Oakland
All-America City
1993

CITY OF OAKLAND

DALZIEL BUILDING • 250 FRANK H. OGAWA PLAZA, SUITE 5301 • OAKLAND, CALIFORNIA 94612

Public Works Agency
Environmental Services

(510) 238-6688
FAX (510) 238-7286
TDD (510) 238-7644

September 13, 1999

#3978

Mr. Barney Chan
Alameda County Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: **Soil Boring Analytical Report-August 1998**
City of Oakland, Municipal Service Center
7101 Edgewater Drive, Oakland

Dear Mr. Chan:

Attached is the report from Cambria Environmental (Cambria) describing subsurface assessment efforts undertaken at the above-referenced site. Included in this report are the results of Cambria's limited soil and groundwater investigation conducted at the site in August 1998.

Should you have any questions or require additional information, please contact me at (510) 238-6259.

Sincerely,

Joseph A. Cotton
Environmental Program Specialist

mscboringrep.COV.wpd
09-13-99

99 SEP 15 PM 4:19
ENVIRONMENTAL PROTECTION

CAMBRIA

September 7, 1999

Joseph Cotton
City of Oakland, Public Works Agency
Environmental Services Division
250 Frank H. Ogawa Plaza, Ste. 5301
Oakland, California 94612-2034

Re: **Soil Boring Analytic Results**
City of Oakland, Municipal Services Center
7101 Edgewater Drive
Oakland, California
Cambria Project #153-1247-009

Dear Mr. Cotton:

As part of the fuel dispensing system piping removal, Cambria Environmental Technology, Inc. (Cambria) collected soil samples in August 1998 to pre-qualify trench spoils for landfill disposal. The analytic results for the trench spoils sampling were reported in an August 11, 1998 Soil Pre-classification Sampling Results letter-report to Mr. Mark Hersh of the City of Oakland, and was subsequently forwarded to Mr. Barney Chan of the Alameda County Health Care Services Agency (ACHCSA) . Cambria completed the pre-classification sampling early and advanced four soil borings for the purposes of subsurface assessment during the remaining available drill time. These analytic results were communicated in draft to Mr. Mark Hersh and to Mr. Barney Chan in August 1998. However, Cambria did not submit a final investigation report documenting the analytic results for soil and groundwater samples collected from the additional borings. This letter-report documents the assessment efforts completed on August 3, 1998. Please find below a site summary, investigation procedures, investigation results, and Cambria's recommendations and conclusions.

SITE SUMMARY

Site and Area Use: The site is an approximately 17-acre corporation yard consisting of offices, shops, warehouse structures, and a vehicle maintenance and repair facility. Bordering the site to the west and to the north is the Martin Luther King Regional Shoreline park. Beyond the narrow strip of park lands lie San Leandro Bay to the west and Damon Slough to the north. Area use to the east and south is primarily light industrial.

Environmental Investigations: In 1989, an environmental site assessment was performed, and monitoring wells MW-1 through MW-4 were installed (Figure 1). In 1992, additional investigation was performed and monitoring wells MW-5 through MW-7 were installed. In 1993, thirty-four soil borings were advanced across the site, and groundwater samples were collected. In 1995, three

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

Cambria Environmental Technology, Inc.

1144 65th Street
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Oakland, CA 94608
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shallow borings were advanced as part of a geotechnical investigation and soil samples were analyzed for petroleum hydrocarbons. In 1996, ten soil borings were advanced and temporary wells were installed outside the western and northern perimeters of the site along San Leandro Bay and Damon Slough. Three of the temporary well locations were converted to monitoring wells: MW-8 through MW-10 (Figure 1). Since installation, monitoring wells MW-1 through MW-10 have been regularly gauged and sampled. From September through December 1999, an approximately 2,650 lineal foot fuel transport and dispensing system was removed from the site. Soil samples from beneath the former piping were collected at 20 ft intervals and analyzed for petroleum hydrocarbons and organic lead. In addition, eight underground storage tanks (USTs) and associated piping have been removed from the site.

Site Hydrogeology: The site is underlain by artificial fill that was emplaced during several phases since 1945. The fill material varies significantly in character across the site. The fill is underlain by clayey silt deposits, known as Bay Mud. Based on measured groundwater elevations, groundwater generally appears to flow towards Damon Slough in the northern part of the site, and toward San Leandro Bay in the southern part of the site. The heterogeneity of the artificial fill material, the presence of underground utilities with high permeability backfill material, and the low permeability of the Bay Mud used as fill at various site locations appear to influence local groundwater flow.

Contaminant Distribution: Petroleum hydrocarbons have been detected in soil and groundwater at multiple locations across the site. The distribution of contamination appears to be related to the former USTs and fuel dispensing systems. The former USTs near TBW-1 and TBW-2, the former USTs east of MW-6, and the recently upgraded active USTs near MW-5 are likely to have been sources of contamination (Figure 1). Low concentrations of petroleum hydrocarbons have been detected in off-site wells MW-8, MW-9, and MW-10 in the past. No petroleum hydrocarbons have ever been detected in off-site wells MW-3 and MW-4.

INVESTIGATION PROCEDURES

Cambria advanced borings SB-A and SB-B west of a former UST tankpit to assess whether hydrocarbons had migrated from the former tankpit towards San Leandro Bay (Figure 1). Borings SB-C and SB-D were advanced to assess the lateral extent of hydrocarbons adjacent to the storm sewer.

The results of Cambria's August 3, 1998 subsurface investigation are summarized below. A copy of the soil boring permit is presented as Attachment A. Boring logs are presented as Attachment B. Analytic results for groundwater and soil are presented in Table 1, and the laboratory analytic reports are presented as Attachment C. Cambria's Standard Field Procedures describing our

sampling methods are presented as Attachment D. Figure 2 presents the soil boring locations completed for this limited investigation.

Soil Borings

Permits:	County of Alameda Public Works Agency Drilling Permit 98WR315 (Attachment A).
Drilling Date:	August 3, 1998
Drilling Methods:	Geoprobe cuttingless drill rig
Number of Borings:	Four; SB-A,B,C, and D (Figure 2)
Boring Depths:	10 to 16 ft below grade (Attachment B)
Sediment Lithology:	The stratigraphy encountered consisted primarily of clayey silts and silty sands to the total depth explored of 16 ft (Attachment B).
Analyses:	Four grab groundwater samples and eight soil samples were collected and analyzed for: • Total petroleum hydrocarbons as gasoline (TPHg) by modified EPA Method 8015, • TPHdiesel (TPHd) by modified EPA Method 8015, • Benzene, ethylbenzene, toluene, and xylenes (BETX) by EPA Method 8020, and •. Methyl tert-butyl ether (MTBE) by EPA Method 8020.
Groundwater Depth During Sampling:	Groundwater stabilized in most borings at approximately 8 to 11.5 ft below grade.

HYDROCARBON DISTRIBUTION IN GROUNDWATER

Both TPHg and TPHd were detected in grab groundwater samples collected from borings SB- A and SB-B at maximum concentrations of 73 parts per billion (ppb) TPHg and 7,900 ppb TPHd (Table 1). No benzene or MTBE were detected in either of the grab groundwater samples collected from these borings. These analytic results indicate that low petroleum hydrocarbon concentrations may be migrating offsite west of the former USTs. Cambria recently submitted a workplan proposing to install a monitoring well in this location (Figure 1).

TPHg and TPHd were also detected in the water samples collected from borings SB-C and SB-D at maximum concentrations of 39,000 ppb TPHg and 6,600 ppb TPHd. However, the laboratory noted that these samples contained approximately 5% sediment, by volume. The hydrocarbons adsorbed to the sediment may have artificially elevated the soluble hydrocarbon concentrations detected.

HYDROCARBON DISTRIBUTION IN SOIL

Very low hydrocarbon concentrations were detected in the soil samples collected from borings SB-A and SB-B. No benzene or MTBE were detected. These analytic results indicate that the hydrocarbons detected in groundwater samples collected from borings SB-A and SB-B are likely the result of groundwater transport, and not the result of a hydrocarbon source in the shallow vadose zone soils.

+ 50 ppm Benzene

Maximum concentrations of 4,400 parts per million (ppm) TPHg and 910 ppm TPHd were detected in the 7.5 ft sample collected from boring SB-C. Relatively low concentrations were detected in the other samples collected and analyzed from borings SB-C and SB-D. These concentrations are consistent with concentrations detected during the fuel dispensing system removal sampling.

RECOMMENDATIONS AND CONCLUSIONS

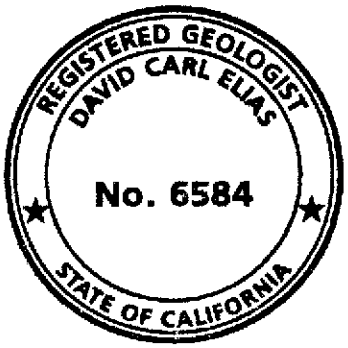
These analytic results were taken into consideration during the preparation of Cambria's August 26, 1999 workplan proposing additional monitoring wells across the site, including a remediation test well. Cambria recommends proceeding with the installation of additional monitoring and remediation test wells. The analytic results from the new wells will provide better data regarding the soluble hydrocarbon concentrations west of the former USTs, located north of the Storage building.

CLOSING

If you have any questions or comments regarding this letter-report or future site activities, please call David Elias at (510) 420-3307.

Sincerely,
Cambria Environmental Technology, Inc.

David C. Elias, R.G.
Senior Geologist



Figures: 1 - Soil Boring Locations

Attachments: A - Soil Boring Permit
B - Boring Logs
C - Analytic Reports
D - Standard Field Procedures for Soil Borings

H:\City of Oakland\Municipal Service Center\Pre-screening and Soil borings\soil boring reporting.wpd

09/02/99

EXPLANATION

SB-A	◉	Soil Boring Location - August 3, 1998
	⊕	Proposed Monitoring Well Location
	⊕	Proposed Remediation Well Location
MW-1	●	Monitoring well location
TBW-1	⊕	Tank Backfill Well
	— —	Fence

MW-4

MW-3

EDGEWATER DRIVE

DAMON SLOUGH

MW-2

Public Works Building

911 Center

Admin.

MW-5

Active USTs

Building No. 5

Former USTs

MW-7

Figure 3

Crafts and Storage

MW-10

MW-1

TBW-6

TBW-5

SB-D

Former USTs

TBW-1

TBW-2

Storage

TBW-3

Former UST

TBW-4

MW-6

SB-A

SB-B

Above Ground Storage Tanks
NGV Fueling Station

MW-9

MW-8

0 75 150 300

Scale (ft)

SAN LEANDRO BAY

FIGURE

1

Soil Boring Locations

CAMBRIA

Municipal Service Center

7101 Edgewater Drive

Oakland, California

Table 1. Soil and Groundwater Analytic Results - City of Oakland - Municipal Service Center - 7171 Edgewater Drive, Oakland, California

Sample ID	Date	Depth (ft)	TPH-G	TPH-D	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
			(Soil concentrations in ppm, Groundwater concentrations in ppb)						
Soil Samples									
SB-A-7.5	8/3/98	7.5	<1.0	6.0[d]	<0.0050	<0.0050	<0.0050	<0.0050	<0.050
SB-A-11.5	8/3/98	11.5	1.1[g]	76[df]	<0.0050	<0.0050	<0.0050	<0.0050	<0.050
SB-B-7.5	8/3/98	7.5	<1.0	2.7d	<0.0050	<0.0050	<0.0050	<0.0050	<0.050
SB-B-11.5	8/3/98	11.5	2.4[g]	37[df]	<0.0050	<0.0050	<0.0050	<0.0050	<0.050
SB-C-7.5	8/3/98	7.5	4,400[c]	910[e]	50	120	68	340	<65
SB-C-9.5	8/3/98	9.5	3.5[c]	1.2[f]	0.32	0.17	0.091	0.42	<0.050
SB-D-7.5	8/3/98	7.5	23[c]	6.8[df]	1.2	0.38	0.55	1.7	<0.40
SB-D-11.5	8/3/98	11.5	3.3[c]	1.4[f]	0.22	0.051	0.037	0.17	<0.050
Grab Groundwater Samples									
SB-A	8/3/98	--	73[bi]	7.900[dfi]	<0.5	0.54	0.56	0.82	<5.0
SB-B	8/3/98	--	60[c]	170[df]	<0.5	0.95	<0.5	<0.5	<10
SB-C	8/3/98	--	9,200[ch]	2,000[edh]	750	580	290	1,400	<100
SB-D	8/3/98	--	39,000[ch]	6,600[edh]	1600	1,200	980	4,900	<5.0

Abbreviations:

TPH-G = Total petroleum hydrocarbons as gasoline analyzed using Modified EPA Method 8015
TPH-D = Total petroleum hydrocarbons as diesel analyzed using Modified EPA Method 8015 with silica gel cleanup
Benzene, ethylbenzene, toluene, xylenes, and methyl tert butyl ether analyzed using EPA Method 8020
<X = Not detected at detection limit of X
ppm = parts per million
ppb = parts per billion
-- = not analyzed

Notes:

a = no recognizable pattern
b = heavier gasoline range compounds are significant (aged gasoline?)
c = unmodified or weakly modified gasoline is significant
d = oil range compounds are significant
e = gasoline range compounds are significant
f = diesel range compounds are significant, no recognizable pattern
g = Strongly aged gasoline or diesel range compounds are significant
h = liquid sample that contains greater than ~5 vol. % sediment
i = lighter than water immiscible sheen is present
j = unmodified or weakly modified diesel is significant

CAMBRIA

ATTACHMENT A

Soil Boring Permit

ALAMEDA COUNTY PUBLIC WORKS AGENCY

PUBLIC WORKS

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

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 7101 EDGEWATER DR. OAKLAND, CA 94621

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

CLIENT
Name CITY OF OAKLAND
Address 250 FRANK H. OGAWA Plaza Phone 238-7695
City OAKLAND Zip 94612

APPLICANT
Name CAMBRIA ENV. TECH. INC.
DAVID ELIAS Fax 420-9170
Address 1144 65th St. E Phone 420-3307
City OAKLAND CA Zip 94608

TYPE OF PROJECT

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

PROPOSED WATER SUPPLY WELL USE

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

DRILLING METHOD:

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

DRILLER'S LICENSE NO. C57 705 927

WELL PROJECTS
Drill Hole Diameter ___ in. Maximum
Casing Diameter ___ in. Depth ___ ft.
Surface Seal Depth ___ ft. Number ___

GEOTECHNICAL PROJECTS
Number of Borings 16 Maximum
Hole Diameter 2 in. Depth 6-8 ft.

ESTIMATED STARTING DATE 8/3/98
ESTIMATED COMPLETION DATE 8/3/98

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

APPLICANT'S SIGNATURE David Elias DATE 7/31/98

FOR OFFICE USE

PERMIT NUMBER 98WR315
WELL NUMBER ___
APN ___

PERMIT CONDITIONS

Circled Permit Requirements Apply

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

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

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

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

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

F. **WELL DESTRUCTION**
See attached.

G. **SPECIAL CONDITIONS**

APPROVED [signature] DATE 7/31/98

CAMBRIA

ATTACHMENT B

Boring Logs

Cambria Environmental Technology, Inc.
1144 - 65th St.
Oakland, CA 94608
Telephone: (510) 420-0700
Fax: (510) 420-9170

BORING/WELL LOG

CLIENT NAME	City of Oakland	**BORING/WELL NAME**	SB-A
JOB/SITE NAME	Municipal Service Center	**DRILLING STARTED**	03-Aug-98
LOCATION	7101 Edgewater Drive, Oakland CA	**DRILLING COMPLETED**	03-Aug-98
PROJECT NUMBER	153-1247	**WELL DEVELOPMENT DATE (YIELD)**	NA
DRILLER	Vironex	**GROUND SURFACE ELEVATION**	NA
DRILLING METHOD	Hydraulic push	**TOP OF CASING ELEVATION**	NA
BORING DIAMETER	2"	**SCREENED INTERVAL**	NA
LOGGED BY	D. Elias, RG	**DEPTH TO WATER (First Encountered)**	12.0 ft (03-Aug-98)
REVIEWED BY	D. Elias, RG	**DEPTH TO WATER (Static)**	NA
REMARKS			

TPHg (mg/kg)	BLOW COUNTS	RECOVERY	SAMPLE ID	EXTENT	DEPTH (ft bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (ft bgs)	WELL DIAGRAM
								ASPHALT.	0.3	
		88%				SW		**SAND**; (SW); light brown; dry; 5% silt, 95% fine to medium grained sand; high estimated permeability; no hydrocarbon odor.	2.5	
						MH		**Clayey SILT**; (MH); light brown; dry to damp; 30% clay, 60% silt, 10% fine to medium grained sand; medium plasticity; low estimated permeability; no hydrocarbon odor.	4.0	
		64%			5	SW		**SAND**; (SW); brown; dry; 5% silt, 95% fine to medium grained sand; high estimated permeability; possibly slough; no hydrocarbon odor.	6.5	
						ML		**Clayey SILT**; (ML); dark brown; dry; 20% clay, 70% silt, 10% sand; medium plasticity; low estimated permeability; no hydrocarbon odor.	7.5	
<1.0			SB-A-7.5							Portland Type I/II
		52%			10			**Clayey SILT**; (MH); grey; damp; 35% clay, 60% silt, 5% very fine grained sand; high plasticity; very low estimated permeability; no hydrocarbon odor. Black @ 10'. Moist @ 11'. 8/3/98 ▽		
1.1			SB-A-11.5			MH				
					15			Hydropunch ground water sample; no soil sample collected from 12' to 16'.	16.0	Bottom of Boring @ 16 ft

WELL LOG (TPH-G) H:\CITYOF-2\GINT\OAKLAND.GPJ DEFAULT.GDT 12/17/98

Cambria Environmental Technology, Inc.
1144 - 65th St.
Oakland, CA 94608
Telephone: (510) 420-0700
Fax: (510) 420-9170

BORING/WELL LOG

CLIENT NAME	City of Oakland	**BORING/WELL NAME**	SB-B
JOB/SITE NAME	Municipal Service Center	**DRILLING STARTED**	03-Aug-98
LOCATION	7101 Edgewater Drive, Oakland CA	**DRILLING COMPLETED**	03-Aug-98
PROJECT NUMBER	153-1247	**WELL DEVELOPMENT DATE (YIELD)**	NA
DRILLER	Vironex	**GROUND SURFACE ELEVATION**	NA
DRILLING METHOD	Hydraulic push	**TOP OF CASING ELEVATION**	NA
BORING DIAMETER	2"	**SCREENED INTERVAL**	NA
LOGGED BY	D. Elias, RG	**DEPTH TO WATER (First Encountered)**	12.0 ft (03-Aug-98)
REVIEWED BY	D. Elias, RG	**DEPTH TO WATER (Static)**	NA
REMARKS			

TPHg (mg/kg)	BLOW COUNTS	RECOVERY	SAMPLE ID	EXTENT	DEPTH (ft bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (ft bgs)	WELL DIAGRAM
								ASPHALT.	0.3	
		100%				SW		**SAND**; (SW); light brown; dry; 5% silt, 95% medium to coarse grained sand; high estimated permeability; no hydrocarbon odor.	2.0	
						ML		**Clayey Sandy SILT**; (ML); brown; damp; 20% clay, 60% silt, 20% sand; medium plasticity; low estimated permeability; no hydrocarbon odor.	5.0	
		12%			5	SM		**Silty SAND**; (SM); rust brown; damp; 5% clay, 45% silt, 50% medium to coarse grained sand; moderate estimated permeability; no hydrocarbon odor.	6.5	
<1.0			SB-B-7.5			ML		**Clayey SILT**; (ML); dark grey; damp; 30% clay, 65% silt, 5% very fine grained sand; medium plasticity; high estimated permeability; no hydrocarbon odor.		◄ Portland Type I/II
		50%			10				10.0	
2.4			SB-B-11.5			SM		**Silty SAND**; (SM); grey; damp to moist; 30% silt, 70% medium to very coarse grained sand, 10% gravel to 0.25" diameter; moderate estimated permeability; no hydrocarbon odor. 8/3/98 ▽		
								Hydropunch ground water sample; no soil sample collected from 12' to 16'.		
					15				16.0	Bottom of Boring @ 16 ft

WELL LOG (TPH-G) H:\CITYOF~2\GINT\OAKLAND.GPJ DEFAULT.GDT 12/17/98

Cambria Environmental Technology, Inc.
1144 - 65th St.
Oakland, CA 94608
Telephone: (510) 420-0700
Fax: (510) 420-9170

BORING/WELL LOG

CLIENT NAME	City of Oakland	**BORING/WELL NAME**	SB-C
JOB/SITE NAME	Municipal Service Center	**DRILLING STARTED**	03-Aug-98
LOCATION	7101 Edgewater Drive, Oakland CA	**DRILLING COMPLETED**	03-Aug-98
PROJECT NUMBER	153-1247	**WELL DEVELOPMENT DATE (YIELD)**	NA
DRILLER	Vironex	**GROUND SURFACE ELEVATION**	NA
DRILLING METHOD	Hydraulic push	**TOP OF CASING ELEVATION**	NA
BORING DIAMETER	2"	**SCREENED INTERVAL**	NA
LOGGED BY	D. Elias, RG	**DEPTH TO WATER (First Encountered)**	8.0 ft (03-Aug-98)
REVIEWED BY	D. Elias, RG	**DEPTH TO WATER (Static)**	NA
REMARKS			

TPHg (mg/kg)	BLOW COUNTS	RECOVERY	SAMPLE ID	EXTENT	DEPTH (ft bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (ft bgs)	WELL DIAGRAM
								ASPHALT.	0.3	
		0%	SB-C-4.0		5	ML		**Sandy Clayey SILT**; (ML); light brown; damp; 15% clay, 70% silt, 15% medium to coarse grained sand; low plasticity; low estimated permeability; fill; slight hydrocarbon odor.	5.0	Portland Type I/II
4,400		100%	SB-C-7.5			MH		**Clayey SILT**; (MH); black; moist; 15% clay, 80% silt, 5% very fine grained sand; high plasticity; very low estimated permeability; strong hydrocarbon odor. Possibly from GW 8/3/98 ▽		
3.5		100%	SB-C-9.5		10				10.0	Bottom of Boring @ 10 ft

WELL LOG (TPH-G) H:\CITYOF~2\GINT\OAKLAND.GPJ DEFAULT.GDT 12/17/98

Cambria Environmental Technology, Inc.
1144 - 65th St.
Oakland, CA 94608
Telephone: (510) 420-0700
Fax: (510) 420-9170

BORING/WELL LOG

CLIENT NAME	City of Oakland	**BORING/WELL NAME**	SB-D
JOB/SITE NAME	Municipal Service Center	**DRILLING STARTED**	03-Aug-98
LOCATION	7101 Edgewater Drive, Oakland CA	**DRILLING COMPLETED**	03-Aug-98
PROJECT NUMBER	153-1247	**WELL DEVELOPMENT DATE (YIELD)**	NA
DRILLER	Vironex	**GROUND SURFACE ELEVATION**	NA
DRILLING METHOD	Hydraulic push	**TOP OF CASING ELEVATION**	NA
BORING DIAMETER	2"	**SCREENED INTERVAL**	NA
LOGGED BY	D. Elias, RG	**DEPTH TO WATER (First Encountered)**	11.0 ft (03-Aug-98)
REVIEWED BY	D. Elias, RG	**DEPTH TO WATER (Static)**	NA
REMARKS			

TPHg (mg/kg)	BLOW COUNTS	RECOVERY	SAMPLE ID	EXTENT	DEPTH (ft bgs)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (ft bgs)	WELL DIAGRAM
								ASPHALT.	0.3	
		75%	SB-D-3.5		5	ML		**Sandy Clayey SILT**; (ML); light brown; damp; 15% clay, 70% silt, 15% medium to very coarse grained sand; low plasticity; moderate estimated permeability; no hydrocarbon odor.		Portland Type I/II
		100%							7.5	
23			SB-D-7.5			MH		**Clayey SILT**; (MH); green brown; moist; 20% clay, 75% silt, 5% medium to coarse grained sand; high plasticity; very low estimated permeability; strong hydrocarbon odor.	9.0	
		50%			10	ML		**Sandy Clayey SILT**; (ML); light brown; damp; 15% clay, 70% silt, 15% medium to very coarse grained sand; low plasticity; moderate estimated permeability; strong hydrocarbon odor. 8/3/98 ▽	11.0	
3.3			SB-D-11.5			MH		**Clayey SILT**; (MH); green brown; moist; 20% clay, 75% silt, 5% sand; high plasticity; very low estimated permeability; strong hydrocarbon odor.	12.0	Bottom of Boring @ 12 ft

WELL LOG (TPH-G) H:\CITYOF-2\GINT\OAKLAND.GPJ DEFAULT.GDT 12/17/98

CAMBRIA

ATTACHMENT C

Laboratory Analytic Reports

McCAMPBELL ANALYTICAL INC.
110 Second Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
http://www.mccampbell.com E-mail: main@mccampbell.com

Cambria Environmental Technology 1144 65th Street, Suite C Oakland, CA 94608	Client Project ID: #153-1247; City of Oakland	Date Sampled: 08/03/98
		Date Received: 08/04/98
	Client Contact: David Elias	Date Extracted: 08/04-08/07/98
	Client P.O:	Date Analyzed: 08/04-08/07/98

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline*, with Methyl tert-Butyl Ether* & BTEX*

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g)+	MTBE	Benzene	Toluene	Ethylben-zene	Xylenes	% Recovery Surrogate
93039	SB-A-7.5	S	ND	ND	ND	ND	ND	ND	99
93040	SB-A-11.5	S	1.1, g	ND	ND	ND	ND	ND	99
93041	SB-B-7.5	S	ND	ND	ND	ND	ND	ND	97
93042	SB-B-11.5	S	2.4, g	ND	ND	ND	ND	ND	96
93044	SB-C-7.5	S	4400, a	ND<65	50	120	68	340	---#
93045	SB-C-9.5	S	3.5, a	ND	0.32	0.17	0.091	0.42	---#
93047	SB-D-7.5	S	23, a	ND<0.40	1.2	0.38	0.55	1.7	---#
93048	SB-D-11.5	S	3.3, a	ND	0.22	0.051	0.037	0.17	---#
93049	SB-A	W	73, b, h	ND	ND	0.54	0.56	0.82	96
93050	SB-B	W	60, a	ND	ND	0.95	ND	ND	99
93051	SB-C	W	9200, a, i	ND<10	750	580	290	1400	---#
93051A	SB-D	W	39,000, a, i	ND<100	1600	1200	980	4900	---#
93051B	Trip Blank	W	ND	ND	ND	ND	ND	ND	92
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	5.0	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.05	0.005	0.005	0.005	0.005	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/L

cluttered chromatogram; sample peak coelutes with surrogate peak

+The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment; j) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

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Cambria Environmental Technology 1144 65th Street, Suite C Oakland, CA 94608	Client Project ID: #153-1247; City of Oakland	Date Sampled: 08/03/98
		Date Received: 08/04/98
	Client Contact: David Elias	Date Extracted: 08/04/98
	Client P.O:	Date Analyzed: 08/04-08/06/98

Diesel Range (C10-C23) Extractable Hydrocarbons as Diesel (with Silica Gel Clean-up)*

EPA methods modified 8015, and 3550 or 3510; California RWQCB (SF Bay Region) method GCFID(3550) or GCFID(3510)

Lab ID	Client ID	Matrix	TPH(d)+	% Recovery Surrogate
93039	SB-A-7.5	S	6.0, g	96
93040	SB-A-11.5	S	76, g, b	104
93041	SB-B-7.5	S	2.7, g	100
93042	SB-B-11.5	S	37, g, b	94
93044	SB-C-7.5	S	910, d	101
93045	SB-C-9.5	S	1.2, b	102
93047	SB-D-7.5	S	6.8, g, d	103
93048	SB-D-11.5	S	1.4, b	101
93049	SB-A	W	7900, g, b, h	101
93050	SB-B	W	170, g, b	107
93051	SB-C	W	2000, d, g, i	99
93051A	SB-D	W	6600, d, g, i	---#
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	
		S	1.0 mg/kg	

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP / STLC / SPLP extracts in ug/L

cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

+The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified diesel is significant; b) diesel range compounds are significant; no recognizable pattern; c) aged diesel? is significant); d) gasoline range compounds are significant; e) medium boiling point pattern that does not match diesel (?); f) one to a few isolated peaks present; g) oil range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment.

DHS Certification No. 1644

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QC REPORT FOR HYDROCARBON ANALYSES

Date: 08/05/98-08/06/98 Matrix: WATER

Analyte	Concentration (mg/L) Sample (#93254)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Toluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ethyl Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Xylenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TPH(diesel)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TRPH (oil & grease)	0	19400	19400	23700	82	82	0.0

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

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QC REPORT FOR HYDROCARBON ANALYSES

Date: 08/07/98 Matrix: WATER

Analyte	Concentration (mg/L) Sample (#93254)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	0.0	76.8	77.6	100.0	76.8	77.6	1.0
Benzene	0.0	10.7	11.2	10.0	107.0	112.0	4.6
Toluene	0.0	11.2	11.9	10.0	112.0	119.0	6.1
Ethyl Benzene	0.0	10.8	11.3	10.0	108.0	113.0	4.5
Xylenes	0.0	33.5	34.7	30.0	111.7	115.7	3.5
TPH(diesel)	0.0	158	155	150	106	103	2.4
TRPH (oil & grease)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

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QC REPORT FOR HYDROCARBON ANALYSES

Date: 08/06/98 Matrix: SOIL

Analyte	Concentration (mg/kg) Sample (#88995)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Toluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ethylbenzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Xylenes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TPH(diesel)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TRPH (oil and grease)	0.0	20.0	19.7	20.8	96	95	1.5

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

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QC REPORT FOR HYDROCARBON ANALYSES

Date: 08/07/98 Matrix: SOIL

Analyte	Concentration (mg/kg) Sample (#89921)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	0.000	2.019	2.048	2.03	99	101	1.4
Benzene	0.000	0.218	0.216	0.2	109	108	0.9
Toluene	0.000	0.226	0.226	0.2	113	113	0.0
Ethylbenzene	0.000	0.224	0.222	0.2	112	111	0.9
Xylenes	0.000	0.672	0.670	0.6	112	112	0.3
TPH(diesel)	0	310	315	300	103	105	1.5
TRPH (oil and grease)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

% Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100

SEPARATE REPORT PLEASE

CAMBRIA ENVIRONMENTAL TECHNOLOGY, INC.

CHAIN OF CUSTODY

1144 65th Street, Suite C, Oakland, CA 94608
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11932 xC304

Cambria Manager: DAVID ELIAS
Cambria Sampler: DAVID ELIAS
Client: CITY OF OAKLAND
Site Address: 7101 EDGEWATER DR. OAK.
Project Number: 153-1247

ANALYSES

LAB: McCAMPBELL
NORMAL T.A.T

SAMPLE ID	DATE	TIME	MATRIX	# OF SAMPLES	TPHg/BETX/MTBE	TPHd w/SILICA GEL	HOLD								
SB-A-7.5	8/3/98		SOIL	1	X	X									[redacted]
SB-A-11.5	8/3/98		SOIL	1	X	X									
SB-B-7.5	8/3/98		↓	↓	X	X									
SB-B-11.5	8/3/98				X	X									
SB-C-4.0	↓				~~X~~	~~X~~	X								
SB-C-7.5					X	X									
SB-C-9.5					X	X									
SB-D-3.5							X								
SB-D-7.5					X	X									
SB-D-11.5	↓		↓	↓	X	X									
SB-A			WATER	5	X	X									
SB-B				4	X	X									
SB-C				4	X	X									
SB-D				5	X	X									

Relinquished by: D. Elias	Relinquished by: Tabatha Pinnell	Relinquished by:	[redacted]
Received by: Tabatha Pinnell	Received by: Anna V MAI	Received by:	
Time/Date: 9:45 8/4/98	Time/Date: 8/4/98 11:38 8/4/98	Time/Date: [redacted]	Time/Date:

✓ TRIP BLANK ✓ | | WATER | 1 | X

L.eV

	VOAS	O&G	METALS	OTHER
ICE/t° ✓	✓			
GOOD CONDITION ✓	PRESERVATION			
HEAD SPACE ABSENT	APPROPRIATE			
	CONTAINERS			

93061 B

CAMBRIA

ATTACHMENT D

Standard Field Procedures for Soil Borings

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 four 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 rinsate 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.