)perylene	ND		330	ug/kg	8270		04/29/1997	798
Chrysene	ND		330	ug/kg	8270		04/29/1997	798
Dibenzo(a,h)anthracene	ND		330	ug/kg	8270		04/29/1997	798
Fluoranthene	ND		330	ug/kg	8270		04/29/1997	798
Fluorene	ND		330	ug/kg	8270		04/29/1997	798
Indeno(1,2,3-cd)pyrene	ND		330	ug/kg	8270		04/29/1997	798
Naphthalene	ND		330	ug/kg	8270		04/29/1997	798
Phenanthrene	ND		330	ug/kg	8270		04/29/1997	798
Pyrene	ND		330	ug/kg	B270		04/29/1997	798
SURROGATE RESULTS							04/29/1997	798
Nitrobenzene-d5 (SURR)	46			% Rec.	8270		04/29/1997	798
2-Fluorobiphenyl (SURR)	58			% Rec.	8270		04/29/1997	798
p-Terphenyl-d14 (SURR)	72			% Rec.	8270		04/29/1997	798

Client Acct: 98900 LEGEND Job No: 97.00840 Date: 05/15/1997

ELAP Cert: 2193 Page: 10

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-5-3.0

Date Taken: 04/24/1997

Time Taken:

LEGEND Sample No: 274969

Parameter	Results	Flags	ReportingLimit	Units		Date	Date	Run Batch
Oil & Grease (Total)	86				<u>Method</u>	<u>Extracted</u>	Analyzed	No.
Dil & Grease (Non-Polar)	50 _V		50 50	mg/kg	5520E		05/08/1997	366
	- 0		ou	mg/kg	5520E/F		05/08/1997	364
48015 (EXT., Solid)								
DILUTION FACTOR*	1					05/07/1997		
as Diesel	1.2 V	DH	• •				05/12/1997	1270
as Motor Oil	ND V	Dn	1.0	mg/kg	3550		05/12/1997	1270
URROGATE RESULTS	~-		10	mg/kg	3550		05/12/1997	1270
rtho-terphenyl (SURR)	112			_			05/12/1997	1270
				% Rec.	3550		05/12/1997	1270

Client Acct: 98900 ELAP Cert: 219
LEGEND Job No: 97.00840 Page: 11

Date: 05/15/1997 ELAP Cert: 2193

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-2-6.0

Date Taken: 04/24/1997

Time Taken:

Parameter			Reporting	t		Date	Date	Run Batch
Oil & Grease (Total)	Results	_Flags	Limit	Units	Method	Extracted	Analyzed	No.
Oil & Grease (Non-Polar)	63 √		50	mg/kg	5520E		05/08/1997	366
out a drease (Non-Polar)	ND V		50	mg/kg	5520E/F		05/08/1997	364
M8015 (EXT., Solid) DILUTION FACTOR*	1					05/14/1997		
as Diesel	2.5	D-		4-			05/15/1997	1271
as Motor Oil	ND	D-	1.0	mg/kg	3550		05/15/1997	1271
SURROGATE RESULTS			10	mg/kg	3550		05/15/1997	1271
rtho-terphenyl (SURR)	72						05/15/1997	1271
• (1-1-1-)	72			% Rec.	3550		05/15/1997	1271

Client Acct: 98900 LEGEND Job No: 97.00840 Date: 05/15/1997

ELAP Cert: 2193 Page: 12

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-2-3.0

Date Taken: 04/24/1997

Time Taken:

Parameter Oil & Grease (Total) Oil & Grease (Non-Polar)	Results	Flags	Reporting Limit 50	Units mg/kg mg/kg	Method 5520E 5520E/F	Date Extracted	Date Analyzed 05/08/1997 05/08/1997	Run Batch No. 366 364
M8015 (EXT., Solid) DILUTION FACTOR* as Diesel as Motor Oil SURROGATE RESULTS Ortho-terphenyl (SURR)	1 2.2 √ ND √ 81	Đ-	1.0	mg/kg mg/kg % Rec.	3550 3550 3550	05/07/1997	05/12/1997 05/12/1997 05/12/1997 05/12/1997 05/12/1997	1270 1270 1270 1270 1270

Client Acct: 98900 LEGEND Job No: 97.00840 Date: 05/15/1997

ELAP Cert: 2193 Page: 13

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-3-3.5

Date Taken: 04/24/1997

*Time Taken:

LEGEND Sample No: 274975							Run
		Reportin	g		Date	Date	Batch
Parameter	Results Flags	<u>Limit</u>	Units	Method	Extracted	Analyzed	No.
Oil & Grease (Total)	690 🗸	50	mg/kg	5520E		05/08/1997	366
Oil & Grease (Non-Polar)	420~	50	mg/kg	5520E/F		05/08/1997	364
M8015 (EXT., Solid)					05/07/1997		
DILUTION FACTOR*	10					05/15/1997	1270
as Diesel	130 🗸	10	mg/kg	3550		05/15/1997	1270
as Motor Oil	210_{V}	100	πg/kg	3550		05/15/1997	1270
SURROGATE RESULTS						05/15/1997	1270
Ortho-terphenyl (SURR)	84		% Rec.	3550		05/15/1997	1270

Date: 05/15/1997

Client Acct: 98900

ELAP Cert: 2193

LEGEND Job No: 97.00840

Page: 14

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-10-3.0

Date Taken: 04/24/1997

LEGEND Sample No: 274977								Run
			Reporting	r		Date	Date	Batch
Parameter	Results	Flags	Limit	Units	Method	Extracted	Analyzed	No.
Oil & Grease (Total)	92 🏑		50	mg/kg	5520E		05/08/1997	366
Oil & Grease (Non-Polar)	72 V		50	mg/kg	5520E/F		05/08/1997	364
M8015 (EXT., Solid)						05/07/1997		
DILUTION FACTOR*	1						05/14/1997	1270
as Diesel	ND 🗸		1.0	mg/kg	3550		05/14/1997	1270
as Motor Oil	11 🗸	HX	10	mg/kg	3550		05/14/1997	1270
SURROGATE RESULTS							05/14/1997	1270
Ortho-terphenyl (SURR)	88			% Rec.	3550		05/14/1997	1270

Client Acct: 98900 LEGEND Job No: 97.00840 Date: 05/15/1997

ELAP Cert: 2193 Page: 15

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-9-5.0

Date Taken: 04/24/1997

Time Taken:

LEGEND Sample No: 274982								Run
			Reporting	3		Date	Date	Batch
Parameter	Results	Flags	Limit	Units	Method	Extracted	Analyzed	No.
Oil & Grease (Total)	100		50	mg/kg	5520£		05/08/1997	366
Oil & Grease (Non-Polar)	52		50	mg/kg	5520E/F		05/08/1997	364
M8015 (EXT., Solid)						05/07/1997		
DILUTION FACTOR*	1						05/14/1997	1270
as Diesel	1.8	D-	1.0	mg/kg	3550		05/14/1997	1270
as Motor Oil	ND		10	mg/kg	3550		05/14/1997	1270
SURROGATE RESULTS							05/14/1997	1270
Ortho-terphenyl (SURR)	70			% Rec.	3550		05/14/1997	1270

Client Acct: 98900

ELAP Cert: 2193 LEGEND Job No: 97.00840 Page: 16

Date: 05/15/1997

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-8-5.0

Date Taken: 04/24/1997

LEGEND Sample No: 274986								Run
			Reporting	r		Date	Date	Batch
Parameter	Results	Flags	Limit	Units	Method	Extracted	Analyzed	No.
Oil & Grease (Total)	ND		50	mg/kg	5520E		05/08/1997	366
Oil & Grease (Non-Polar)	ND		50	mg/kg	5520E/F		05/08/1997	364
M8015 (EXT., Solid)						05/14/1997		
DILUTION FACTOR*	1						05/15/1997	1270
as Diesel	1.7	D-	1.0	mg/kg	3550		05/15/1997	1270
as Motor Oil	ND		10	mg/kg	3550		05/15/1997	1270
SURROGATE RESULTS							05/15/1997	1270
Ortho-terphenyl (SURR)	88			% Rec.	3550		05/15/1997	1270

Client Acct: 98900 LEGEND Job No: 97.00840 Date: 05/15/1997

ELAP Cert: 2193 Page: 17

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-11-5.0

Date Taken: 04/24/1997

LEGEND Sample No: 274990							Run
		Reporting	I		Date	Date	Batch
Parameter	Results Flags	Limit	Units	Method	Extracted	Analyzed	No.
Oil & Grease (Total)	380	50	mg/kg	5520E		05/08/1997	366
Oil & Grease (Non-Polar)	380	50	mg/kg	5520E/F		05/08/1997	364
MB015 (EXT., Solid)					05/07/1997		
DILUTION FACTOR*	10					05/13/1997	1270
as Diesel	210	10	mg/kg	3550		05/13/1997	1270
as Motor Oil	4 50	100	mg/kg	3550		05/13/1997	1270
SURROGATE RESULTS						05/13/1997	1270
Ortho-terphenyl (SURR)	117		% Rec.	3550		05/13/1997	1270

Client Acct: 98900 LEGEND Job No: 97.00840 Date: 05/15/1997

ELAP Cert: 2193 Page: 18

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-12-3.0

Date Taken: 04/24/1997

LEGEND Sample No: 274992								Run
			Reporting	ī		Date	Date	Batch
Parameter	Results	Flags	Limit	Units	Method	Extracted	Analyzed	No.
TPH (Gas/BTXE, Solid)								
5030/M8015							05/03/1997	2134
DILUTION FACTOR*	100 /						05/03/1997	2134
as Gasoline	840√	GH	100	mg/kg	5030		05/03/1997	2134
8020 (GC,Solid)	,						05/03/1997	2134
Benzene	NDV/		250	ug/kg	8020		05/03/1997	2134
Toluene	ND _		250	ug/kg	8020		05/03/1997	2134
Ethylbenzene	2,000		250	ug/kg	8020		05/03/1997	2134
Xylenes (Total)	6,200℃		250	ug/kg	8020		05/03/1997	2134
SURROGATE RESULTS							05/03/1997	2134
Bromofluorobenzene (SURR)	112			% Rec.	5030		05/03/1997	2134

Client Acct: 98900 LEGEND Job No: 97.00840 Date: 05/15/1997

ELAP Cert: 2193 Page: 19

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-6-3.0

Date Taken: 04/24/1997

LEGEND Sample No: 274995								Run Batch
			Reporting	Ţ		Date	Date	
Parameter	Results	Flags	Limit	Units	Method	Extracted	Analyzed	No.
Oil & Grease (Total)	93		50	mg/kg	5520E		05/08/1997	366
Oil & Grease (Non-Polar)	64		50	mg/kg	5520E/F		05/08/1997	363
M8015 (EXT., Solid)						05/07/1997		
DILUTION FACTOR*	1						05/14/1997	1270
as Diesel	ND		1.0	mg/kg	3550		05/14/1997	1270
as Motor Oil	14		10	mg/kg	3550		05/14/1997	1270
SURROGATE RESULTS							05/14/1997	1270
Ortho-terphenyl (SURR)	88			% Rec.	3550		05/14/1997	1270

Client Acct: 98900 LEGEND Job No: 97.00840 Date: 05/15/1997

ELAP Cert: 2193 Page: 2

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-1

Date Taken: 04/25/1997

Time Taken:

LEGEND Sample No: 274952								Run
			Reporting	3		Date	Date	Batch
Parameter	Results	Flags	Limit	Units	Method	Extracted	Analyzed	No.
Oil & Grease (Total)	ND		47	mg/L	5520B		05/08/1997	450
Oil & Grease (Non-Polar)	ND		47	mg/L	5520B/F		05/08/1997	425
M8015 (EXT., Liquid)						05/06/1997		
DILUTION FACTOR*	12						05/08/1997	1329
as Diesel	4.2	DH	0.60	mg/L	3510		05/08/1997	1329
as Motor Cil	15		6.0	mg/L	3510		05/08/1997	1329
SURROGATE RESULTS							05/08/1997	1329
Ortho-terphenyl (SURR)	110			% Rec.	3510		05/08/1997	1329

Date: 05/15/1997

Client Acct: 98900 LEGEND Job No: 97,00840 ELAP Cert: 2193 Page: 4

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-10

Date Taken: 04/25/1997

LEGEND Sample No: 274956								Run
			Reporting	ſ		Date 1	Date	Batch
Parameter	Results	Flags	Limit	Units	Method	Extracted	Analyzed	No.
Oil & Grease (Total)	ND		5.0	mg/L	5520B		05/08/1997	450
Oil & Grease (Non-Polar)	ND		5.0	mg/L	5520B/F		05/08/1997	425
M8015 (EXT., Liquid)						05/06/1997		
DILUTION FACTOR*	4						05/08/1997	1329
as Diesel	2.0	DH	0.2	mg/L	3510		05/08/1997	1329
as Motor Oil	3.3	HX	2	mg/L	3510		05/08/1997	1329
SURROGATE RESULTS							05/08/1997	1329
Ortho-terphenyl (SURR)	115			% Rec.	3510		05/08/1997	1329

Date: 05/15/1997 ELAP Cert: 2193

LEGEND Job No: 97.00840

Page: 9

Ref: Becker/Project No. 950-0423-4

SAMPLE DESCRIPTION: CB-7-3.0

Date Taken: 04/24/1997

LEGEND Sample No: 274965								Run
			Reporting	ī		Date Date	Batch	
Parameter	Results	Flags	Limit	Units	Method	Extracted	Analyzed	No.
Oil & Grease (Total)	100		50	mg/kg	5520E		05/08/1997	366
Oil & Grease (Non-Polar)	ND		50	mg/kg	5520E/F		05/08/1997	364
M8015 (EXT., Solid)						05/07/1997		
DILUTION FACTOR*	1						05/13/1997	1270
as Diesel	1.8	D-	1.0	mg/kg	3550		05/13/1997	1270
as Motor Oil	ND		10	mg/kg	3550		05/13/1997	1270
SURROGATE RESULTS							05/13/1997	1270
Ortho-terphenyl (SURR)	66			% Rec.	3550		05/13/1997	1270

Client Name: Cambria Env. Technology Date: 05/15, Client Acct: 98900 ELAP Cert: 2193

LEGEND Job No: 97.00840

Date: 05/15/1997

Page: 20

Ref: Becker/Project No. 950-0423-4

		CCV	CCA					
	CCV	Standard	Standard					Run
	Standard	Amount	Amount			Date	Analyst	Batch
Parameter	% Recovery	Found	Expected	Flags	Units	Analyzed	-	
Cadmium (ICP)	98.8	0.9876	1.00		mg/kg	04/30/1997	jeo	734
Chromium (ICP)	104.3	1.043	1.00		mg/kg	04/30/1997	jeo	745
Lead (ICP)	101.6	1.016	1.00		mg/kg	04/30/1997	jeo	608
Nickel (ICP)	101.5	1.015	1.00		mg/kg	04/30/1997	jeo	638
Zinc (ICP)	101.3	1.013	1.00		mg/kg	04/30/1997	jeo	683
M8015 (EXT., Liquid)								
as Diesel	102.3	1023	1000		mg/L	05/08/1997	vah	1329
as Motor Oil	105.0	1050	1000		mg/L	05/08/1997	vah	1329
Ortho-terphenyl (SURR)	105.0	105	100		% Rec.	05/08/1997	vah	1329
M8015 (EXT., Liquid)								
as Diesel	103.9	1039	1000		mg/L	05/08/1997	vah	1329
as Motor Oil	108.2	1082	1000		mg/L	05/08/1997		1329
Ortho-terphenyl (SURR)	108.0	108	100		% Rec.	05/08/1997	vah	1329
M8015 (EXT., Liquid)								
as Diesel	110.7	1107	1000		mg/L	05/12/1997		1329
as Motor Oil	111.1	1111	1000		mg/L	05/12/1997		1329
Ortho-terphenyl (SURR)	112.0	112	100		% Rec.	05/12/1997	vah	1329
M8015 (EXT., Liquid) as Diesel					JT	05/13/1997	vah	1329
as Diesel as Motor Oil	101.6	1016	1000 1000		mg/L mg/L	05/13/1997		1329
Ortho-terphenyl (SURR)	104.0	104	1000		% Rec.	05/13/1997		1329
TPH (Gas/BTXE, Solid)	104,0	104	100		o nec.	03, 13, 13,	*1211	1303
as Gasoline	96.7	2.417	2.50		mg/kg	04/28/1997	aal	2133
Benzene	94.5	94.50	100.0		ug/kg	04/28/1997		2133
Toluene	90.6	90.60	100.0		ug/kg	04/28/1997	aal	2133
Ethylbenzene	90.7	90.70	100.0		ug/kg	04/28/1997	aal	2133
Xylenes (Total)	89.7	269.2	300.0		ug/kg	04/28/1997	aal	2133
Bromofluorobenzene (SURR)	94.0	94	100		% Rec.	04/28/1997	aal	2133
TPH (Gas/BTXE, Solid)								
as Gasoline	97.5	2.437	2.50		mg/kg	05/03/1997	сју	2134
Benzene	96.1	96.1	100.0		ug/kg	05/03/1997	⊂ју	2134
Toluene	89.8	89.8	100.0		ug/kg	05/03/1997	сју	2134
Ethylbenzene	89.8	89.8	100.0		ug/kg	05/03/1997	cjy	2134
Xylenes (Total)	89.0	267	300.0		ug/kg	05/03/1997	cjy	2134
Bromofluorobenzene (SURR)	100.0	100	100		% Rec.	05/03/1997	сју	2134
8015M - HEAVY SCAN								
as Diesel	94.2	942	1000		mg/kg	05/02/1997	vah	31
Ortho-terphenyl (SURR)	97.0	97	100		% Rec.	05/02/1997	vah	31
M8015 (EXT., Solid)								
as Diesel	102.1	1021	1000		mg/kg	05/12/1997		1270
as Motor Oil	102.5	1025	1000		mg/kg	05/12/1997		1270
Ortho-terphenyl (SURR)	107.0	107	100		% Rec.	05/12/1997	vah	1270
M8015 (EXT., Solid)								

Client Name: Cambria Env. Technology Date: 05/15/ Client Acct: 98900 ELAP Cert: 2193 LEGEND Job No: 97.00840

Date: 05/15/1997

Page: 21

Ref: Becker/Project No. 950-0423-4

	•	CCV	CCV					
	CCV	Standard	Standard					Run
	Standard	Amount	Amount			Date	Analyst	Batch
Parameter	% Recovery	Found	Expected	Flags	Units	Analyzed	Initials	Number
as Diesel	101.6	1016	1000		mg/kg	05/13/1997	vah	1270
as Motor Oil			1000		mg/kg	05/13/1997	vah	1270
Ortho-terphenyl (SURR)	104.0	104	100		% Rec.	05/13/1997	vah	1270
M8015 (EXT., Solid)								
as Diesel	99.4	994	1000		mg/kg	05/14/1997	vah	1270
as Motor Oil	97.7	977	1000		mg/kg	05/14/1997	vah	1270
Ortho-terphenyl (SURR)	107.0	107	100		% Rec.	05/14/1997	vah	1270
M8015 (EXT., Solid)								
as Diesel	109.7	1097	1000		mg/kg	05/15/1997	vah	1270
as Motor Oil	102.2	1022	1000		mg/kg	05/15/1997	vah	1270
Ortho-terphenyl (SURR)	119.0	119	100		% Rec.	05/15/1997	vah	1270
M8015 (EXT., Solid)								
as Diesel	109.7	1097	1000		mg/kg	05/15/1997	vah	1271
as Motor Oil	106.0	1060	1000		mg/kg	05/15/1997	vah	1271
Ortho-terphenyl (SURR)	119.0	119	100		% Rec.	05/15/1997	vah	1271

LEGEND Job No: 97.00840

Date: 05/15/1997

Client Name: Cambria Env. Technology Date: 05/15/1 Page: 22

Ref: Becker/Project No. 950-0423-4

Parameter	CCV Standard % Recovery	CCV Standard Amount Found	CCV Standard Amount Expected	Flags	Units	Date Analyzed	Analyst Initials	Run Batch Number
8240 (GCMS, Solid)								
Chloroform	92.4	46.2	50.0		ug/kg	05/01/1997	jde	476
1,1-Dichloroethene	96.0	48.0	50.0		ug/kg	05/01/1997	jde	476
1,2-Dichloropropane	98.4	49.2	50.0		ug/kg	05/01/1997	jde	476
Ethyl benzene	100.6	50.3	50.0		ug/kg	05/01/1997	jde	476
Toluene	96.0	48.0	50.0		ug/kg	05/01/1997	jde	476
Vinyl chloride	91.0	45.5	50.0		ug/kg	05/01/1997	jde	476
Toluene-d8 (SURR)	110.0	110	100		% Rec.	05/01/1997	jde	476
Bromofluorobenzene (SURR)	112.0	112	100		% Rec.	05/01/1997	jde	476
1,2-Dichloroethane-d4 (SURR)	95.0	95	100		% Rec.	05/01/1997	jde	476

Client Acct: 98900 LEGEND Job No: 97.00840 Date: 05/15/1997

ELAP Cert: 2193 Page: 23

Ref: Becker/Project No. 950-0423-4

	CCV Standard	CCV Standard Amount	CCV Standard Amount			Date	Analyst	Run Batch
Parameter	% Recovery	Found	Expected	Flags	Units	Analyzed	Initials	Number
8270 (GCMS, Solid, PAH)		•						
Acenaphthene	99.7	99.7	100		ug/kg	04/29/1997	gec	798
Benzo(a)pyrene	95.0	95.0	100		ug/kg	04/29/1997	gec	798
HYDROCARBONS	110.0	110	100		ug/kg	04/29/1997	gec	798
SURROGATE RESULTS	100.0	100	100		% Rec.	04/29/1997	gec	798
Nitrobenzene-d5 (SURR)	97.4	97.4	100		% Rec.	04/29/1997	gec	798
2-Fluorobiphenyl (SURR)	92.7	92.7	100		% Rec.	04/29/1997	gec	798
p-Terphenyl-d14 (SURR)	102.0	102	100		% Rec.	04/29/1997	gec	798

 Client Name:
 Cambria Env. Technology
 Date:
 05/15,

 Client Acct:
 98900
 ELAP Cert:
 2193

 LEGEND Job No:
 97.00840
 Page:
 24

Date: 05/15/1997

Ref: Becker/Project No. 950-0423-4

	ccv	CCV Standard	CCV Standard					Run
	Standard	Amount	Amount			Date	Analyst	Batch
Parameter	% Recovery	Found	Expected	Flags	Units	Analyzed	Initials	Number
8270 (GCMS, Solid, PAH)								
Acenaphthene	101.0	101	100		ug/kg	04/30/1997	gec	798
Benzo(a)pyrene	94.4	94.4	100		ug/kg	04/30/1997	gec	798
HYDROCARBONS	113.0	113	100		ug/kg	04/30/1997	gec	798
SURROGATE RESULTS	104.0	104	100		% Rec.	04/30/1997	gec	798
Nitrobenzene-d5 (SURR)	99.9	99.9	100		% Rec.	04/30/1997	gec	798
2-Fluorobiphenyl (SURR)	91.8	91.8	100		% Rec.	04/30/1997	gec	798
p-Terphenyl-dl4 (SURR)	107.0	107	100		% Rec.	04/30/1997	gec	798

Client Acct: 98900 LEGEND Job No: 97.00840 Date: 05/15/1997

1271

1271

vah

vah

05/15/1997

05/15/1997

mg/kg

% Rec.

ELAP Cert: 2193 Page: 25

Ref: Becker/Project No. 950-0423-4

METHOD BLANK REPORT

Method Run Blank Batch Analyst Date Amount Reporting Units Number Flags Limit Found Parameter 05/08/1997 temp 450 mg/L 5.0 Oil & Grease (Total) ND 05/08/1997 temp mg/L Oil & Grease (Non-Polar) ND 5.0 365 04/30/1997 aal 50 mg/kg Oil & Grease (Total) 68 366 mg/kg 05/08/1997 temp Oil & Grease (Total) ND mg/kg 04/30/1997 aal 362 ND 50 Oil & Grease (Non-Polar) 363 mg/kg 05/08/1997 temp Oil & Grease (Non-Polar) ND 50 05/08/1997 temp 364 mg/kg Oil & Grease (Non-Polar) ND 50 734 2.0 mg/kg 04/30/1997 ieo Cadmium (ICP) ND 745 ND 2.0 mg/kg 04/30/1997 jeo (ICP) Chromium ND 20 mg/kg 04/30/1997 jeo 608 Lead (TCP) 04/30/1997 638 NΠ 5.0 mg/kg ieo Nickel (ICP) 683 04/30/1997 jeo Zinc (ICP) ND 5.0 mg/kg MB015 (EXT., Liquid) 1329 05/08/1997 vah as Diesel ND 0.050 mg/L 1329 05/08/1997 vah mg/L as Motor Oil ND 0.50 1329 % Rec. 05/08/1997 vah Ortho-terphenyl (SURR) 124 TPH (Gas/BTXE, Solid) 04/28/1997 aal 2133 mq/kq as Gasoline ND 1.0 04/28/1997 aal 2133 ug/kg Benzene ND 2.5 2133 04/28/1997 aal ND 2.5 ug/kg Toluene 2133 04/28/1997 aal ug/kg Ethylbenzene ND 2.5 2133 ug/kg 04/28/1997 aal 2,5 Xylenes (Total) ND 2133 % Rec. 04/28/1997 aal Bromofluorobenzene (SURR) 93 TPH (Gas/BTXE, Solid) 2134 05/03/1997 сју mg/kg as Gasoline ND 1.0 05/03/1997 2134 civ ND 2.5 ug/kg Benzene 2134 05/03/1997 Toluene ND 2.5 ug/kg ciy 2134 ug/kg 05/03/1997 ciy Ethylbenzene ND 2.5 05/03/1997 сју 2134 ug/kg Xylenes (Total) ND 2.5 05/03/1997 2134 % Rec. cjy Bromofluorobenzene (SURR) 103 8015M - HEAVY SCAN vah 31 05/02/1997 ND 10 mg/kg as Creosote 31 mg/kg 05/02/1997 vah ND as Diesel 1.0 mg/kg 05/02/1997 vah 31 as Kerosene ΝD 1.0 vah 31 mg/kg 05/02/1997 as Motor Oil ND 10 05/02/1997 vah Ortho-terphenyl (SURR) % Rec. M8015 (EXT., Solid) 1270 mg/kg 05/12/1997 vah ND 1.0 as Diesel 05/12/1997 vah 1270 mg/kg as Motor Oil MD 10 1270 05/12/1997 vah % Rec. Ortho-terphenyl (SURR) 125 M8015 (EXT., Solid) 1271 vah ND 1.0 mg/kg 05/15/1997 as Diesel

NOTE: Results apply only to the samples analyzed. Reproduction of this report is permitted only in its entirety.

1.0

ND

118

as Motor Oil

Ortho-terphenyl (SURR)

Client Name: Cambria Env. Technology Date: 05/15/ Client Acct: 98900 ELAP Cert: 2193

LEGEND Job No: 97.00840

Date: 05/15/1997

Page: 26

Ref: Becker/Project No. 950-0423-4

METHOD BLANK REPORT

Method

	Mechoa						
	Blank						Run
	Amount	Reporting			Date	Analyst	Batch
Parameter	Found	Limit	Flags	Units	Analyzed	Initials	Number
8240 (GCMS, Solid)							
Benzene	ND	5.0		ug/kg	05/01/1997	jde	476
Acetone	6.0	10	B-I	ug/kg	05/01/1997	jde	476
Bromodichloromethane	ND	5.0		ug/kg	05/01/1997	jde	476
Bromoform	ND	5.0		ug/kg	05/01/1997	jde	476
Bromomethane	ND	5.0		ug/kg	05/01/1997	jde	476
2-Butanone	ND	10		ug/kg	05/01/1997	jde	476
Carbon disulfide	ND	5.0		ug/kg	05/01/1997	jde	476
Carbon tetrachloride	ND	5.0		ug/kg	05/01/1997	jđe	476
Chlorobenzene	ND	5.0		ug/kg	05/01/1997	jde	476
Chloroethane	ND	5.0		ug/kg	05/01/1997	jde	476
2-Chloroethyl vinyl ether	ND	10		ug/kg	05/01/1997	jde	476
Chloroform	ND	5.0		ug/kg	05/01/1997	jde	476
Chloromethane	ND	5.0		ug/kg	05/01/1997	jde	476
Dibromochloromethane	ND	5.0		ug/kg	05/01/1997	jde	476
1,2-Dichlorobenzene	ND	5.0		ug/kg	05/01/1997	jde	476
1,3-Dichlorobenzene	ND	5.0		ug/kg	05/01/1997	jde	476
1,4-Dichlorobenzene	ND	5.0		ug/kg	05/01/1997	jde	476
1,1-Dichloroethane	ND	5.0		ug/kg	05/01/1997	jđe	476
1,2-Dichloroethane	ND	5.0		ug/kg	05/01/1997	jde	476
1,1-Dichloroethene	ND	5.0		ug/kg	05/01/1997	jde	476
trans-1,2-Dichloroethene	ND	5.0		ug/kg	05/01/1997	jde	476
1,2-Dichloropropane	ND	5.0		ug/kg	05/01/1997	jde	476
cis-1,3-Dichloropropene	ND	5.0		ug/kg	05/01/1997	jde	476
trans-1,3-Dichloropropene	ND	5.0		ug/kg	05/01/1997	jde	476
Ethyl benzene	ND	5.0		ug/kg	05/01/1997	jde	476
Freon 113	ND	0.50		ug/kg	05/01/1997	jde	476
2-Hexanone	ND	10		ug/kg	05/01/1997	jde	476
Methylene chloride	ND	5.0		ug/kg	05/01/1997	jde	476
4-Methyl-2-pentanone	ND	10		ug/kg	05/01/1997	jde	476
Styrene	ND	5.0		ug/kg	05/01/1997	jde	476
1,1,2,2-Tetrachloroethane	ND	5.0		ug/kg	05/01/1997	jde	476
Tetrachloroethene	ND	5.0		ug/kg	05/01/1997	jde	476
Toluene	ND	5.0		ug/kg	05/01/1997	jde	476
1,1,1-Trichloroethane	ND	5.0		ug/kg	05/01/1997	jde	476
1,1,2-Trichloroethane	ND	5.0		ug/kg	05/01/1997	jde	476
Trichloroethene	ND	5.0		ug/kg	05/01/1997	jde	476
Trichlorofluoromethane	ND	5.0		ug/kg	05/01/1997	jde	476
Vinyl acetate	ND	10		ug/kg	05/01/1997	jde	476
Vinyl chloride	ND	5.0		ug/kg	05/01/1997	jđe	476
Xylenes (total)	ND	5.0		ug/kg	05/01/1997	jđe	476
Toluene-d8 (SURR)	99			% Rec.	05/01/1997	jde	476
Bromofluorobenzene (SURR)	99			% Rec.	05/01/1997	jđe	476
1,2-Dichloroethane-d4 (SURR)	98			% Rec.	05/01/1997	jde	476

Client Acct: 98900 LEGEND Job No: 97.00840 Date: 05/15/1997

ELAP Cert: 2193 Page: 27

Ref: Becker/Project No. 950-0423-4

METHOD BLANK REPORT

Method Run Blank Batch Date Analyst Reporting Amount Units Analyzed Initials Number Found Limit Flags Parameter 8270 (GCMS, Solid, PAH) 798 ug/kg 04/29/1997 gec 330 Acenaphthene ND 798 04/29/1997 qec Acenaphthylene ND 330 ug/kg 798 04/29/1997 ND 330 ug/kg gec Anthracene ug/kg 04/29/1997 gec 798 ND 330 Benzo(a)anthracene 04/29/1997 798 ug/kg gec 330 Benzo(b&k) fluoranthene ND 04/29/1997 gec 798 ug/kg Benzo(a)pyrene ND 330 04/29/1997 qec 798 ug/kg Benzo(g,h,i)perylene ND 330 04/29/1997 798 ND 330 ug/kg gec Chrysene ug/kg 04/29/1997 gec 798 Dibenzo (a, h) anthracene ND 330 Fluoranthene 330 ug/kg 04/29/1997 gec 798 ND ug/kg 04/29/1997 gec 798 ND 330 Fluorene 798 ug/kg 04/29/1997 ged Indeno(1,2,3-cd)pyrene ND 330 798 04/29/1997 Naphthalene ND 1600 ug/kg qec 798 Phenanthrene ND 330 ug/kg 04/29/1997 gec 798 Pyrene ND 330 ug/kg 04/29/1997 gec 798 ug/kg 04/29/1997 gec HYDROCARBONS ND 330 04/29/1997 798 % Rec. SURROGATE RESULTS 65 04/29/1997 798 % Rec. gec Nitrobenzene-d5 (SURR) 83 798 04/29/1997 % Rec. qec 2-Fluorobiphenyl (SURR) 79 04/29/1997 798 % Rec. qec p-Terphenyl-d14 (SURR) 66

 Client Name:
 Cambria Env. Technology
 Date:
 05/15/1997

 Client Acct:
 98900
 ELAP Cert:
 2193

 LEGEND Job No:
 97.00840
 Page:
 28

Ref: Becker/Project No. 950-0423-4

		Matrix					Matrix					
	Matrix	Spike				Matrix	Spike					
	Spike	Dup		Spike	Sample	Spike	Dup.			Date	Run	Sample
Parameter	% Rec.	% Rec.	RPD	Amount	Conc.	Conc.	Conc.	Flags	Units	Analyzed	Batch	Spiked
Oil & Grease (Total)	79.3	93.6	16.5	137.7	ND	109.2	84.6		mg/L	05/08/1997	450	275090
Oil & Grease (Non-Polar)	58.4	80.2	31.5	137.7	ND	80.4	72.5	*M	mg/L	05/08/1997	425	275090
Oil & Grease (Total)	109.8	100.4	8.9	2809	99	3184	3553	NAR	mg/kg	04/30/1997	365	274962
Oil & Grease (Total)	100.9	103.6	2.6	2,227	260	2,508	3,350		mg/kg	05/08/1997	366	274958
Oil & Grease (Total)	105.8	114.3	7.7	3,254	93	3,535	3,428		mg/kg	05/08/1997	366	274995
Oil & Grease (Non-Polar)	109.1	99.0	9.6	2809	57	3123	3461		mg/kg	04/30/1997	362	274962
Oil & Grease (Non-Polar)	93.5	83.7	11.1	3,254	64	3,106	2,506		mg/kg	05/08/1997	363	274995
Oil & Grease (Non-Polar)	97.2	91.8	5.7	2,227	80	2,244	2,820		mg/kg	05/08/1997	364	274958
METHOD 6010 (SOLID)										04/30/1997	828	274962
Cadmium (ICP)	93.9	92.4	1.6	81.97	ND	77.01	61.58		mg/kg	04/30/1997	734	274962
Chromium (ICP)	91.7	92.3	0.7	81.97	35	110.2	96.55		mg/kg	04/30/1997	745	274962
Lead (ICP)	102.0	97.9	4.0	81.97	ND	83.59	65.30		mg/kg	04/30/1997	608	274962
Nickel (ICP)	80.0	81.2	1.5	81.97	26	91.57	80.14		mg/kg	04/30/1997	638	274962
Zinc (ICP)	76.2	79.2	3.9	81.97	31	93.48	83.80	NI3	mg/kg	04/30/1997	683	274962
M8015 (EXT., Liquid)												275079
as Diesel	95.2	102.7	7.5	1.89	2.3	4.1	4.20	D-	mg/L	05/08/1997	1329	275079
Ortho-terphenyl (SURR)	127.0	133.0	4.6	100	154	127	133	MI	% Rec.	05/08/1997	1329	275079
TPH (Gas/BTXE, Solid)												274962
as Gasoline	88.6	89.8	1.3	2.50	ND	2.216	2.244		mg/kg	04/29/1997	2133	274962
Benzene	90.6	91.2	0.7	30.75	ND	27.85	28.05		ug/kg	04/29/1997	2133	274962
Toluene	89.5	89.5	0.0	166.2	ND	148.7	148.8		ug/kg	04/29/1997	2133	274962
Bromofluorobenzene (SURR)	84.0	84.0	0.0	100	82	84	84		% Rec.	04/29/1997	2133	274962
TPH (Gas/BTXE,Solid)												275166
as Gasoline	89.6	84.1	6.3	2.50	ND	2.239	2.102		mg/kg	05/03/1997	2134	275166
Benzene	90.2	95.8	6.0	20.45	ND	18.45	19.60		ug/kg	05/03/1997	2134	275166
Toluene	94.8	89.8	5.4	168.0	ND	159.2	150.9		ug/kg	05/03/1997	2134	275166
Bromofluorobenzene (SURR)	94.0	90.0	4.3	100	88	94	90		% Rec.	05/03/1997	2134	275166
M8015 (EXT., Solid)												274986
as Diesel	80.2	85.0	5.8	16.7	1.7	15.1	15.9	D-	mg/kg	05/15/1997	1270	274986
Ortho-terphenyl (SURR)	96.0	87.0	9.8	100	88	96	87		% Rec.	05/15/1997	1270	274986
M8015 (EXT., Solid)												275326
as Diesel	101.8	96.4	5.3	16.7	ND	17.0	16.1		mg/kg	05/15/1997	1271	275326
Ortho-terphenyl (SURR)	92.0	110.0	17.7	100	72	92	110		% Rec.	05/15/1997	1271	275326
M8015 (EXT., Solid)												274986
as Diesel	80.2	85.0	5.8	16.7	1.7	15.1	15.9	D-	mg/kg	05/15/1997	1270	274986
Ortho-terphenyl (SURR)	96.0	87.0	9.8	100	88	96	87		% Rec.	05/15/1997	1270	274986
M8015 (EXT., Solid)												275326
as Diesel	101.8	96.4	5.3	15.7	ND	17.0	16.1		mg/kg	05/15/1997	1271	275326
Ortho-terphenyl (SURR)	92.0	110.0	17.7	100	72	92	110		% Rec.	05/15/1997	1271	275326

Client Name: Cambria Env. Technology Date: 05/15/ LEGEND Job No: 97.00840

Date: 05/15/1997

Page: 29

Ref: Becker/Project No. 950-0423-4

	Matrix	Matrix Spike				Matrix	Matrix Spike	:				
	Spike	Dup		Spike	Sample	Spike	Dup.			Date	Run	Sample
Parameter	% Rec.	% Rec.	RPD	Amount	Conc.	Conc.	Conc.	Flaqs	Units	Analyzed	Batch	Spiked
8240 (GCMS, Solid)												274962
Benzene	98.6	100.6	1.9	50.0	ND	49.3	50.3		ug/kg	05/01/1997	476	274962
Chlorobenzene	97.4	105.0	7.4	50.0	ND	48.7	52.5		ug/kg	05/01/1997	476	274962
1,1-Dichloroethene	107.2	111.8	4.2	50.0	ND	53.6	55.9		ug/kg	05/01/1997	476	274962
Toluene	93.4	99.2	6.0	50.0	ND	46.7	49.6		ug/kg	05/01/1997	476	274962
Trichloroethene	100.8	103.8	2.9	50.0	ND	50.4	51.9		ug/kg	05/01/1997	476	274962
Toluene-d8 (SURR)	95.0	98.0	3.1	100	102	95	98		% Rec.	05/01/1997	476	274962
Bromofluorobenzene (SURR)	94.0	100.0	6.1	100	101	94	100		% Rec.	05/01/1997	476	274962
1,2-Dichloroethane-d4 (SURR)	94.0	94.0	0.0	100	85	94	94		% Rec.	05/01/1997	476	274962

Client Name: Cambria Env. Technology Date: 05/15/ LEGEND Job No: 97.00840

Date: 05/15/1997

Page: 30

Ref: Becker/Project No. 950-0423-4

		Matrix					Matrix	<u>.</u>				
	Matrix	Spike				Matrix	Spike					
	Spike	Dup		Spike	Sample	Spike	Dup.			Date	Run	Sample
Parameter	% Rec.	% Rec.	RPD	Amount	Conc.	Conc.	Conc.	Flags	Units	Analyzed	Batch	Spiked
8270 (GCMS, Solid, PAH)												274962
Acenaphthene	70,0	67.3	3.9	3,330	ND	2,330	2,240		ug/kg	04/29/1997	798	274962
Phenanthrene	82.0	76.3	7.2	3,330	ND	2,730	2,540		ug/kg	04/29/1997	798	274962
Pyrene	59.8	55.6	7.3	3,330	ND	1,990	1,850		ug/kg	04/29/1997	798	274962
HYDROCARBONS	67.2	65.5	2.6	6,670	ND	4,480	4,370		ug/kg	04/29/1997	798	274962
SURROGATE RESULTS	58.0	54.0	7.1	100	46	58	54		% Rec.	04/29/1997	798	274962
Nitrobenzene-d5 (SURR)	61.0	58.0	5.0	100	58	61	58		% Rec.	04/29/1997	798	274962
2-Fluorobiphenyl (SURR)	77.0	74.0	4.0	100	72	77	74		₹ Rec.	04/29/1997	798	274962
p-Terphenyl-d14 (SURR)	60.0	59.0	1.7	100	53	60	59		% Rec.	04/29/1997	798	274962

Client Name: Cambria Env. Technology Date: 05/15/ Client Acct: 98900 ELAP Cert: 2193

LEGEND Job No: 97,00840

Date: 05/15/1997

Page: 31

Ref: Becker/Project No. 950-0423-4

	Matrix Spike	Matrix Spike Dup		Spike	Sample	Matrix Spike	Matrix Spike Dup.			Date	Run	Sample
Parameter	% Rec.	% Rec	RPD	Amount	Conc.	Conc.	Conc.	Flags	Units	Analyzed	Batch	Spiked
8270 (GCMS, Solid, PAH)												274962
Acenaphthene	70.0	67.3	3.9	3,330	ND	2,330	2,240		ug/kg	04/29/1997	798	274962
SURROGATE RESULTS	58.0	54.0	7.1	100	46	58	54		% Rec.	04/29/1997	798	274962
2-Fluorobiphenyl (SURR)	61.0	58.0	5.0	100	50	61	58		% Rec.	04/29/1997	798	274962
p-Terphenyl-d14 (SURR)	77.0	74.0	4.0	100	72	77	74		% Rec.	04/29/1997	798	274962

Client Name: Cambria Env. Technology Date: 05/15/ LEGEND Job No: 97.00840

Date: 05/15/1997

Page: 32

Ref: Becker/Project No. 950-0423-4

LABORATORY CONTROL SAMPLE REPORT

					DUP						
		DUP		LCS	LCS	LCS					
	LCS	LCS		Amount	Amount	Amount			Date	Analyst	Run
Parameter	% Rec.	% Rec.	RPD	Found	Found	Ехр.	Flags	Units	Analyzed	Initials	Batch
Oil & Grease (Total)	83.2			83.8		100.7		mg/L	05/08/1997	temp	450
Oil & Grease (Non-Polar)	83.1			83.7		100.7		mg/L	05/08/19 9 7	temp	425
Oil & Grease (Total)	101.1			3420		3384		mg/kg	04/30/1997	aal	365
Oil & Grease {Total}	102.4			3,022		2,952		mg/kg	05/08/1997	temp	366
Oil & Grease (Non-Polar)	100.7			3408		3384		mg/kg	04/30/1997	aal	362
Oil & Grease (Non-Polar)	93.3			2,630		2,818		mg/kg	05/08/1997	temp	363
Oil & Grease (Non-Polar)	94.7			2,796		2,952		mg/kg	05/08/1997	temp	364
Cadmium (ICP)	94.7			94.67		100		mg/kg	04/30/1997	jeo	734
Chromium (ICP)	101.7			101.7		100		mg/kg	04/30/1997	jeo	745
Lead (ICP)	98.2			98.18		100		mg/kg	04/30/1997	jeo	608
Nickel (ICP)	96.8			96.80		100		mg/kg	04/30/1997	jeo	638
Zinc (ICP)	95.6			95.55		100		mg/kg	04/30/1997	jeo	683
M8015 (EXT., Liquid)											
as Diesel	106.0			1.06		1.00		mg/L	05/07/1997	vah	1329
Ortho-terphenyl (SURR)	134.0			134		100		% Rec.	05/07/1997	vah	1329
8015M - HEAVY SCAN											
as Diesel	91.0	90.4	0.7	15.2	15.1	16.7		mg/kg	05/02/1997	vah	31
Ortho-terphenyl (SURR)	105.0	105.0	0.0	105	105	100		% Rec.	05/02/1997	vah	31
M8015 (EXT., Solid)											
as Diesel	92.8			15.5		16.7		mg/kg	05/12/1997	vah	1270
Ortho-terphenyl (SURR)	119.0			119		100		% Rec.	05/12/1997	vah	1270
M8015 (EXT., Solid)											
as Diesel	95.2			15.9		16.7		mg/kg	05/15/1997	vah	1271
Ortho-terphenyl (SURR)	121.0			121		100		% Rec.	05/15/1997	vah	1271

Client Acct: 98900 LEGEND Job No: 97.00840 Date: 05/15/1997

ELAP Cert: 2193 Page: 33

Ref: Becker/Project No. 950-0423-4

LABORATORY CONTROL SAMPLE REPORT

					DUP						
		DUP		LCS	LCS	LCS					
	LCS	LCS		Amount	Amount	Amount			Date	Analyst	Run
Parameter	% Rec.	% Rec.	RPD	Found	Found	Exp.	Flags	Units	Analyzed	Initials	Batch
8270 (GCMS, Solid, PAH)											
Acenaphthene	91.3			3,040		3,330		ug/kg	04/29/1997	gec	798
Phenanthrene	93.7			3,120		3,330		ug/kg	04/29/1997	gec	798
Pyrene	79.6			2,650		3,330		ug/kg	04/29/1997	gec	798
HYDROCARBONS	82.8			5,520		6,670		ug/kg	04/29/1997	gec	798
SURROGATE RESULTS	74.0			74		100		% Rec.	04/29/1997	gec	798
Nitrobenzene-d5 (SURR)	74.0			74		100		Rec.	04/29/1997	gec	798
2-Fluorobiphenyl (SURR)	88.0			88		100		% Rec.	04/29/1997	gec	798
p-Terphenyl-d14 (SURR)	78.0			78		100		% Rec.	04/29/1997	gec	798

Client Name: Cambria Env. Technology Date: 05/15, Client Acct: 98900 ELAP Cert: 2193 LEGEND Job No: 97.00840

Date: 05/15/1997

Page: 34

Ref: Becker/Project No. 950-0423-4

DUPLICATE REPORT

			Original Sample	Duplicate Sample	e		Date		Duplicate
Parameter		RPD	Result	Result_	Flags	Units	Analyzed	Analyst	Sample No.
METHOD 601	0 (SOLID)		- -				04/30/1997	jeo	274896
Cadmium	(ICP)		ND	ND		mg/kg	04/30/1997	jeo	274896
Chromium	(ICP)	0.0	170	170		mg/kg	04/30/1997	jeo	274896
Lead	(ICP)		ND	ND		mg/kg	04/30/1997	jeo	274896
Nickel	(ICP)	0.0	110	110		mg/kg	04/30/1997	jeo	274896
Zinc	(ICP)	0.0	68	68		mg/kg	04/30/1997	jeo	274896

KEY TO RESULT FLAGS

: RPD between sample duplicates exceeds 30%. *M : RPD between sample duplicates or MS/MSD exceeds 20%. : Correlation coefficient for the Method of Standard Additions is less than 0.995. : Sample result is less than reported value. B-I : Value is between Method Detection Limit and Reporting Limit. : Analyte found in blank and sample. : The result confirmed by secondary column or GC/MS analysis. CNA : Cr+6 not analyzed; Total Chromium concentration below Cr+6 regulatory level. COMP : Sample composited by equal volume prior to analysis. CV : 2-Chloroethylvinyl ether cannot be determined in a preserved sample. CWT : Due to the sample matrix, constant weight could not be achieved. Ð-: The result has an atypical pattern for Diesel analysis. D1 : The result for Diesel is an unknown hydrocarbon which consists of a single peak. DΒ : ND for hydrocarbons, non-discrete baseline rise detected. DH : The result appears to be a heavier hydrocarbon than Diesel. DL: The result appears to be a lighter hydrocarbon than Diesel. DR : Elevated Reporting Limit due to Matrix. DS Surrogate diluted out of range. $\mathbf{D}\mathbf{X}$ The result for Diesel is an unknown hydrocarbon which consists of several peaks. FΑ Compound quantitated at a 2X dilution factor. FBCompound quantitated at a 5X dilution factor. FC Compound quantitated at a 10% dilution factor. FD: Compound quantitated at a 20% dilution factor. : Compound quantitated at a 50% dilution factor. FΕ $\mathbf{F}\mathbf{F}$: Compound quantitated at a 100% dilution factor. FG : Compound quantitated at a 200X dilution factor. FΗ : Compound quantitated at a 500X dilution factor. FI : Compound quantitated at a 1000X dilution factor. FJ : Compound quantitated at a greater than 1000x dilution factor. FΚ : Compound quantitated at a 25% dilution factor. FL: Compound quantitated at a 250% dilution factor. G-: The result has an atypical pattern for Gasoline. G1 : The result for Gasoline is an unknown single peak. GH : The result appears to be a heavier hydrocarbon than Gasoline. GL: The result appears to be a lighter hydrocarbon than Gasoline. GX : The result for Gasoline is an unknown hydrocarbon which consists of several peaks. HT: Analysis performed outside of the method specified holding time. HTC : Confirmation analyzed outside of the method specified holding time. : Prep procedure performed outside of the method specified holding time. HTR : Received after holding time expired, analyzed ASAP after receipt. : Peaks detected within the quantitation range do not match standard used. ıΤ : Value is estimated. MI : Matrix Interference Suspected. : Value determined by Method of Standard Additions. MSA*: Value obtained by Method of Standard Additions; Correlation coefficient is <0.995. : Sample spikes outside of QC limits; matrix interference suspected. : Sample concentration is greater than 4X the spiked value; the spiked value is considered insignificant. : Matrix Spike values exceed established QC limits, post digestion spike is in NI3 control. NI4 : MS/MSD outside of control limits, serial dilution within control. P : There is >40% difference between primary and confirmation analysis. P7 : pH of sample > 2; sample analyzed past 7 days. : Refer to subcontract laboratory report for QC data. S2 : Matrix interference confirmed by repeat analysis. SCN : Thiocyanate not analyzed separately; total value is below the Reporting Limit for Free Cyanide. : Analysis performed by Selective Ion Monitoring. : Conc. of the total analyte ND; therefore this analyte is ND also. UMDL: Undetected at the Method Detection Limit.

UTD : Unable to perform requested analysis.

FORM.FLAGS rev. 04/08/1997



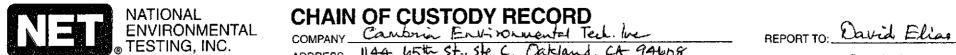
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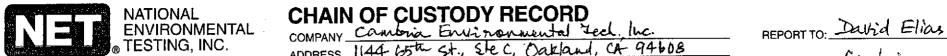
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May 27, 1997

David Elias Cambria Environmental Technology, Inc. 1144 65th Street, Suite B Oakland, CA 94608

Re:

1300 Powell Street

Dear Mr. Elias:

Two soil and one water samples were submitted to Global Geochemistry Corporation (GGC) for hydrocarbon fingerprinting. The main objectives of the investigation were to characterize the hydrocarbon contamination and to estimate its residence time in the environment. According to your request on May 5, 1997, all three samples were extracted with methylene chloride (see Table 1 for extractables concentration) and the extract of sample CB-12-3.0 was then analyzed by gas chromatography-mass spectrometry (GC/MS) in a full scan mode. Extracts of the other two samples are being retained pending your instructions.

The reconstructed ion chromatogram (RIC) of sample CB-12-3.0 (Figure 1) depicts a peak distribution which spans a range from a middle distillate fuel (group of peaks with retention time between 16 and 50 min) to a high-boiling petroleum product (unresolved "hump" between 66 and 84 min). This RIC suggests that hydrocarbon contamination in sample CB-12-3.0 represents a mixture of different petroleum products. To identify components of this mixture, further examination of the acquired GC/MS data was performed, based on distributions of the product-specific groups of hydrocarbons:

- a. Alkanes; m/z 85 mass chromatogram (Figure 2)
- b. Isoprenoids; m/z 113 mass chromatogram (Figure 3)
- c. Alkylcyclohexanes; m/z 83 mass chromatogram (Figure 4)
- d. C₄-Alkylbenzenes; m/z 134 mass chromatogram (Figure 5, see Table 2 for key)
- e. Polynuclear aromatic hydrocarbons (Figure 6, see Table 3 for key).
- f. Steranes; m/z 217 mass chromatogram (Figure 7, see Table 4 for key)
- g. Terpanes; m/z 191 mass chromatogram (Figure 8, see Table 5 for key)
- h. Monoaromatic steranes; m/z 253 mass chromatogram (Figure 9, see Table 6 for key).

The alkane mass chromatogram presented in Figure 2 is dominated by isoalkanes from i- C_9 to i- C_{20} (see also Figure 3). It also exhibits subordinate amounts of n-alkanes in the C_8 - C_{18} range. The distribution patterns of these two homologous series are typical for a moderately degraded diesel-type fuel. The alkylcyclohexane mass chromatogram (Figure 4) shows a distribution pattern maximizing around pentylcyclohexane (CH-5), which closely matches that for the reference diesel fuel No.1. This conclusion is also consistent with distribution patterns of C_4 -alkylbenzenes (Figure 5) and polynuclear aromatic hydrocarbons presented as bar diagram in Figure 6.

Timing a diesel fuel release is site-dependent and requires consideration of a wide set of environmental parameters such as soil characteristics, site hydrology, oxygen and nutrient availability. Among the hydrocarbon components of diesel fuel, n-alkanes are the most susceptible to biodegradation, that leads to their content reduction relative to the content of more recalcitrant branched-chain hydrocarbons (isoprenoids). Published results on biological degradation of diesel fuel in the protected subsurface environment suggest that it typically take about 15 - 20 years to remove most of the n-alkanes from a petroleum product.

The presence and distribution of a subordinate content of high boiling steranes (Figure 7), terpanes (Figure 8) and monoaromatic steranes (Figure 9) indicate that the heavy petroleum product in sample CB-12-3.0 represents hydraulic fluid. A relatively high abundance of diasteranes (peaks 1 - 8D in Figure 7, see Table 4 for key) is indicative of a moderate biodegradation of the hydraulic fluid, which suggests that it could have been in the subsurface environment for more than 10 years.

In summary, the results of GC/MS analysis seem to indicate that hydrocarbon contamination in soil sample CB-12-3.0 consists of a mixture of environmentally altered diesel fuel No.1 and hydraulic fluid. The degree of hydrocarbon biodegradation allows us to estimate subsurface residence time of a diesel fuel as 15 - 20 years and that of a hydraulic fluid as longer then 10 years.

Please do not hesitate to contact us if you have any questions or comments regarding this report.

Sincerely,

Isaac Kaplan

President

A3914-report.wpd

TABLES

Table 1

Concentration of extracts for samples submitted by Cambria Environmental Technology, Inc.

Sample ID	GGC ID	Sample Weight for Extraction (g)	Water Volume for Extraction (ml)	Extract Weight (mg)	Sample Concentration (mg/g or µg/ml)
CB-12-1.0	3914-1	30.6		564	18.4
CB-7	3914-2		950	23.4	24.9
CB-12-3.0	3914-3	30.1		117	3.89
CB-12-3.0	3914-3D	30.6		116	3.79

D: Duplicate

Table 2

Key for C₄-Alkylbenzenes (m/z 134 mass chromatograms)

#	Compound
16	Sec-Butylbenzene
17	1-Methyl-3-Isopropylbenzene
18	1-Methyl-4-Isopropylbenzene
19	1-Methyl-2-Isopropylbenzene
20	1,3-Diethylbenzene
21	1-Methyl-3-Propylbenzene
22	Butylbenzene
23	1,3-Diemethyl-5-Ethylbenzene
24	1,2-Diethylbenzene
25	1-Methy-2-Propylbenzene
26	1,4-Dimethyl-2-Ethylbenzene
27	1,3-Dimethyl-4-Ethylbenzene
28	1,2-Dimethyl-4-Ethylbenzene
29	1,3-Dimethyl-2-Ethylbenzene
30	1,2-Dimethyl-3-Ethylbenzene
31a	1,2,4,5-Tetramethylbenzene
31	1,2,3,5-Tetramethylbenzene
32	1,2,3,4-Tetramethylbenzene

Table 3

Key for Aromatic Compounds Identification in bar diagram

AB:

C₃-C₆ Alkylbenzenes

NAPH:

C₀-C₄ Naphthalenes

FL:

C₀-C₄ Fluorenes

BP:

C₀-C₂ BP Biphenyl/Dibenzofuran

PHEN:

C₀-C₄ Phenanthrenes

PY:

C₀-C₄ Pyrenes/Fluoranthenes

CHR:

C₀-C₄ Chrysenes

BT:

C₁-C₅ Benzothiophenes

DBT:

C₀-C₄ Dibenzothiophenes

NBT:

C₀-C₄ Naphthobenzothiophenes

MAS:

Monoaromatic Steranes

TAS:

Triaromatic Steranes

Table 4

Key for steranes identification (m/z 217 mass chromatogram)

Code	Identity	Carbon #
1	13β,17α-diacholestane (20S)	27
2	13β,17α-diacholestane (20R)	27
3	13α,17β-diacholestane (20S)	27
4	13α,17β-diacholestane (20R)	27
5	24-methyl-13β,17α-diacholestane (20S)	28
6	24-methyl-13ß,17α-diacholestane (20R)	28
7D	24-methyl-13α,17β-diacholestane (20S)	28
7	14α,17α-cholestane (20S)	27
8+8D	14ß,17ß-cholestane (20R) + 24-ethyl-13ß,17 α -diacholestane (20S)	27+29
9	14ß,17ß-cholestane (20S)	27
9D	24-methyl-13α,17β-diacholestane (20R)	28
10	14α,17α-cholestane (20R)	27
11	24-ethyl-13β,17α-diacholestane (20R)	29
12	24-ethyl-13α,17β-diacholestane (20S)	29
13	24-methyl-14α,17α-cholestane (20S)	28
14+14D	24-methyl-14ß,17ß-cholestane (20R) + 24-ethyl-13α,17ß-diacholestane (20R)	28+29
15	24-methyl-14ß,17ß-cholestane (20S)	28
16	24-methyl-14α,17α-cholestane (20R)	28
17	24-ethyl-14α-cholestane (20S)	29
18	24-ethyl-14ß,17ß-cholestane (20R)	29
19	24-ethyl-14ß,17ß-cholestane (20S)	29
20	24-ethyl-14α,17α-cholestane (20R)	29
21A	24-n-Propylcholestanes	30
21B	4-Methyl-24-ethylcholestane	30

Table 5

Key for Tricyclic, Tetracyclic, and Pentacyclic Terpanes Identification (m/z 191 mass chromatograms)

0	Code	Identity	Carbon #
2 C _{y-} Tricyclic Terpane 22 3 C _{y-} Tricyclic Terpane 24 4 C _{y-} Tricyclic Terpane 25 24 C _{y-} Tricyclic Terpane 25 24 C _{y-} Tricyclic Terpane 26 6a C _{y-} Tricyclic Terpane 26 6b C _{y-} Tricyclic Terpane 27 7 C _{y-} Tricyclic Terpane 27 8 C _{y-} Tricyclic Terpane #2 28 8 C _{y-} Tricyclic Terpane #2 28 9 D C _{y-} Tricyclic Terpane #2 29 10 C _{y-} Tricyclic Terpane #2 29 29 11 Tricyclic Terpane #2 29 27 12 Tricyclic Terpane #2 29 29 12 Tricyclic Terpane #2 29 27 14 Tricyclic Terpane #2 29 27 15 Tricyclic Terpane #1 30 30 16 Tricyclic Terpane #2 30 30 17 Tricyclic Terpane #2 30 31	0	C ₂₀ -Tricyclic Terpane	20
2 C _{xx} Tricyclic Terpane 23 4 C _{xx} Tricyclic Terpane 24 5 C _{xx} Tricyclic Terpane 25 24 C _{xx} Tricyclic Terpane 26 6a C _{xx} Tricyclic Terpane 26 6b C _{xx} Tricyclic Terpane 26 7 C _{xx} Tricyclic Terpane 27 A C _{xx} Tricyclic Terpane #2 28 B C _{xx} Tricyclic Terpane #2 28 C C _{xx} Tricyclic Terpane #2 29 E 18α-22,29,30-Trisnormeohopane (Ts) 27 F 17α-22,29,30-Trisnormeohopane (Tm) 27 G 178-22,29,30-Trisnormeohopane 27 H 17α-22,29,30-Trisnormeohopane 27 H 17α-22,29,30-Trisnormeohopane 27 H 17α-23,28-Bisnorlupane 28 L 17α-22,29,30-Trisnormeohopane 28 I 17α-23,28-Bisnorlupane 28 I 17α-23,28-Bisnorlupane 28 I 17α-28,30-Bisnorlupane 29 <t< td=""><td>1</td><td></td><td>21</td></t<>	1		21
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Mb 18β-Oleanane 30 N 17α,21β-Hopane 30 O 17β,21α-Moretane 30 13a C ₃₃ -Tricyclic Terpane #1 33 13b C ₃₃ -Tricyclic Terpane #2 33 P 22S-17α,21β-30-Homohopane 31 Q 22R-17α,21β-30-Homohopane 31 R Gammacerane 30 14a C ₃₄ -Tricyclic Terpane #1 34 S 17β,21α-Homomoretane 31 14b C ₃₄ -Tricyclic Terpane #2 34 T 22S-17α,21β-30-Bishomohopane 32 U 22R-17α,21β-30-Bishomohopane 32 U 22R-17α,21β-30-Bishomohopane 35 15b C ₃₆ -Tricyclic Terpane #1 35 V 17β,21α-C ₃₂ -Bishomomoretane 32 WS 22S-17α,21β-30,31,32-Trishomohopane 33 WR 22R-17α,21β-30,31,32-Trishomohopane 33 WR 22R-17α,21β-30,31,32,33-Tetrahomohopane 36 XS 22S-17α,21β-30,31,32,33-Tetrahomohopane 34 XS 22S-17α,21β-30,31,32,33-Tetrahomohopane 35			
N 17α,21β-Hopane 30 O 17β,21α-Moretane 30 13a C_{33} -Tricyclic Terpane #1 33 13b C_{33} -Tricyclic Terpane #2 33 P 22S-17α,21β-30-Homohopane 31 Q 22R-17α,21β-30-Homohopane 31 R Gammacerane 30 14a C_{34} -Tricyclic Terpane #1 34 S 17α,21α-Homomoretane 31 14b C_{34} -Tricyclic Terpane #2 34 T 22S-17α,21β-30-Bishomohopane 32 U 22R-17α,21β-30-Bishomohopane 32 U 22R-17α,21β-30-Bishomohopane 32 V 17β,21α- C_{32} -Bishomomoretane 35 V 17β,21α- C_{32} -Bishomomoretane 32 WS 22S-17α,21β-30,31,32-Trishomohopane 32 WS 22S-17α,21β-30,31,32-Trishomohopane 33 WR 22R-17α,21β-30,31,32-Trishomohopane 33 KR 22R-17α,21β-30,31,32-Terpane #1 36 C ₃₆ -Tricyclic Terpane #2 36 XS 22S-17α,21β-30,31,32-Tetrahomohopane 34 XR 22R-17α,21β-30,31,32,33-Tetrahomohopane 34 XR 22R-17α,21β-30,31,32,33-Tetrahomohopane 34 YS 22S-17α,21β-30,31,32,33,34-Pentahomohopane 35			
O 17β,21α-Moretane 30 13a C ₃₃ -Tricyclic Terpane #1 33 13b C ₃₃ -Tricyclic Terpane #2 33 P 22S-17α,21β-30-Homohopane 31 Q 22R-17α,21β-30-Homohopane 31 R Gammacerane 30 14a C ₃₄ -Tricyclic Terpane #1 34 S 17β,21α-Homomoretane 31 14b C ₃₄ -Tricyclic Terpane #2 34 T 22S-17α,21β-30-Bishomohopane 32 U 22R-17α,21β-30-Bishomohopane 32 U 22R-17α,21β-30-Bishomohopane 35 15a C ₃₆ -Tricyclic Terpane #1 35 15b C ₃₆ -Tricyclic Terpane #2 35 V 17β,21α-C ₃₂ -Bishomomoretane 32 WS 22S-17α,21β-30,31,32-Trishomohopane 33 WR 22R-17α,21β-30,31,32-Trishomohopane 33 16a C ₃₆ -Tricyclic Terpane #1 36 16b C ₃₆ -Tricyclic Terpane #2 36 XS 22S-17α,21β-30,31,32,33-Tetrahomohopane 34 XR 22R-17α,21β-30,31,32,33-Tetrahomohopane			
13a C_{33} -Tricyclic Terpane #1 33 13b C_{33} -Tricyclic Terpane #2 33 P 22S-17α,21β-30-Homohopane 31 Q 22R-17α,21β-30-Homohopane 31 R Gammacerane 30 14a C_{34} -Tricyclic Terpane #1 34 S 17β,21α-Homomoretane 31 14b C_{34} -Tricyclic Terpane #2 34 T 22S-17α,21β-30-Bishomohopane 32 U 22R-17α,21β-30-Bishomohopane 32 U 22R-17α,21β-30-Bishomohopane 35 15a C_{35} -Tricyclic Terpane #1 35 15b C_{35} -Tricyclic Terpane #2 35 V 17β,21α- C_{37} -Bishomomoretane 32 WS 22S-17α,21β-30,31,32-Trishomohopane 33 WR 22R-17α,21β-30,31,32-Trishomohopane 33 16a C_{36} -Tricyclic Terpane #1 36 16b C_{36} -Tricyclic Terpane #2 36 XS 22S-17α,21β-30,31,32,33-Tetrahomohopane 34 XR 22R-17α,21β-30,31,32,33,32-Tetrahomohopane 34 YS		· · · · · · · · · · · · · · · · · · ·	
13b C_{33} -Tricyclic Terpane #2 33 P 22S-17α,21β-30-Homohopane 31 Q 22R-17α,21β-30-Homohopane 31 R Gammacerane 30 14a C_{34} -Tricyclic Terpane #1 34 S 17β,21α-Homomoretane 31 14b C_{34} -Tricyclic Terpane #2 34 T 22S-17α,21β-30-Bishomohopane 32 U 22R-17α,21β-30-Bishomohopane 32 U 22R-17α,21β-30-Bishomohopane 35 15b C_{35} -Tricyclic Terpane #1 35 V 17β,21α- C_{32} -Bishomomoretane 32 VS 22S-17α,21β-30,31,32-Trishomohopane 33 VR 22R-17α,21β-30,31,32-Trishomohopane 33 VR 22R-17α,21β-30,31,32,33-Tetrahomohopane 36 XS 22S-17α,21β-30,31,32,33-Tetrahomohopane 34 XR 22R-17α,21β-30,31,32,33,34-Pentahomohopane 35			
P 22S-17α,21β-30-Homohopane 31 Q 22R-17α,21β-30-Homohopane 31 R Gammacerane 30 14a C_{34} -Tricyclic Terpane #1 34 S 17β,21α-Homomoretane 31 14b C_{34} -Tricyclic Terpane #2 34 T 22S-17α,21β-30-Bishomohopane 32 U 22R-17α,21β-30-Bishomohopane 32 U 22R-17α,21β-30-Bishomohopane 32 15a C_{35} -Tricyclic Terpane #1 35 15b C_{35} -Tricyclic Terpane #2 35 V 17β,21α- C_{32} -Bishomomoretane 32 WS 22S-17α,21β-30,31,32-Trishomohopane 33 WR 22R-17α,21β-30,31,32-Trishomohopane 33 WR 22R-17α,21β-30,31,32-Trishomohopane 33 16a C_{36} -Tricyclic Terpane #1 36 16b C_{36} -Tricyclic Terpane #2 XS 22S-17α,21β-30,31,32,33-Tetrahomohopane 34 XR 22R-17α,21β-30,31,32,33-Tetrahomohopane 34 YS 22S-17α,21β-30,31,32,33,34-Pentahomohopane 35			
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R Gammacerane 30 14a C_{34} -Tricyclic Terpane #1 34 S 17β,21α-Homomoretane 31 14b C_{34} -Tricyclic Terpane #2 34 T 22S-17α,21β-30-Bishomohopane 32 U 22R-17α,21β-30-Bishomohopane 32 15a C_{35} -Tricyclic Terpane #1 35 15b C_{35} -Tricyclic Terpane #2 35 V 17β,21α- C_{32} -Bishomomoretane 32 WS 22S-17α,21β-30,31,32-Trishomohopane 33 WR 22R-17α,21β-30,31,32-Trishomohopane 33 VR 22R-17α,21β-30,31,32,33-Tetrahomohopane 36 XS 22S-17α,21β-30,31,32,33-Tetrahomohopane 34 XR 22R-17α,21β-30,31,32,33-Tetrahomohopane 34 YS 22S-17α,21β-30,31,32,33,34-Pentahomohopane 35			
14a C_{34} -Tricyclic Terpane #134S17ß,21α-Homomoretane3114b C_{34} -Tricyclic Terpane #234T22S-17α,21ß-30-Bishomohopane32U22R-17α,21ß-30-Bishomohopane3215a C_{35} -Tricyclic Terpane #13515b C_{35} -Tricyclic Terpane #235V17ß,21α- C_{32} -Bishomomoretane32WS22S-17α,21ß-30,31,32-Trishomohopane33WR22R-17α,21ß-30,31,32-Trishomohopane3316a C_{36} -Tricyclic Terpane #13616b C_{36} -Tricyclic Terpane #236XS22S-17α,21ß-30,31,32,33-Tetrahomohopane34XR22R-17α,21ß-30,31,32,33-Tetrahomohopane34YS22S-17α,21ß-30,31,32,33,34-Pentahomohopane35		· · · · · · · · · · · · · · · · · · ·	
S 17β,21α-Homomoretane 31 14b C ₃₄ -Tricyclic Terpane #2 34 T 22S-17α,21β-30-Bishomohopane 32 U 22R-17α,21β-30-Bishomohopane 32 15a C ₃₅ -Tricyclic Terpane #1 35 15b C ₃₅ -Tricyclic Terpane #2 35 V 17β,21α-C ₃₂ -Bishomomoretane 32 WS 22S-17α,21β-30,31,32-Trishomohopane 33 WR 22R-17α,21β-30,31,32-Trishomohopane 33 WR 22R-17α,21β-30,31,32-Trishomohopane 33 16a C ₃₆ -Tricyclic Terpane #1 36 16b C ₃₆ -Tricyclic Terpane #2 XS 22S-17α,21β-30,31,32,33-Tetrahomohopane 34 XR 22R-17α,21β-30,31,32,33-Tetrahomohopane 34 YS 22S-17α,21β-30,31,32,33,34-Pentahomohopane 35			
14b C_{34} -Tricyclic Terpane #234T22S-17α,21β-30-Bishomohopane32U22R-17α,21β-30-Bishomohopane3215a C_{35} -Tricyclic Terpane #13515b C_{35} -Tricyclic Terpane #235V17β,21α- C_{32} -Bishomomoretane32WS22S-17α,21β-30,31,32-Trishomohopane33WR22R-17α,21β-30,31,32-Trishomohopane3316a C_{36} -Tricyclic Terpane #13616b C_{36} -Tricyclic Terpane #236XS22S-17α,21β-30,31,32,33-Tetrahomohopane34XR22R-17α,21β-30,31,32,33-Tetrahomohopane34YS22S-17α,21β-30,31,32,33,34-Pentahomohopane35		The state of the s	
T 22S-17α,21β-30-Bishomohopane 32 U 22R-17α,21β-30-Bishomohopane 32 15a C_{35} -Tricyclic Terpane #1 35 15b C_{35} -Tricyclic Terpane #2 35 V 17β,21α- C_{32} -Bishomomoretane 32 WS 22S-17α,21β-30,31,32-Trishomohopane 33 WR 22R-17α,21β-30,31,32-Trishomohopane 33 16a C_{36} -Tricyclic Terpane #1 36 16b C_{36} -Tricyclic Terpane #2 36 XS 22S-17α,21β-30,31,32,33-Tetrahomohopane 34 XR 22R-17α,21β-30,31,32,33-Tetrahomohopane 34 YS 22S-17α,21β-30,31,32,33,34-Pentahomohopane 35			
U $22R-17\alpha,21β-30$ -Bishomohopane 32 15a C_{35} -Tricyclic Terpane #1 35 15b C_{35} -Tricyclic Terpane #2 35 V $17β,21α-C_{32}$ -Bishomomoretane 32 WS $22S-17\alpha,21β-30,31,32$ -Trishomohopane 33 WR $22R-17\alpha,21β-30,31,32$ -Trishomohopane 33 16a C_{36} -Tricyclic Terpane #1 36 16b C_{36} -Tricyclic Terpane #2 36 XS $22S-17\alpha,21β-30,31,32,33$ -Tetrahomohopane 34 XR $22R-17\alpha,21β-30,31,32,33$ -Tetrahomohopane 34 YS $22S-17\alpha,21β-30,31,32,33,34$ -Pentahomohopane 35	14b		
15a C_{35} -Tricyclic Terpane #13515b C_{35} -Tricyclic Terpane #235V17β,21α- C_{32} -Bishomomoretane32WS22S-17α,21β-30,31,32-Trishomohopane33WR22R-17α,21β-30,31,32-Trishomohopane3316a C_{36} -Tricyclic Terpane #13616b C_{36} -Tricyclic Terpane #236XS22S-17α,21β-30,31,32,33-Tetrahomohopane34XR22R-17α,21β-30,31,32,33-Tetrahomohopane34YS22S-17α,21β-30,31,32,33,34-Pentahomohopane35		· · · · · · · · · · · · · · · · · · ·	
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V 17β,21α-C ₃₂ -Bishomomoretane 32 WS 22S-17α,21β-30,31,32-Trishomohopane 33 WR 22R-17α,21β-30,31,32-Trishomohopane 33 16a C ₃₆ -Tricyclic Terpane #1 36 16b C ₃₆ -Tricyclic Terpane #2 36 XS 22S-17α,21β-30,31,32,33-Tetrahomohopane 34 XR 22R-17α,21β-30,31,32,33-Tetrahomohopane 34 YS 22S-17α,21β-30,31,32,33,34-Pentahomohopane 35	15a	C ₃₅ -Tricyclic Terpane #1	
WS 22S-17α,21β-30,31,32-Trishomohopane 33 WR 22R-17α,21β-30,31,32-Trishomohopane 33 16a C ₃₆ -Tricyclic Terpane #1 36 16b C ₃₆ -Tricyclic Terpane #2 36 XS 22S-17α,21β-30,31,32,33-Tetrahomohopane 34 XR 22R-17α,21β-30,31,32,33-Tetrahomohopane 34 YS 22S-17α,21β-30,31,32,33,34-Pentahomohopane 35	15b	C ₃₅ -Tricyclic Terpane #2	35
WR 22R-17α,21β-30,31,32-Trishomohopane 33 16a C_{36} -Tricyclic Terpane #1 36 16b C_{36} -Tricyclic Terpane #2 36 XS 22S-17α,21β-30,31,32,33-Tetrahomohopane 34 XR 22R-17α,21β-30,31,32,33-Tetrahomohopane 34 YS 22S-17α,21β-30,31,32,33,34-Pentahomohopane 35	V	17β,21α-C ₃₂ -Bishomomoretane	32
WR 22R-17α,21β-30,31,32-Trishomohopane 33 16a C_{36} -Tricyclic Terpane #1 36 16b C_{36} -Tricyclic Terpane #2 36 XS 22S-17α,21β-30,31,32,33-Tetrahomohopane 34 XR 22R-17α,21β-30,31,32,33-Tetrahomohopane 34 YS 22S-17α,21β-30,31,32,33,34-Pentahomohopane 35	WS		33
16a C ₃₆ -Tricyclic Terpane #1 36 16b C ₃₆ -Tricyclic Terpane #2 36 XS 22S-17α,21β-30,31,32,33-Tetrahomohopane 34 XR 22R-17α,21β-30,31,32,33-Tetrahomohopane 34 YS 22S-17α,21β-30,31,32,33,34-Pentahomohopane 35		•	33
16bC ₃₆ -Tricyclic Terpane #236XS22S-17α,21β-30,31,32,33-Tetrahomohopane34XR22R-17α,21β-30,31,32,33-Tetrahomohopane34YS22S-17α,21β-30,31,32,33,34-Pentahomohopane35			
XS 22S-17α,21β-30,31,32,33-Tetrahomohopane 34 XR 22R-17α,21β-30,31,32,33-Tetrahomohopane 34 YS 22S-17α,21β-30,31,32,33,34-Pentahomohopane 35			
XR 22R-17α,21β-30,31,32,33-Tetrahomohopane 34 YS 22S-17α,21β-30,31,32,33,34-Pentahomohopane 35			
YS 22S-17α,21β-30,31,32,33,34-Pentahomohopane 35			
CIC CALLIFORATIO CONTROLOGICAL CONTROLOGICA	YR	22R-17α,21β-30,31,32,33,34-Pentahomohopane	35

GLOBAL GEOCHEMISTRY CORP. 6919 ETON AVENUE • CANOGA PARK, CA 91303-2194 • (818) 992-4103

Table 6

Key for Monoaromatic Steranes Identification (m/z 253 mass chromatogram)

Code	Identity	Elemental Composition
a	20S, 5ß C ₂₇ -Monoaromatic sterane	C ₂₇ H ₄₂
b	20S, dia C ₂₇ -Monoaromatic sterane	C ₂₇ H ₄₂
С	20R, 5ß C_{27} -Monoaromatic sterane + 20R C_{27} dia MAS	$C_{27}H_{42}$
d	20S, 5α C ₂₇ -Monoaromatic sterane	C ₂₇ H ₄₂
е	20S, 5ß C_{28} -Monoaromatic sterane + 20S C_{28} dia MAS	C ₂₈ H ₄₄
f	20R, 5α C ₂₇ -Monoaromatic sterane	C ₂₇ H ₄₂
g	20S, 5α C ₂₈ -Monoaromatic sterane	C ₂₈ H4 ₄
h	20R, 5ß C_{28} -Monoaromatic sterane + 20R C_{28} dia MAS	C ₂₈ H ₄₄
i	20S, 5ß C_{29} -Monoaromatic sterane + 20S C_{29} dia MAS	$C_{29}H_{46}$
j	20S, $5α$ C ₂₉ -Monoaromatic sterane	C ₂₉ H ₄₆
k	20R, 5α C ₂₈ -Monoaromatic sterane	C ₂₈ H ₄₄
1	20R, 5ß C_{29} -Monoaromatic sterane + 20R C_{29} dia MAS	C ₂₉ H ₄₆
m	20R, 5α C ₂₉ -Monoaromatic sterane	C ₂₉ H ₄₆

FIGURES

Figure 1

RIC

DATA: G7742 #1

SCANS 250 TO 2800

05/12/97 12:57:00

CALI: G7742 #1

SAMPLE: C8-12-3.0 (A3914-3) SOIL EXT 0.6UL OF 3500UL +0.5UL STD CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN

1,2850 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3 RANGE: G

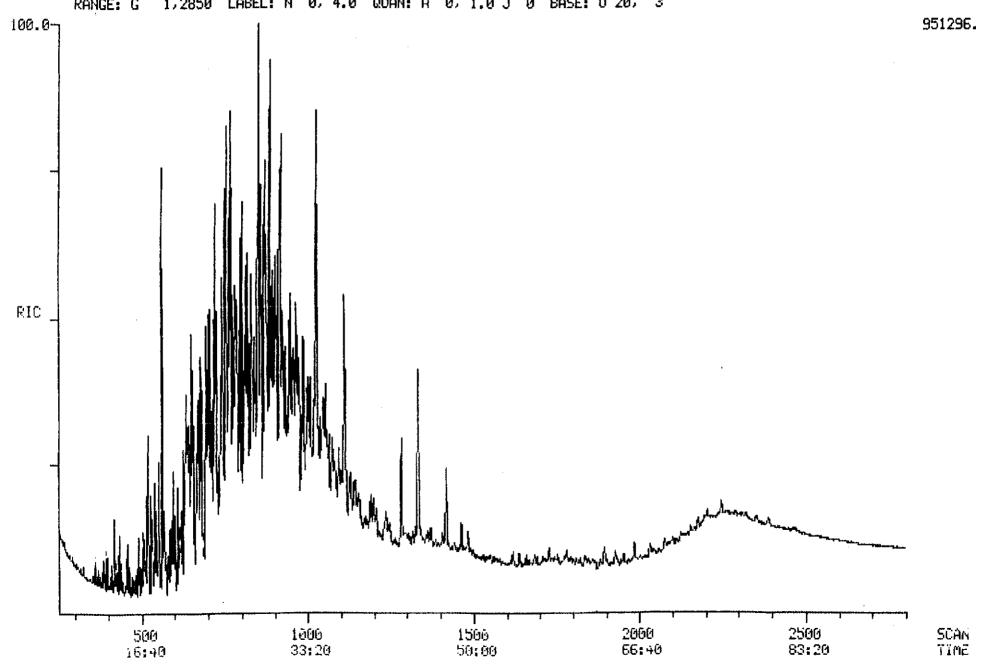


Figure 2

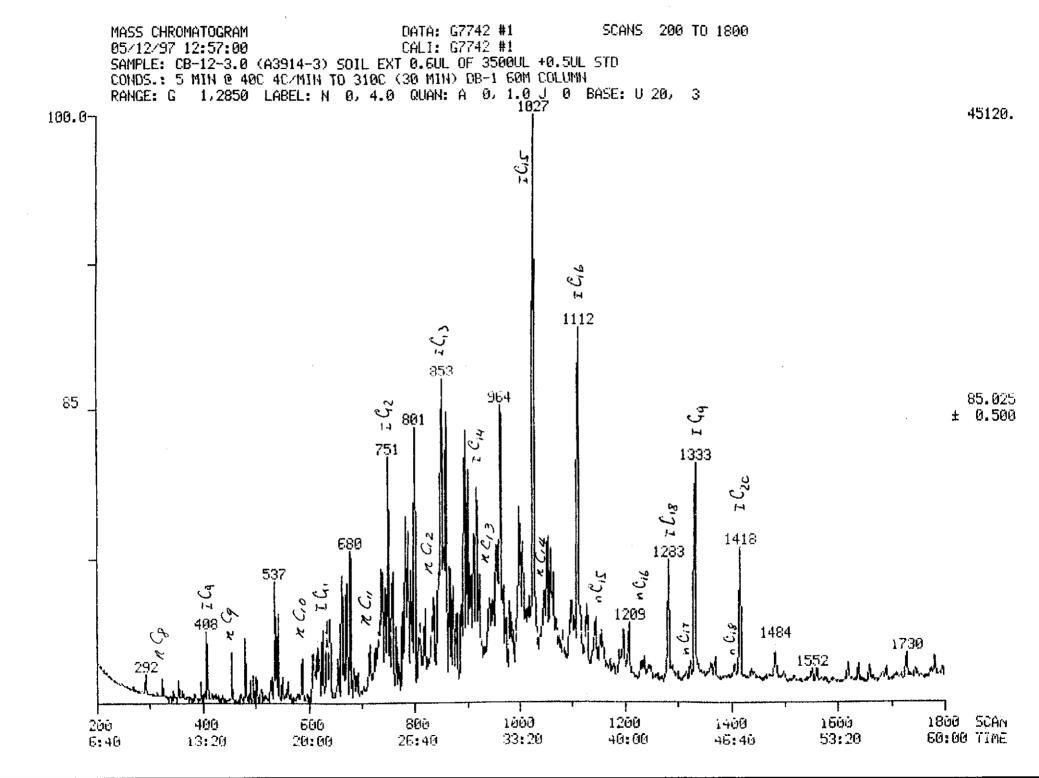


Figure 3

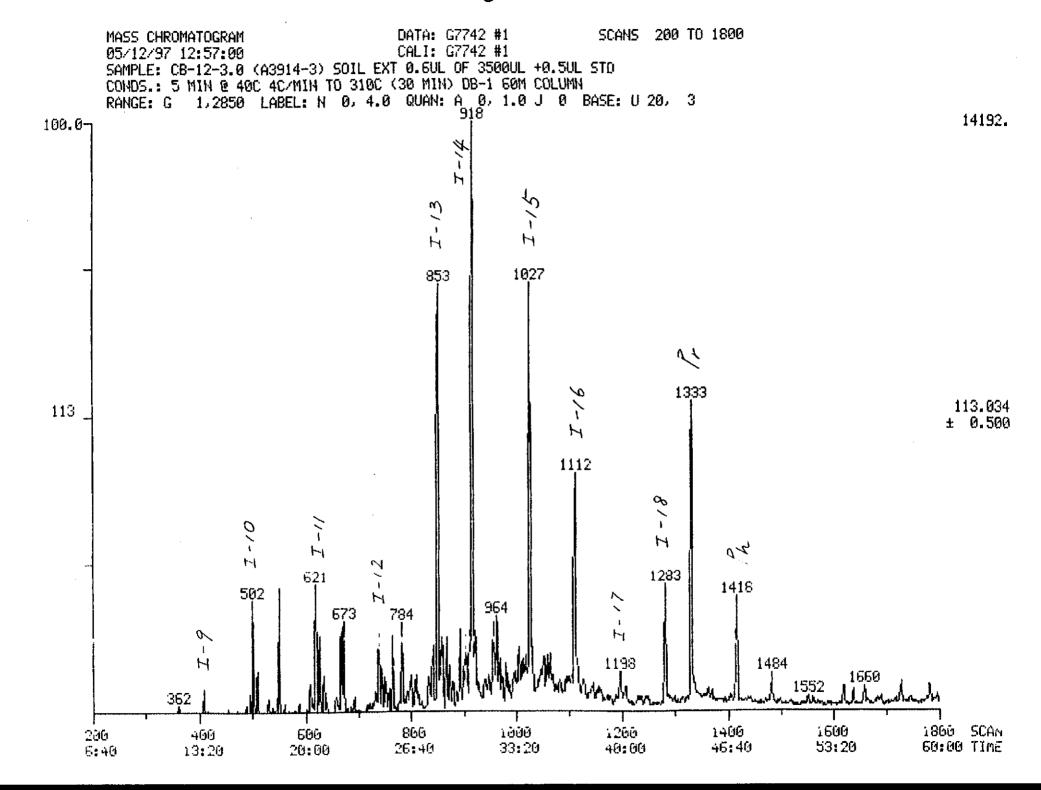


Figure 4

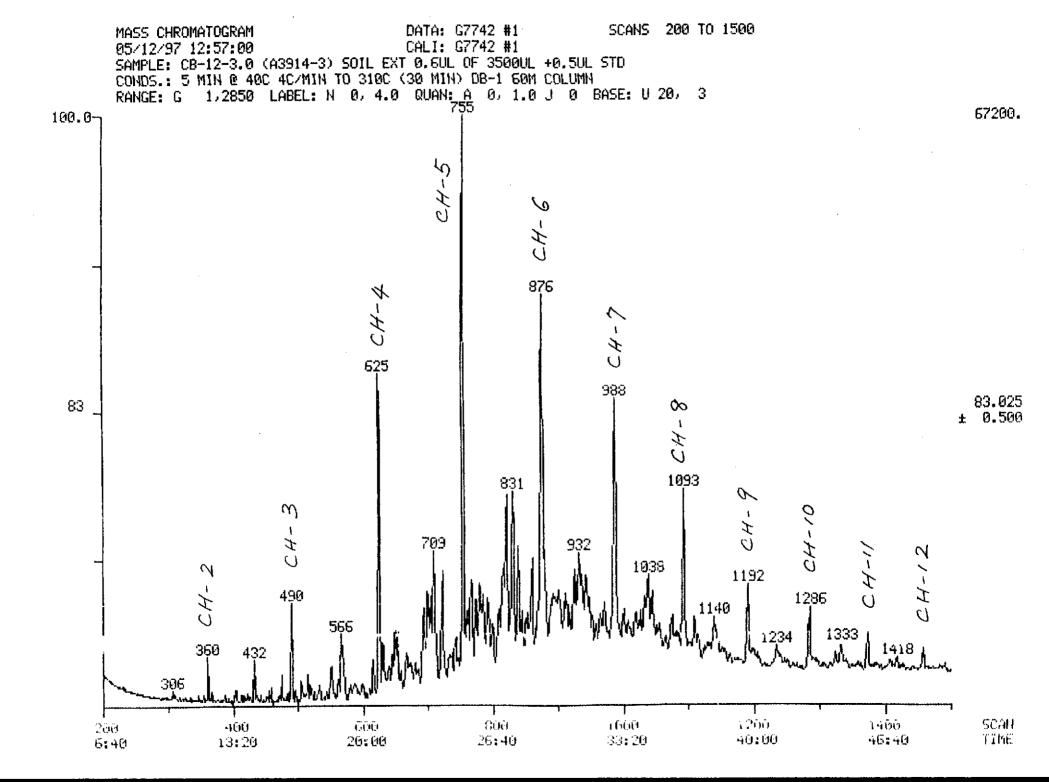


Figure 5

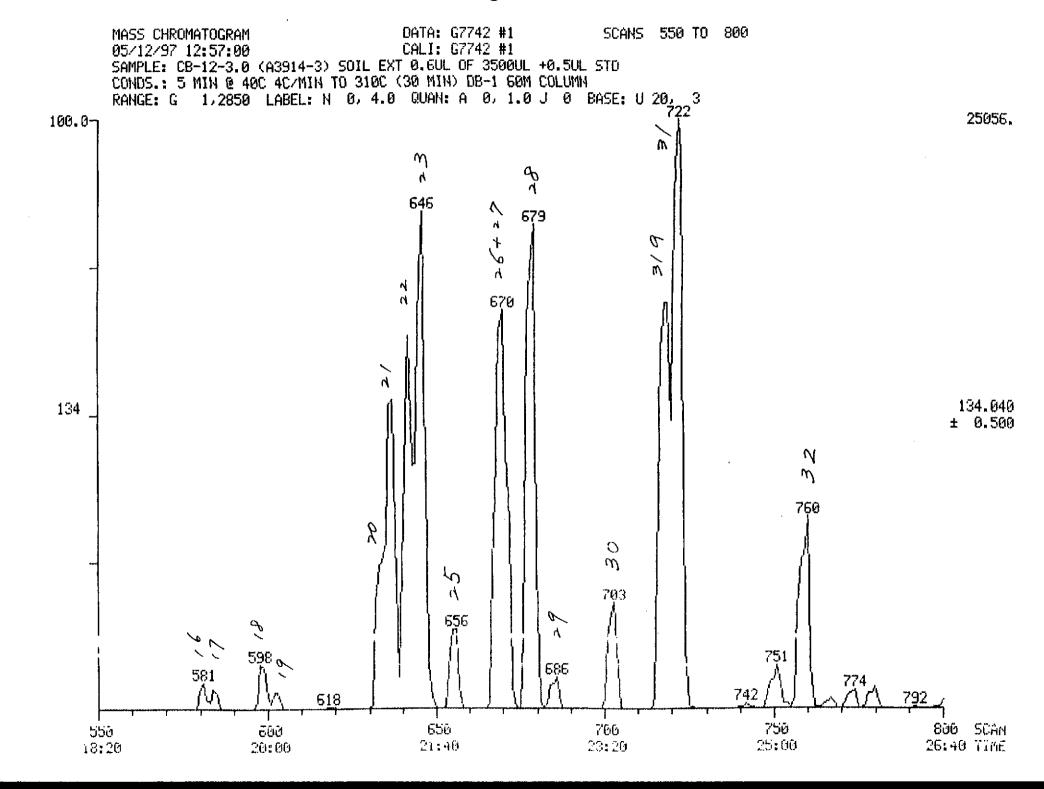


Figure 6

Aromatic Hydrocarbon Distribution

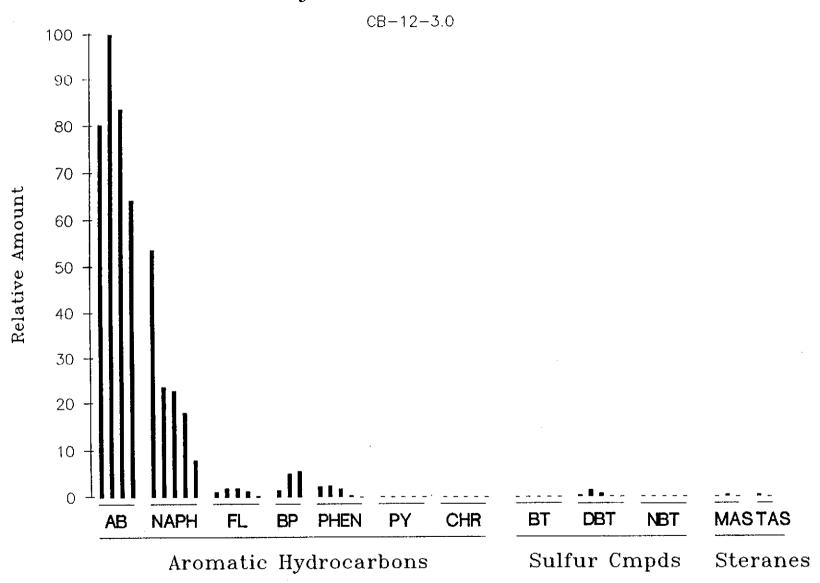


Figure 7

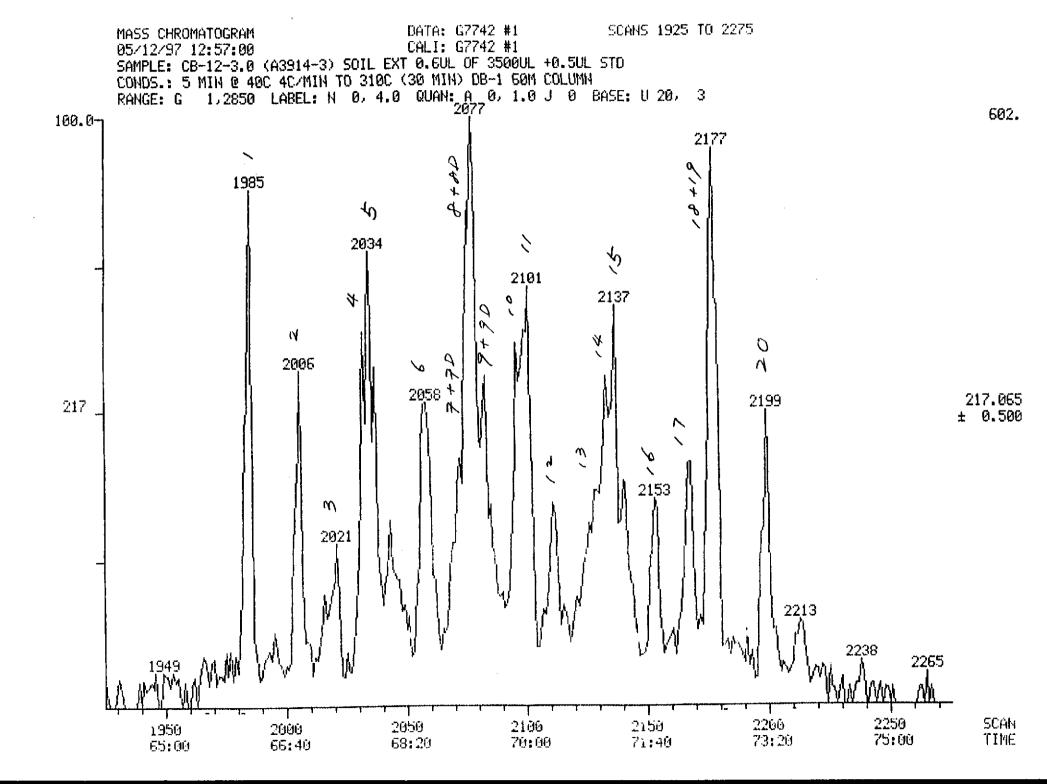


Figure 8

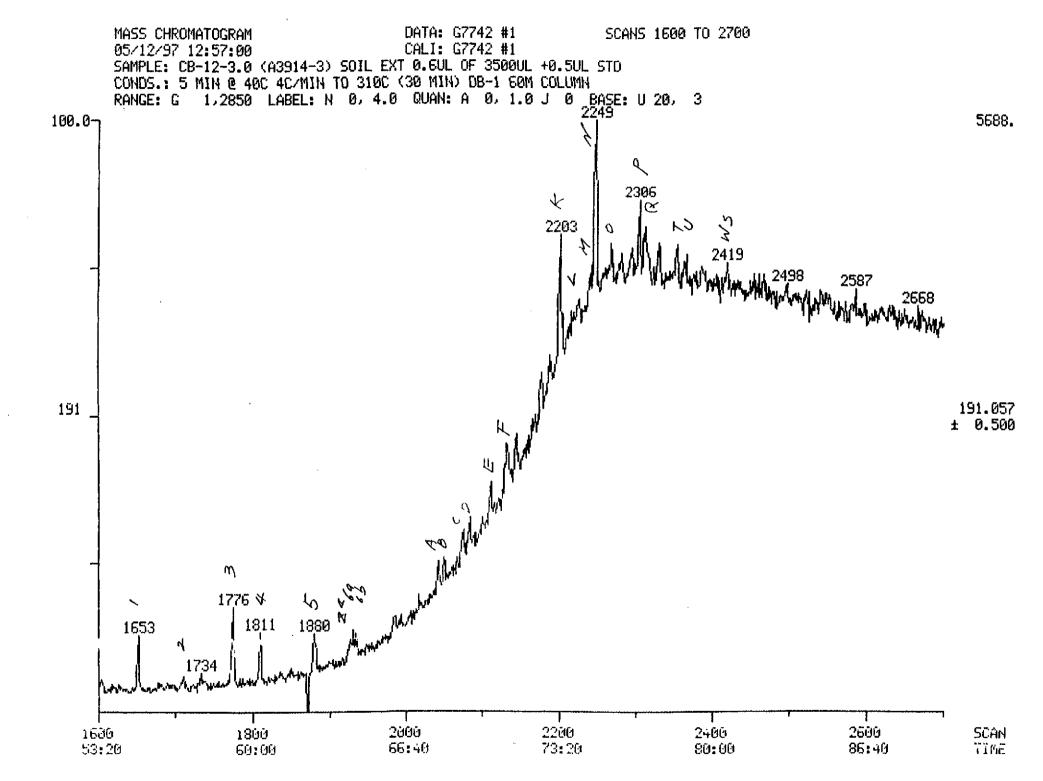


Figure 9

MASS CHROMATOGRAM DATA: G7742 #1 SCANS 1900 TO 2200 05/12/97 12:57:00 CALI: G7742 #1 SAMPLE: CB-12-3.0 (A3914-3) SOIL EXT 0.6UL OF 3500UL +0.5UL STD CONDS.: 5 MIN @ 40C 4C/MIN TO 310C (30 MIN) DB-1 60M COLUMN 1,2850 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3 RANGE: G 100.07 136. N 1997 ¥ 2075 253 253.076 J ± 0.500 1984 Z 14 2111 1928 2089 2125 1946 2154 1906 1950 2060 2050 2100

68:20

70:00

2150

71:40

2200 SCAN 73:20 TIME

63:20

65:00

66:40

APPENDIX

CHAIN OF CUSTODY

H 7717

CAMBRIA ENVIRONMENTAL TECHNOLOGY, INC.

3+3+9-1

CHAIN OF CUSTODY

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

Page ____ of ____

	· · ·								ANAL	YSES				LAB: 610BAL
Cambria Manager: Navid ExiAS Cambria Sampler: San PATH RANGARATAN Client: BECKER Site Address: 13-00 Power L ST Project Number: 95-423-4						Subject Bar								LAB: 610842
Client: Be	CKER				3,4	12.]			
Site Address:	1300	Pow	ELL	ST	13. 0	9 6								
Project Number:	95-	423-	4		A Part	101						<u>.</u>		
SAMPLE ID	DATE	TIME	MATRIX	# OF SAMPLES										
CB-12-1.0	4/24/97		5016	1	AN,	X								ARE COMPLETE, WILL
CB-12-1.0	4/25/94		H20	1 LITER	, ,	Y								REQUEST AMALTSES
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Time/Date: 4/28/97 Time/Date: 4-29-			97 Time/Date: Time/Date:											
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H 2714

LEG	END		·				su	всс	TNC	RA	C1	ГC	HAII	N (OF C	cus	STODY RECORD
Suite 110 Address 36		3636	LEGEND Analytical Services, Inc. 3636 N. Laughlin Rd. Suite 110 Santa Rosa CA 95403 (707) 541-2313 FAX (707) 541-2333									SUB LAB: GLORAL GENCHEMISTRY CONTACT: PHONE: 818-902-4103					
(707) 541-	-2313	·	Report To:	Clie	nt Se	rvices				_Inv		To:	-		unts Pa	ayabl	ble transfer to 2
Additional		7.00840)	4 00	d Tivos	of Conta	more		MBAS	L F	R.E	REAR A					REQUESTED TAT: STANDARD RUSH due
Date	Time	SAMPLE DES	CRIPTION	M (H N	H A N 2 O S	Olher	5 5 A >		Ň		* ×				CODE: TEMPÉRATURE UPON RECEIPT:
4/29/97		CB-12	3.0	\$										1000年間 日本			CAMBRIA ENV. TECHNOLOGY LIAA GETL ST. SLITE C
																	(510) 420-3300
	Resul		RETURN	ITH	IS I											SU	
RELINQUIS METHOD		nser		TIME:		RECEIV							nquis				DATE: TIME: RECEIVED BY:

TPH (diesel) in samples submitted by Cambria Environmental Technology, Inc.

Sample Matrix: Water Analysis Date: 7/10/97 Method: EPA 8015M (diesel)

Sample ID	GGCID	TPH (diesel)*
		ppm
Method Blank:	<1.0	
CB-7	3914-2	17.9

^{*} No hydrocarbons beyond the diesel range were detected

3914 TPH-table.wpd

Surrogate Recovery

Sample ID	GGC ID	o-Terphenyl (8015M diesel)		
		Recovery %		
Method Blank		78		
CB-7	3914-2	86		

MS = Matrix Spike MSD= Matrix Spike Duplicate

Instrument calibration control for TPH analysis

Analytes	RF	RF _D	% Difference	Acceptance Limit (%)	
TPH (diesel)	960.4	1020	6.2	±10	

RF = Linear response factor from 3 point calibration.

RF_D = Daily response factor from calibration check standards.

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ATTACHMENT D

LUSH GEOSCIENCES FIGURE AND TABLE

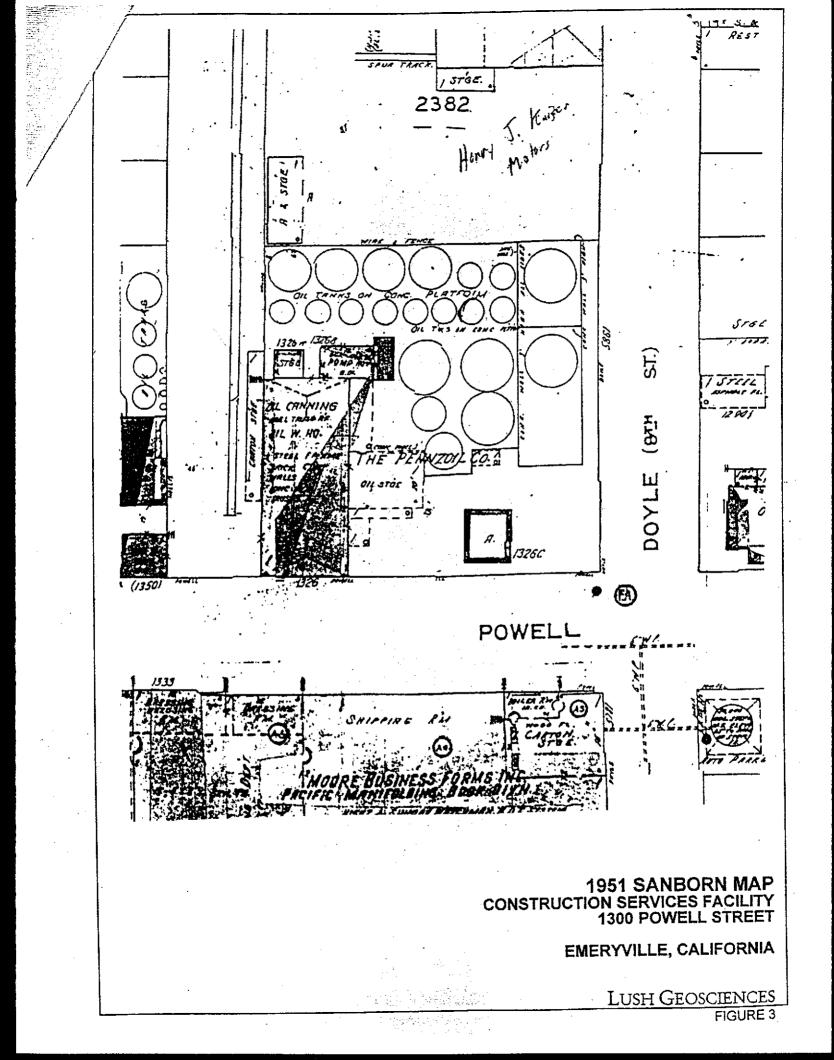


TABLE 2

RESULTS OF LABORATORY ANALYSES SOIL SAMPLES FROM SOIL BORINGS

CONSTRUCTION SERVICES FACILITY EMERYVILLE, CALIFORNIA

		ENERYVI	LLE, CALIFO	RNIA		
Sample Number	Sample Depth (ft)	TPHd	TPHk	TPHmo	TOG	
Boring B1	,					i
S-1-B1	1	<1.0	<1.0	24	360	
S-5-B1	5	2.7	<1.0	320	430	
Boring B2		•			,	·
S-1-B2	1	<1.0	<1.0	<1.0	250	
S-5-B2	1 5	6.7	<1.0	210	3,200	
Boring B3						
S-1-B3	1 5	1.3	<1.0	130	360	
S-5-B3	5 ·	<1.0	<1.0	<1.0	190	
Boring B4	•		·			
S-1-B4	1 5	17	<1.0	880	1,200	
S-5-B4	<u>,</u> 5	<1.0	<1.0	<1.0	440	
Boring B5	_					
· S-1-B5	1 5	110	<1.0	<1.0	2,800	
S-5-B5	5	17 .	<1.0	<1.0	600	
Boring B6						
S-1-B6	1 5	<1.0	<1.0	15	220	
S-5-B6	5	12	<1.0	230	940	
Boring B7						
S-1-B7	1 5	<1.0	<1.0	<1.0	200	1
S-5-B7	5 .	12	<1.0	<1.0	320	
Boring B8						:
S-1-B8	1	11	<1.0	<1.0	320	
		•				P

TPHd = Total petroleum hydrocarbons as diesel
TPHk = Total petroleum hydrocarbons as kerosene
TPHmo = Total petroleum hydrocarbons as motor oil

TOG = Total oil and grease
Results given in parts per million (ppm)
< = less than laboratory minimum detection limits

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ATTACHMENT E

STANDARD FIELD PROCEDURES

STANDARD FIELD PROCEDURES FOR SOIL BORINGS

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

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor odor or staining, estimate ground water depth and quality and to submit samples for chemical analysis.

Soil Classification/Logging

All soil samples are classified according to the Unified Soil Classification System by a trained geologist or engineer working under the supervision of a California Registered Geologist (RG) or a Certified Engineering Geologist (CEG). The following soil properties are noted for each soil sample:

- Principal and secondary grain size category (i.e. sand, silt, clay or gravel)
- · Approximate percentage of each grain size category,
- Color.
- · Approximate water or product saturation percentage,
- · Observed odor and/or discoloration,
- · Other significant observations (i.e. cementation, presence of marker horizons, mineralogy), and
- · Estimated permeablily.

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or hydraulic push technologies. At least one and one half ft of the soil column is collected for every five ft of drilled depth. 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 beyond the bottom of the borehole. The vertical location of each soil sample is determined by measuring the distance from the middle of the soil sample tube to the end of the drive rod used to advance the split barrel sampler. All sample depths use the ground surface immediately adjacent to the boring as a datum. The horizontal location of each boring is measured in the field from an onsite permanent reference using a measuring wheel or tape measure.

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 Storage, Handling and Transport

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

Field Screening

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 photoionization detector (PID) measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. PID 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.

Duplicates and Blanks

Blind duplicate water samples are collected usually collected only for monitoring well sampling programs, at a rate of one blind sample for every 10 wells sampled. Laboratory-supplied trip blanks accompany samples collected for all sampling programs to check for cross-contamination caused by sample handling and transport. These trip blanks are analyzed if the internal laboratory QA/QC blanks contain the suspected field contaminants. An equipment blank may also be analyzed if non-dedicated sampling equipment is used.

Grouting

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

Waste Handling and Disposal

Soil cuttings from drilling activities are usually stockpiled onsite on top of and covered by plastic sheeting. At least three individual soil samples are collected from the stockpiles for later compositing at the analytic laboratory. The composite sample is analyzed for the same constituents analyzed in the borehole samples. Soil cuttings are transported by licenced waste haulers and disposed in secure, licenced facilities based on the composite analytic results.

Ground water removed during sampling and/or rinseate generated during decontamination procedures are stored onsite in sealed 55 gallon drums. Each drum is labeled with the drum number, date of generation, suspected contents, generator identification and consultant contact. Disposal of the water is based on the analytic results for the well samples. The water is either pumped out using a vacuum truck for transport to a licenced waste treatment/disposal facility or the individual drums are picked up and transported to the waste facility where the drum contents are removed and appropriately disposed.