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

#3978

99 MAY 10 PM 3:11

ENVIRONMENTAL PROTECTION

May 7, 1999

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

Subject: **First Quarter (February 1999) Monitoring Report – City of Oakland Municipal Service Center (94407)**

Dear Mr. Chan:

Enclosed is one copy of the *First Quarter (February 1999) Monitoring Report*, prepared by our consultant, Cambria Environmental Technology, Inc., for the City of Oakland's Municipal Service Center at 7101 Edgewater Drive.

We are continuing to compile the data from the EPA laboratory that was collected during the pipeline removal. A report with these data and a work plan for additional site characterization will be submitted to your office as soon as the data compilation and analysis is completed.

The second quarter 1999 groundwater monitoring will be performed in May. A report containing the results will be sent to you in July 1999.

Please call me at 238-7695, if you have any questions or require additional information.

Sincerely,

Mark B. Hersh
Environmental Program Specialist

cc: Andrew Clark-Clough
David Elias, Cambria Environmental Technology, Inc.
Diane Heinze, Port of Oakland

CAMBRIA

May 4, 1999

Mr. Mark Hersh, R.G.
City of Oakland, Public Works Agency
Environmental Services Division
250 Frank H. Ogawa Plaza, Ste. 5301
Oakland, California 94612-2034

Re: **First Quarter 1999 Monitoring Report**
City of Oakland, Municipal Services Center
7101 Edgewater Drive
Oakland, California
Cambria Project #153-1247-009

Dear Mr. Hersh:

As required by the Alameda County Health Care Services Agency (ACHCSA), Cambria Environmental Technology, Inc. (Cambria) has prepared this first quarter 1999 groundwater monitoring report for the site referenced above. Presented below are the first quarter 1999 activities and results and the anticipated second quarter 1999 activities. Groundwater elevations and selected hydrocarbon concentrations are presented on Figure 1. Analytical results are tabulated in Tables 1 and 2, and the laboratory analytical report is included as Attachment A. Well sampling forms, completed in the field, are included as Attachment B, and our standard field procedures for sampling monitoring wells are included as Attachment C.

FIRST QUARTER 1999 ACTIVITIES AND RESULTS

On February 23, 1999, Cambria gauged monitoring wells MW-1 through MW-10 (Figure 1), and inspected the wells for separate phase hydrocarbons (SPH). As per the ACHCSA approved schedule (Figure A, below), **Cambria collected groundwater samples from monitoring wells MW-1, MW-2 and MW-5 through MW-10.** Selected groundwater samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg), TPH as diesel (TPHd), TPH as kerosene (TPHk), TPH as motor oil (TPHmo), benzene, toluene, ethylbenzene and xylenes (BTEX), methyl tert-butyl ether (MTBE), and select bioparameters at Caltest Analytical of Napa, California, a California state-certified laboratory.

In addition to sampling the above-listed monitoring wells, Cambria gauged, inspected for separate-phase hydrocarbons, and sampled backfill wells TBW-1, TBW-3, TBW-5, and TBW-6. Wells TBW-1 and TBW-3 were previously installed during underground storage tank removal, and wells TBW-5 and TBW-6 were recently installed during fuel piping removal and soil overexcavation. Cambria sampled one backfill well from each former tank complex. Collected samples were analyzed for TPHd, TPHk, TPHmo, TPHg, BTEX, MTBE, and bioparameters.

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

Cambria Environmental Technology, Inc.

1144 65th Street
Suite B
Oakland, CA 94608
Tel (510) 420-0700
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Figure A
Well Sampling Protocol

Well	Sampling Frequency	Proposed Analytes
MW-1	1st and 3rd Quarters	TPHd, TPHk, TPHmo, TPHg/BTEX/ MTBE*, bioparameters
MW-2	1st and 3rd Quarters	TPHd , TPHg/BTEX/MTBE*, bioparameters
MW-3		None - destroy well
MW-4		None - destroy well
MW-5	1st and 3rd Quarters	TPHd, TPHk, TPHmo, TPHg/BTEX/MTBE*, bioparameters
MW-6	1st and 3rd Quarters	TPHd, TPHg/BTEX/MTBE*, bioparameters
MW-7	1st and 3rd Quarters	TPHd, TPHk, TPHmo, TPHg/BTEX/MTBE*, bioparameters
MW-8	1st, 2nd, 3rd, and 4th Quarters	TPHd, TPHk, TPHmo, TPHg/BTEX/MTBE*, bioparameters
MW-9	1st, 2nd, 3rd, and 4th Quarters	TPHd, TPHk, TPHmo, TPHg/BTEX/MTBE*, bioparameters
MW-10	1st, 2nd, 3rd, and 4th Quarters	TPHd, TPHk, TPHmo, TPHg/BTEX/MTBE*, bioparameters

* Any positive results for MTBE will be confirmed by re-analysis using EPA Method 8260, except in MW-5. Confirmation by EPA Method 8260 for MW-5 is not necessary due to positive confirmation results in the third quarter 1998.
Bioparameters = Ferrous iron, ORP, DO, total alkalinity, nitrate, and sulfate and conducted only during 1st and 3rd quarters.

Groundwater Flow Direction

Depth-to-water measurements collected on February 23, 1999 indicate a northeastward groundwater gradient of 0.017 ft/ft parallel to Damon Slough in the northern portion of the site and a southwestward groundwater gradient of 0.011 ft/ft toward San Leandro Bay in the southern portion of the site (Figure 1). The groundwater gradient on both sides of the site increased substantially in comparison to the 4th quarter 1998 sampling event. This increased gradient may have resulted from a combination of tidal influence and seasonally higher groundwater elevations. During the rainy season the higher groundwater table increases the difference in elevation between the groundwater table and the low tide, thereby increasing the gradient. We measured depth-to-water at 9:30 AM on February 23rd. This sampling time corresponded with a low tide of -2.87 ft that occurred three hours later, at 12:42 that afternoon. During 1st quarter 1998 a similar gradient was observed on the north side of the site, while the gradient on the southern portion of the site was about half as steep as the December 1998 southern gradient. All wells were gauged within a thirty-minute period to minimize the effects of tidal fluctuation on the measurement of groundwater elevations. Groundwater elevation data are presented in Table 1.

Hydrocarbon Distribution in Groundwater

Separate-phase hydrocarbons were detected in monitoring well MW-6 and in backfill wells TBW-1, and TBW-5. The maximum TPHd concentration detected in groundwater was 3,800 ppb in well TBW-3. The maximum TPHmo and benzene concentrations detected in groundwater were 3,700 ppb and 620 ppb, respectively, in well MW-9. The maximum TPHg concentration detected in groundwater was 6,700 ppb in MW-5. MTBE was detected in well MW-5 only, at a concentration of 1,600 ppb. No TPHk was detected in any of the wells this quarter.

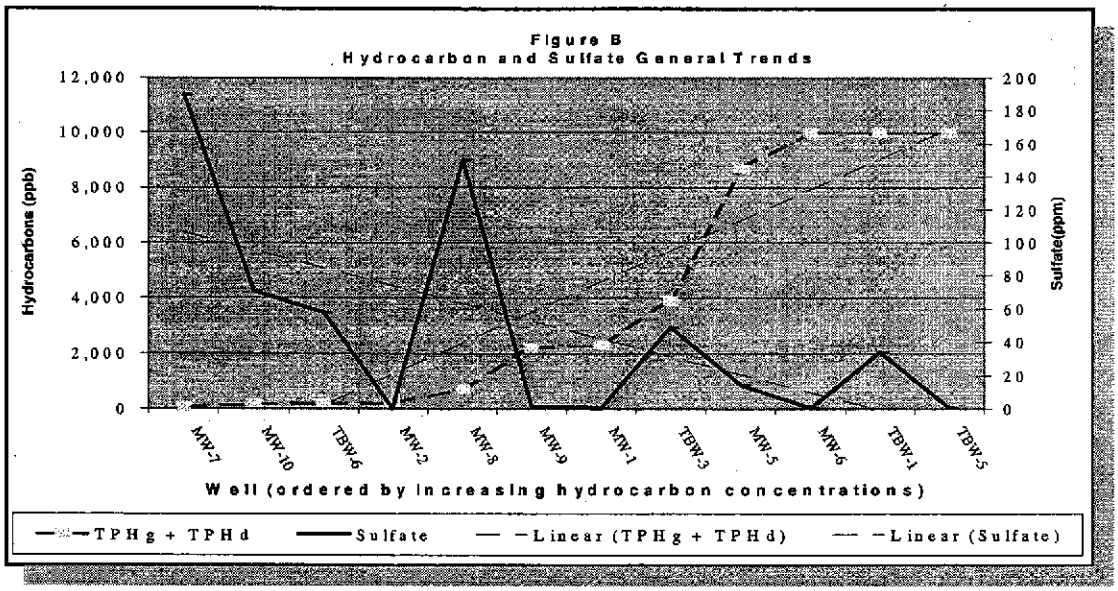
The hydrocarbon concentrations detected in wells MW-8, MW-9, and MW-10, located west of the site, near the San Leandro Bay shoreline (Figure 1) increased over the fourth quarter 1998 results. Of the hydrocarbon concentrations detected in these wells, the highest were in MW-9 which contained 1,100 ppb TPHd, 3,700 ppb TPHmo, and 1,100 ppb TPHg.

mistake!

This quarter the TPHd, TPHk, and TPHmo samples were inadvertently not analyzed using a silica gel cleanup. Therefore, the increased TPHd and TPHmo concentrations may actually be the result of non-petroleum, naturally occurring hydrocarbons.

Bioparameter Analyses Results

Cambria analyzed groundwater samples for ferrous iron, total alkalinity, oxidation reduction potential (ORP), dissolved oxygen (DO), nitrate, and sulfate to assess the present level of intrinsic bioremediation. These bioparameters were quantified in all of the monitoring wells analyzed for hydrocarbons and in select backfill wells. The analytical results, including TPHg and TPHd concentrations for comparison, are presented in Table 2. The trends were evaluated by using Excel graphs and a linear trend line function. The trend line shows general increasing or decreasing concentration trends without overly weighting individual results. We included a graph on Figure B below that compares total hydrocarbon concentrations (TPHg + TPHd) to the sulfate concentrations detected in all of the wells sampled this quarter. The wells are ordered by increasing hydrocarbon concentrations starting from the left side of the graph. As shown below, in general, sulfate concentrations decrease as hydrocarbon concentrations increase.



is used as an acceptor after O2 consumed.

Aerobic biodegradation: DO and sulfate concentrations appear to decrease as hydrocarbon concentrations increase, suggesting that aerobic biodegradation of hydrocarbons is occurring. Also, total alkalinity results show a general increasing trend as hydrocarbon concentrations increase. Analytical results for nitrates as nitrogen also showed an increasing trend as hydrocarbon concentrations increased. However, the nitrate data set only contained three results above the 0.1 ppm detection limit.

Anaerobic biodegradation: ORP appeared to decrease as hydrocarbon concentrations increased, suggesting that anaerobic biodegradation is occurring. The negative ORP values measured in wells MW-5, MW-9, and MW-10 indicate that reducing conditions may be present in the groundwater

surrounding these wells. However, the inverse relationship observed between ferrous iron concentrations and hydrocarbon concentrations this quarter conflicts with the ORP result indication.

In general, the bioparameter results indicate that natural biodegradation of hydrocarbons is occurring at the site. Continued quantification of bioparameters may help to clarify some of the apparent conflicts existing in this quarter's data.

ANTICIPATED SECOND QUARTER 1999 ACTIVITIES

Cambria will gauge and measure any SPH detected in MW-1 through MW-10, and collect groundwater samples from wells MW-8, MW-9, and MW-10. Cambria will tabulate the analytical data, contour groundwater elevations, and write a quarterly monitoring report. Cambria will also present the piping removal analytical results in a written report, pending U.S. EPA delivery of analytical results. This new data will be used in proposing the next steps for both site assessment and remediation.

CLOSING

Please call Bob Schultz at (510) 420-3341 or David Elias at (510) 420-3307, if you have any questions or comments regarding this report or anticipated site activities.

Sincerely,
Cambria Environmental Technology, Inc.

Robert W. Schultz
Senior Staff Geologist

David Elias, R.G.
Senior Geologist

Figure: 1. Groundwater Elevation Contour Map and Hydrocarbon Concentrations

Tables: 1. Groundwater Analytical Results for Fuel Hydrocarbons
2. Groundwater Analytical Results for Bioparameters

Attachments: A - Laboratory Analytical Report
B - Well Sampling Forms
C - Standard Procedures for Monitoring Wells

H:\City of Oakland\Municipal Service Center\QM\1q99\1q99.wpd

04/12/99

Ground Water Elevation Contour Map and Hydrocarbon Concentrations

February 23, 1999

EXPLANATION

- Monitoring well location
- TBW-1 — Tank Backfill Well
- NM — Not measured (area flooded)
- NS — Not sampled for TPHg/TPHd/benzene
- NSV — Well Not Surveyed
- SPH — Separate Phase Hydrocarbons detected in well
- Well — Monitoring Well Designation
- ELEV — Ground water elevation, feet above mean sea level (msl)
- TPHg / TPHd / BENZ — TPHg, TPHd, and benzene concentrations in parts per billion (ppb)
- 0.004 — Approximate ground water flow direction and gradient
- Fence

DAMON SLOUGH

EDGEWATER DRIVE

MW-4 | 4.79 | NS | NS | NS

MW-3 | NM | NS | NS | NS

MW-2 | 1.79 | <50 | 200 | 3.5

MW-1 | 6.79 | 1,100 | 1,200 | 190

MW-10 | 5.08 | <50 | 170 | 1.3

TBW-6 | NSV | 60 | 160 | <0.5

(piping run not UST)

TBW-5 | NSV | SPH | SPH | SPH

TBW-1 | NSV | SPH | SPH | SPH

TBW-2

Former USTs

Public Works Building

911 Center

Admin.

Crafts and Storage

Storage

MW-5 | 7.56 | 6,700 | 2,000 | 300

Active USTs

Building No. 5

Former USTs

MW-7 | 5.94 | 80 | <50 | <0.5

TBW-3 | NSV | 110 | 3,900 | 1.8

Former USTs

Former UST

TBW-4

MW-6 | 3.67 | SPH | SPH | SPH

MW-9 | 4.12 | 1,100 | 1,100 | 620

MW-8 | 0.69 | <50 | 700 | <0.5

SAN LEANDRO BAY

0 75 150 300

Scale (ft)

FIGURE

1

CAMBRIA

Municipal Service Center
7101 Edgewater Drive
Oakland, California

CAMBRIA

Table 1. Groundwater Analytical Results for Fuel Hydrocarbons - City of Oakland Municipal Service Center, Oakland, California

Date	TOC Elev.	DTW	GW Elev.	BTEX Method	Notes	TPHd	TPHmo	TPHk	TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Organic Lead
						<---------- µg/l ---------->									
MW-1															
10/04/89	10.20	---	---	8020		---	---	---	540	65	26	14	22	---	---
10/04/89	10.20	---	---	8240		---	---	---	---	120	46	43	78	---	---
04/27/93	10.20	---	---	8020		---	---	---	<1,000	<1.0	<1.0	<1.0	<1.0	---	---
04/19/95	10.20	---	---	8020		---	---	---	3,200	880	15	23	21	---	---
07/27/95	10.20	4.62	5.58	8020		---	---	---	980	130	3.6	1.4	5.6	---	---
11/20/95	10.20	6.08	4.12	8020		---	---	---	400	99	2.8	1.1	4.6	---	---
02/21/96	10.20	4.62	5.58	8020		---	---	---	1,700	340	8.4	5.3	16	---	---
05/13/96	10.20	4.33	5.87	8020		---	---	---	7,300	2,000	30	42	38	---	---
08/27/96	10.20	5.25	4.95	8020		---	---	---	380	61	2.4	<0.5	4.2	---	---
02/23/98	10.20	1.75	8.45	8020		<50	<500	<50	820	160	4.9	3	9.7	---	---
08/19/98	10.20	4.78	5.42	8020	SGC	1,200	---	---	780	69	4.1	0.84	8.5	<5.0	---
11/11/98	10.20	5.64	4.56	---	SGC	---	---	---	---	---	---	---	---	---	---
02/23/99	10.20	3.41	6.79	8020	Confirmed	1,200	1,600	<50	1,100	190	5.0	3.0	12	<5.0	---
MW-2															
10/04/89	10.47	---	---	8020		---	---	---	<30	<0.3	<0.3	<0.3	<0.3	---	---
10/04/89	10.47	---	---	8240		---	---	---	---	2.0	<2.0	<2.0	<2.0	---	---
04/27/93	10.47	---	---	8020		---	---	---	<1,000	<1.0	<1.0	<1.0	<1.0	---	---
04/19/95	10.47	---	---	8020		---	---	---	<50	1.8	<0.5	<0.5	<0.5	---	---
07/27/95	10.47	6.22	4.25	8020		---	---	---	<50	2.3	<0.5	<0.5	<0.5	---	---
11/20/95	10.47	7.49	2.98	8020		---	---	---	<50	2.2	<0.5	<0.5	<0.5	---	---
02/21/96	10.47	6.68	3.79	8020		---	---	---	<50	1.7	<0.5	<0.5	0.5	---	---

Table 1. Groundwater Analytical Results for Fuel Hydrocarbons - City of Oakland Municipal Service Center, Oakland, California

Date	TOC Elev.	DTW	GW Elev.	BTEX Method	Notes	TPHd	TPHmo	TPHk	TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Organic Lead
						<---------- µg/l ----------									---------->
MW-2															
05/13/96	10.47	6.32	4.15	8020		---	---	---	---	2.0	<0.5	<0.5	<0.5	---	---
08/27/96	10.47	6.84	3.63	8020		---	---	---	---	2.4	<0.5	<0.5	<0.5	---	---
02/24/98	10.47	5.44	5.03	8020		<50	<500	<50	---	1.6	<0.5	<0.5	<0.5	---	---
08/19/98	10.47	6.56	3.91	8020	SGC	330	---	---	<50	4.1	3.4	0.8	2.6	<5.0	<100
11/11/98	10.47	7.37	3.10	---	SGC	---	---	---	---	---	---	---	---	---	---
02/23/99	10.47	8.68	1.79	8020		200	900	<50	<50	3.5	0.6	0.6	1.2	<5.0	---
MW-3															
10/04/89	---	---	---	8020		---	---	---	<30	<0.3	<0.3	<0.3	<0.3	---	---
10/04/89	---	---	---	8240		---	---	---	---	<2.0	<2.0	<2.0	<2.0	---	---
02/23/98	---	---	---	8020		<50	<500	<50	---	---	---	---	---	---	---
11/11/98	---	5.83	---	---		---	---	---	---	---	---	---	---	---	---
02/23/99	---	---	---	---	submerged	---	---	---	---	---	---	---	---	---	---
MW-4															
10/04/89	7.89	---	---	8020		---	---	---	<30	<0.3	<0.3	<0.3	<0.3	---	---
10/04/89	7.89	---	---	8240		---	---	---	---	<2.0	<2.0	<2.0	<2.0	---	---
11/11/98	7.89	6.25	1.64	---		---	---	---	---	---	---	---	---	---	---
02/23/99	7.89	3.10	4.79	---		---	---	---	---	---	---	---	---	---	---
MW-5															
12/13/91	11.15	---	---	8020		1,900	---	---	13,000	1,500	190	970	2,500	---	---
12/13/91	---	---	---	8020	Dup	---	---	---	16,000	1,400	180	870	2,500	---	---

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Table 1. Groundwater Analytical Results for Fuel Hydrocarbons - City of Oakland Municipal Service Center, Oakland, California

Date	TOC Elev.	DTW	GW Elev.	BTEX Method	Notes	TPHd	TPHmo	TPHk	TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Organic Lead
						<----------				µg/l					---------->
MW-5															
12/13/91	11.15	---	---	8240		---	---	---	---	1,800	<250	1,000	3,800	---	---
12/13/91	---	---	---	8240	Dup	---	---	---	---	1,600	<250	980	3,500	---	---
04/27/93	11.15	---	---	8240		12,000	---	---	35,000	2,100	<1.0	1,800	2,700	---	---
04/19/95	11.15	---	---	8240		880	4,700	---	14,000	490	51	610	1,200	---	---
07/27/95	11.15	6.29	4.86	8240		590	5,000	---	22,000	1,300	54	1,500	2,400	---	---
11/20/95	11.15	6.98	4.17	8020		<50	<50	<50	8,900	430	31	610	880	---	---
02/21/96	11.15	5.97	5.18	8020		480	<50	<50	1,000	540	65	700	970	---	---
05/13/96	11.15	6.25	4.90	8020		<50	<50	<50	5,900	430	26	580	760	---	---
05/13/96	---	---	---	8020	Dup	<50	<50	<50	7,300	360	22	49	640	---	---
08/27/96	11.15	6.40	4.75	8020		2,000	<51	<51	6,600	430	27	600	650	---	---
08/27/96	---	---	---	8020	Dup	6,600	<51	<51	6,300	410	25	580	620	---	---
02/23/98	11.15	4.22	6.93	8020		<50	<500	<50	740	19	1.4	41	34	---	---
08/19/98	11.15	6.14	5.01	8020		1,400	<250	1,700	5,800	500	25	730	300	5,900	---
08/19/98	11.15	6.14	5.01	8260	SGC	---	---	---	---	---	---	---	---	6,700	---
11/11/98	11.15	6.51	4.64	---	SGC	---	---	---	---	---	---	---	---	---	---
02/23/99	11.15	3.59	7.56	8020		2,000	700	<50	6,700	300	26	800	690	1,600	---
				← high chl. hmo SGC?											
MW-6															
12/13/91	10.98	---	---	8020		520	---	---	780	110	2.7	<2.5	5.5	---	---
12/13/91	10.98	---	---	8240		---	---	---	---	95	5	<5	<5	---	---
04/27/93	10.98	---	---	8020		<1,000	---	---	<1,000	430	4	5	10	---	---
04/19/95	10.98	---	---	8020		6,700	---	---	5,700	40	<0.8	3.9	29	---	---

Table 1. Groundwater Analytical Results for Fuel Hydrocarbons - City of Oakland Municipal Service Center, Oakland, California

Date	TOC Elev.	DTW	GW Elev.	BTEX Method	Notes	TPHd	TPHmo	TPHk	TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Organic Lead
						<---------- µg/l ---------->									
MW-6															
04/19/95	---	---	---	8020	Dup	3,700	---	---	3,000	310	3.1	2.7	100	---	---
07/27/95	10.98	7.09	3.89	8020		3,900	---	---	6,100	430	15	200	600	---	---
07/27/95	---	---	---	8020	Dup	2,600	---	---	6,300	420	15	200	600	---	---
11/20/95	10.98	7.89	3.09	8020		850	---	---	6,800	160	4.6	8.0	240	---	---
11/20/95	---	---	---	8020	Dup	---	---	---	3,600	130	11	4.4	200	---	---
02/21/96	10.98	7.40	3.58	8020		1,700	---	---	2,800	230	2.8	3.8	44	---	---
02/21/96	---	---	---	8020	Dup	2,500	---	---	2,200	280	3.0	4.0	4.6	---	---
05/13/96	10.98	7.10	3.88	8020		400	<50	<50	3,100	430	12	5.2	67	---	---
08/27/96	10.98	7.42	3.56	8020		3,100	---	---	4,200	300	9.3	110	110	---	---
08/19/98	10.98	---	---	---	SPH: 0.125 ft	---	---	---	---	---	---	---	---	---	---
11/11/98	10.98	7.09	3.89	---	SPH: 0.05 ft	---	---	---	---	---	---	---	---	---	---
02/23/99	10.98	7.31	3.67	---	SPH: NM	---	---	---	---	---	---	---	---	---	---
MW-7															
12/13/91	11.51	---	---	8020		<50	---	---	<50	<0.5	<0.5	<0.5	<0.5	---	---
12/13/91	11.51	---	---	8240		---	---	---	---	<5	<5	<5	<5	---	---
04/27/93	11.51	---	---	8240		<1,000	---	---	<1,000	<1.0	<1.0	<1.0	<1.0	---	---
04/19/95	11.51	---	---	8240		<50	<1,000	---	<50	<2.0	<2.0	<2.0	<2.0	---	---
07/27/95	11.51	6.87	4.64	8240		<50	<1,000	---	<50	<2.0	<2.0	<2.0	<2.0	---	---
11/20/95	11.51	8.48	3.03	8020		<50	---	---	<50	<0.5	<0.5	<0.5	1.5	---	---
02/21/96	11.51	6.29	5.22	8020		<50	---	---	<50	<0.5	<0.5	<0.5	<0.5	---	---
05/13/96	11.51	6.95	4.56	8020		<50	---	---	---	<0.5	<0.5	<0.5	<0.5	---	---

Table 1. Groundwater Analytical Results for Fuel Hydrocarbons - City of Oakland Municipal Service Center, Oakland, California

Date	TOC Elev.	DTW	GW Elev.	BTEX Method	Notes	TPHd	TPHmo	TPHk	TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Organic Lead
						<---------- µg/l ---------->									
MW-7															
08/27/96	11.51	6.80	4.71	8020		---	---	---	---	<0.5	<0.5	<0.5	<0.5	---	---
08/19/98	11.51	6.88	4.63	---		---	---	---	---	---	---	---	---	---	---
11/11/98	11.51	7.40	4.11	---		---	---	---	---	---	---	---	---	---	---
02/23/99	11.51	5.57	5.94	8020		<50	<200	<50	80	<0.5	<0.5	<0.5	1.0	<5.0	---
MW-8															
11/20/96	12.22	---	---	8020		880	---	---	<50	0.66	<0.5	<0.5	<0.5	---	---
11/20/97	12.22	9.59	2.63	8020		200	---	---	<50	<0.5	<0.5	<0.5	<0.5	2.0	---
02/24/98	12.22	8.42	3.80	8020		<50	<500	<50	<50	<0.5	<0.5	<0.5	<0.5	---	---
06/08/98	12.22	9.57	2.65	8020		1,200	1,000	<50	<50	<0.5	<0.5	<0.5	<0.5	---	---
08/19/98	12.22	9.49	2.73	8020	SGC	<50	<250	<50	<50	1.6	3.4	1.0	2.8	<5.0	---
11/11/98	12.22	9.64	2.58	8020	SGC	<50	<200	<50	<50	0.9	0.8	0.6	2.3	<5.0	---
02/23/99	12.22	11.53	0.69	8020		700	1,500	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	---
						high due to no SGC									
MW-9															
11/20/96	10.77	---	---	8020		1,900	---	---	240	21	0.81	1.8	2.2	---	---
11/20/97	10.77	7.91	2.86	8020		---	---	---	300	20	<0.5	<0.5	1.8	<1.0	---
02/24/98	10.77	6.11	4.66	8020		<50	<500	<50	2,200	540	5.6	1.6	4.9	---	---
06/08/98	10.77	7.14	3.63	8020		1,800	890	<50	840	450	6.1	3.3	5.3	---	---
08/19/98	10.77	7.88	2.89	8020	SGC	190	<250	160	740	370	8.6	0.99	7.3	<5.0	---
11/11/98	10.77	8.23	2.54	8020	SGC	<50	230	<50	700	130	4.3	<0.5	3.9	<5.0	---
02/23/99	10.77	6.65	4.12	8020		1,100	3,700	<50	1,100	620	9.7	1.5	7.7	<5.0	---
						high due to no SGC									

Table 1. Groundwater Analytical Results for Fuel Hydrocarbons - City of Oakland Municipal Service Center, Oakland, California

Date	TOC Elev.	DTW	GW Elev.	BTEX Method	Notes	TPHd	TPHmo	TPHk	TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Organic Lead
						<---------- µg/l ---------->									
MW-10															
11/20/96	10.59	---	---	8020		940	---	---	<50	49	0.59	0.54	1.2	---	---
11/20/97	10.59	7.70	2.89	8020		---	---	---	<50	<0.5	<0.5	<0.5	<0.5	---	---
02/24/98	10.59	4.39	6.20	8020		<50	<500	<50	<50	<0.5	<0.5	<0.5	<0.5	---	---
06/08/98	10.59	6.94	3.65	8020		500	<500	<50	<50	7.3	<0.5	<0.5	<0.5	---	---
08/19/98	10.59	6.99	3.60	8020	SGC	240	520	110	<50	<0.5	<0.5	<0.5	<0.5	<5.0	---
11/11/98	10.59	7.57	3.02	8020	SGC	<50	<200	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	---
02/23/99	10.59	5.51	5.08	8020		170	1,200	<50	<50	1.3	<0.5	<0.5	<0.5	<5.0	---
TBW-1															
02/23/99	---	6.25	---	---	SPH: 0.10 ft	---	---	---	---	---	---	---	---	---	---
TBW-3															
08/19/98	---	2.67	---	8020	SGC	810,000	---	---	920	3.2	<0.5	<0.5	0.77	<10	---
08/19/98	---	2.67	---	8260		---	---	---	---	---	---	---	---	<5.0	---
02/23/99	---	1.25	---	8020		3,800	3,000	<50	110	1.6	<0.5	<0.5	<0.5	<5.0	---
TBW-5															
02/23/99	---	9.72	---	---	SPH: 1.45 ft	---	---	---	---	---	---	---	---	---	---
TBW-6															
02/23/99	---	2.09	---	8020		160	600	<50	60	<0.5	<0.5	<0.5	<0.5	<5.0	---
Trip Blank															
08/19/98	---	---	---	8020		---	---	---	<50	<0.5	<0.5	<0.5	<0.5	<5.0	---

Table 1. Groundwater Analytical Results for Fuel Hydrocarbons - City of Oakland Municipal Service Center, Oakland, California

Date	TOC Elev.	DTW	GW Elev.	BTEX Method	Notes	TPHd	TPHmo	TPHk	TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE	Organic Lead
						<---------- µg/l ---------->									

Notes

All concentrations in micrograms per liter (µg/l)
--- = not measured/analyzed
TOC = Top of casing
DTW = Depth to water
GW = Ground water
BTEX = Benzene, toluene, ethylbenzene, and xylenes - analyzed by EPA Method 8020 or 8240/8260
TPHd = Total petroleum hydrocarbons as diesel - analyzed by Modified EPA method 8015
TPHmo = Total petroleum hydrocarbons as motor oil - analyzed by Modified EPA method 8015
TPHk = Total petroleum hydrocarbons as kerosene - analyzed by EPA method 8015
TPHg= Total petroleum hydrocarbons as gasoline - analyzed by Modified EPA method 8015
MTBE = Methyl tert-butyl ether - analyzed by EPA Method 8020 or 8260
DUP = Duplicate sample
SPH = Separate-phase hydrocarbons; measured thickness
SGC = Silica gel cleanup prior to TPHd, TPHk, or TPHmo analysis
NM = Not measured
TBW = Tank backfill well

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Table 2. Groundwater Analytical Results for Bioparameters, Sodium, and Chloride

City of Oakland Municipal Service Center, Oakland, California

Sample ID / Date	TPHg (µg/l)	TPHd (µg/l)	ORP (mV)	Ferrous Iron	DO-B	DO-A	Nitrate	Sulfate	Total Alkalinity	Sodium	Chloride
					<---------- mg/l ----------						----->
Damon Slough											
08/19/98	---	---	---	---	---	---	---	---	---	5,900	14,400
MW-1											
08/19/98	780	1,200	60	>5.0	9.8	8.47	<1.0	<1	1,270	1,600	3,750
02/23/99	1,100	1,200	---	>5.0	---	1.6	<0.1	<0.5	1,400	---	---
MW-2											
08/19/98	<50	330	120	>5.0	8.63	8.56	<1.0	5	215	4,700	8,000
02/23/99	<50	200	50	>5.0	---	1.5	<0.1	<0.5	140	---	---
MW-3											
08/19/98	---	---	-170	0.9	9.33	9.21	<1.0	400	3,260	14,000	23,750
MW-4											
08/19/98	---	---	-178	2.6	9.41	8.0	<1.0	280	1,700	3,600	7,000
MW-5											
08/19/98	5,800	1,400	75	>5.0	9.43	9.18	<1.0	10	820	970	2,520
02/23/99	6,700	2,000	-55	2.1	---	1.8	<0.1	14	400	---	---
MW-6											
02/23/99 SPH: NM	---	---	115	3.2	---	6.4	<0.1	<0.5	1,300	---	---
MW-7											
08/19/98	---	---	110	>5.0	8.6	7.86	<1.0	300	970	920	1,800
02/23/99	80	<50	75	4.9	---	3.9	<0.1	190	870	---	---

Table 2. Groundwater Analytical Results for Bioparameters, Sodium, and Chloride

City of Oakland Municipal Service Center, Oakland, California

Sample ID / Date	TPHg (µg/l)	TPHd (µg/l)	ORP (mV)	Ferrous Iron	DO-B	DO-A	Nitrate	Sulfate	Total Alkalinity	Sodium	Chloride
					<---------- mg/l ----------						---------->
MW-8											
11/20/96	<50	880	50	<0.10	---	---	<0.50	478	---	---	7,490
11/20/97	<50	200	262	<1.0	4	---	<0.050	1,200	380	---	---
08/19/98	<50	<50	220	3.4	10.18	9.82	<1.0	610	490	4,300	7,500
02/23/99	<50	700	75	5.0	---	5.3	<0.1	150	630	---	---
MW-9											
11/20/96	240	1,900	-73	0.24	---	---	<0.50	<3.0	---	---	2,230
11/20/97	300	---	202	<1.0	<1.0	---	<0.050	1.0	1,300	---	---
08/19/98	740	190	275	>5.0	10.15	9.67	<1.0	1	1,180	820	1,400
02/23/99	1,100	1,100	-40	4.9	---	1.1	<0.1	1.2	1,000	---	---
MW-10											
11/20/96	<50	940	-54	<0.1	---	---	<0.50	52	---	---	1,940
11/20/97	<50	---	226	<1.0	<1.0	---	<0.050	<0.10	870	---	---
08/19/98	<50	240	68	4.2	10.21	9.84	<1.0	10	900	330	350
02/23/99	<50	170	-10	3.0	---	1.9	3.0	71	690	---	---
San Leandro Bay											
08/19/98	---	---	---	---	---	---	---	---	---	5,700	14,400
TBW-1											
02/23/99 SPH: 0.10 ft	---	---	---	---	---	---	<0.1	34	420	---	---

CAMBRIA

Table 2. Groundwater Analytical Results for Bioparameters, Sodium, and Chloride

City of Oakland Municipal Service Center, Oakland, California

Sample ID / Date	TPHg (µg/l)	TPHd (µg/l)	ORP (mV)	Ferrous Iron	DO-B	DO-A	Nitrate	Sulfate	Total Alkalinity	Sodium	Chloride
					<---------- mg/l ----------						---------->
TBW-3											
08/19/98	920	810,000	135	1.8	6.86	7	<1.0	45	410	91	175
02/23/99	110	3,800	---	1.9	---	2.4	2.0	49	410	---	---
TBW-5											
02/23/99 SPH: 1.45 ft	---	---	---	---	---	---	13	1.0	690	---	---
TBW-6											
02/23/99	60	160	---	<0.1	---	1.1	<0.1	58	180	---	---
Ideal Relationship with Hydrocarbon Concentrations:			Inverse	Direct	Inverse	Inverse	Inverse	Inverse	Direct		
Most Recent Observed Relationship with Hydrocarbon Concentrations:			Inverse	Inverse	---	Inverse	Direct	Inverse	Direct		

Legend

ORP = Oxidation/reduction potential
DO = Dissolved Oxygen (B = before purging, A = After purging)
Inc. = Inconclusive

Notes

All concentrations in milligrams per liter (mg/l), unless otherwise noted
--- = not measured/analyzed

ATTACHMENT A

Laboratory Analytical Report

CALTEST ANALYTICAL LABORATORY
1885 N. Kelly Rd. • Napa, California 94558
(707) 258-4000 • Fax: (707) 226-1001

CERTIFIED ENVIRONMENTAL SERVICES
CALIFORNIA ELAP #1664

LAB ORDER No.: 9902-533

REPORT of ANALYTICAL RESULTS

Report Date: 24 MAR 1999
Received Date: 24 FEB 1999

Client: David Elias
Cambria
1144 65th Street, Suite C
Oakland, CA 94608

Project: CITY OF OAKLAND, MSC 153-1247

Sampled by: BOB SCHULTZ

Lab Number	Sample Identification	Matrix	Sampled Date/Time
9902533-1	MW-1	AQUEOUS	23 FEB 99 15:15
9902533-2	MW-2	AQUEOUS	23 FEB 99 12:40
9902533-3	MW-5	AQUEOUS	23 FEB 99 13:55
9902533-4	MW-7	AQUEOUS	23 FEB 99 13:15
9902533-5	MW-8	AQUEOUS	23 FEB 99 10:00
9902533-6	MW-9	AQUEOUS	23 FEB 99 10:45
9902533-7	MW-10	AQUEOUS	23 FEB 99 12:00
9902533-8	TBW-3	AQUEOUS	23 FEB 99 16:15
9902533-9	TBW-6	AQUEOUS	23 FEB 99 17:20
9902533-10	MW-6	AQUEOUS	23 FEB 99 14:30
9902533-11	TBW-1	AQUEOUS	23 FEB 99 16:45
9902533-12	TBW-5	FREE PRODUCT	23 FEB 99 18:00
9902533-13	TRAVEL BLANK	AQUEOUS	23 FEB 99

William Svoboda
Project Manager

CAHorn
Christine Horn
Laboratory Director

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Results are specific to the sample as submitted and only to the parameters reported.
All analyses performed by EPA Methods or Standard Methods (SM) 18th Ed. except where noted.
Results of 'ND' mean not detected at or above the listed Reporting Limit (R.L.).
'D.F.' means Dilution Factor and has been used to adjust the listed Reporting Limit (R.L.).
Acceptance Criteria for all Surrogate recoveries are defined in the QC Spike Data Reports.

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CERTIFIED ENVIRONMENTAL SERVICES
CALIFORNIA ELAP #1664

LAB ORDER No.: 9902-533

INORGANIC ANALYTICAL RESULTS

ANALYTE	RESULT	R.L.	UNITS	D.F.	METHOD	ANALYZED	QC BATCH	NOTES
LAB NUMBER: 9902533-1								
SAMPLE ID: MW-1								
SAMPLED: 23 FEB 99 15:15								
ALKALINITY				1	310.1	02.25.99	I990007ALK	
Bicarbonate as CaCO3	1400.	10.	mg/L					
Hydroxide as CaCO3	ND	10.	mg/L					
Carbonate as CaCO3	ND	10.	mg/L					
Total Alkalinity as CaCO3	1400.	10.	mg/L					
Nitrate as N	ND	0.1	mg/L	1	300.0	02.24.99	I990021IC	
Sulfate	ND	0.5	mg/L	1	300.0	02.24.99	I990021IC	
LAB NUMBER: 9902533-2								
SAMPLE ID: MW-2								
SAMPLED: 23 FEB 99 12:40								
ALKALINITY				1	310.1	02.25.99	I990007ALK	
Bicarbonate as CaCO3	140.	10.	mg/L					
Hydroxide as CaCO3	ND	10.	mg/L					
Carbonate as CaCO3	ND	10.	mg/L					
Total Alkalinity as CaCO3	140.	10.	mg/L					
Nitrate as N	ND	0.1	mg/L	1	300.0	02.24.99	I990021IC	
Sulfate	ND	0.5	mg/L	1	300.0	02.24.99	I990021IC	
LAB NUMBER: 9902533-3								
SAMPLE ID: MW-5								
SAMPLED: 23 FEB 99 13:55								
ALKALINITY				1	310.1	02.25.99	I990007ALK	
Bicarbonate as CaCO3	400.	10.	mg/L					
Hydroxide as CaCO3	ND	10.	mg/L					
Carbonate as CaCO3	ND	10.	mg/L					
Total Alkalinity as CaCO3	400.	10.	mg/L					
Nitrate as N	ND	0.1	mg/L	1	300.0	02.24.99	I990021IC	
Sulfate	14.	0.5	mg/L	1	300.0	02.24.99	I990021IC	

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CERTIFIED ENVIRONMENTAL SERVICES
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INORGANIC ANALYTICAL RESULTS

LAB ORDER No.: 9902-533

ANALYTE	RESULT	R.L.	UNITS	D.F.	METHOD	ANALYZED	QC BATCH	NOTES
LAB NUMBER: 9902533-4								
SAMPLE ID: MW-7								
SAMPLED: 23 FEB 99 13:15								
ALKALINITY				1	310.1	02.25.99	I990007ALK	
Bicarbonate as CaCO3	870.	10.	mg/L					
Hydroxide as CaCO3	ND	10.	mg/L					
Carbonate as CaCO3	ND	10.	mg/L					
Total Alkalinity as CaCO3	870.	10.	mg/L					
Nitrate as N	ND	0.1	mg/L	1	300.0	02.24.99	I990021IC	
Sulfate	190.	5.	mg/L	10	300.0	02.24.99	I990021IC	
LAB NUMBER: 9902533-5								
SAMPLE ID: MW-8								
SAMPLED: 23 FEB 99 10:00								
ALKALINITY				1	310.1	02.25.99	I990007ALK	
Bicarbonate as CaCO3	630.	10.	mg/L					
Hydroxide as CaCO3	ND	10.	mg/L					
Carbonate as CaCO3	ND	10.	mg/L					
Total Alkalinity as CaCO3	630.	10.	mg/L					
Nitrate as N	ND	0.1	mg/L	1	300.0	02.24.99	I990021IC	
Sulfate	150.	5.	mg/L	10	300.0	02.24.99	I990021IC	
LAB NUMBER: 9902533-6								
SAMPLE ID: MW-9								
SAMPLED: 23 FEB 99 10:45								
ALKALINITY				1	310.1	02.25.99	I990007ALK	
Bicarbonate as CaCO3	1000.	10.	mg/L					
Hydroxide as CaCO3	ND	10.	mg/L					
Carbonate as CaCO3	ND	10.	mg/L					
Total Alkalinity as CaCO3	1000.	10.	mg/L					
Nitrate as N	ND	0.1	mg/L	1	300.0	02.24.99	I990021IC	
Sulfate	1.2	0.5	mg/L	1	300.0	02.24.99	I990021IC	

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INORGANIC ANALYTICAL RESULTS

LAB ORDER No.: 9902-533

ANALYTE	RESULT	R.L.	UNITS	D.F.	METHOD	ANALYZED	QC BATCH	NOTES
LAB NUMBER: 9902533-7								
SAMPLE ID: MW-10								
SAMPLED: 23 FEB 99 12:00								
ALKALINITY				1	310.1	02.25.99	I990007ALK	
Bicarbonate as CaCO3	690.	10.	mg/L					
Hydroxide as CaCO3	ND	10.	mg/L					
Carbonate as CaCO3	ND	10.	mg/L					
Total Alkalinity as CaCO3	690.	10.	mg/L					
Nitrate as N	3.	1.	mg/L	10	300.0	02.24.99	I990021IC	
Sulfate	71.	5.	mg/L	10	300.0	02.24.99	I990021IC	
LAB NUMBER: 9902533-8								
SAMPLE ID: TBW-3								
SAMPLED: 23 FEB 99 16:15								
ALKALINITY				1	310.1	02.25.99	I990008ALK	
Bicarbonate as CaCO3	410.	10.	mg/L					
Hydroxide as CaCO3	ND	10.	mg/L					
Carbonate as CaCO3	ND	10.	mg/L					
Total Alkalinity as CaCO3	410.	10.	mg/L					
Nitrate as N	2.	1.	mg/L	10	300.0	02.24.99	I990021IC	
Sulfate	49.	5.	mg/L	10	300.0	02.24.99	I990021IC	
LAB NUMBER: 9902533-9								
SAMPLE ID: TBW-6								
SAMPLED: 23 FEB 99 17:20								
ALKALINITY				1	310.1	02.25.99	I990008ALK	
Bicarbonate as CaCO3	180.	10.	mg/L					
Hydroxide as CaCO3	ND	10.	mg/L					
Carbonate as CaCO3	ND	10.	mg/L					
Total Alkalinity as CaCO3	180.	10.	mg/L					
Nitrate as N	ND	0.1	mg/L	1	300.0	02.24.99	I990021IC	
Sulfate	58.	5.	mg/L	10	300.0	02.24.99	I990021IC	

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CERTIFIED ENVIRONMENTAL SERVICES
CALIFORNIA ELAP #1664

INORGANIC ANALYTICAL RESULTS

LAB ORDER No.: 9902-533

ANALYTE	RESULT	R.L.	UNITS	D.F.	METHOD	ANALYZED	QC BATCH	NOTES
LAB NUMBER: 9902533-10								
SAMPLE ID: MW-6								
SAMPLED: 23 FEB 99 14:30								
ALKALINITY				1	310.1	02.25.99	I990008ALK	
Bicarbonate as CaCO3	1300.	10.	mg/L					
Hydroxide as CaCO3	ND	10.	mg/L					
Carbonate as CaCO3	ND	10.	mg/L					
Total Alkalinity as CaCO3	1300.	10.	mg/L					
Nitrate as N	ND	0.1	mg/L	1	300.0	02.24.99	I990021IC	
Sulfate	ND	0.5	mg/L	1	300.0	02.24.99	I990021IC	
LAB NUMBER: 9902533-11								
SAMPLE ID: TBW-1								
SAMPLED: 23 FEB 99 16:45								
ALKALINITY				1	310.1	02.25.99	I990008ALK	
Bicarbonate as CaCO3	420.	10.	mg/L					
Hydroxide as CaCO3	ND	10.	mg/L					
Carbonate as CaCO3	ND	10.	mg/L					
Total Alkalinity as CaCO3	420.	10.	mg/L					
Nitrate as N	ND	0.1	mg/L	1	300.0	02.24.99	I990021IC	
Sulfate	34.	5.	mg/L	10	300.0	02.24.99	I990021IC	
LAB NUMBER: 9902533-12								
SAMPLE ID: TBW-5								
SAMPLED: 23 FEB 99 18:00								
ALKALINITY				1	SM2320B	02.25.99	I990008ALK	
Bicarbonate as CaCO3	690.	10.	mg/L					
Hydroxide as CaCO3	ND	10.	mg/L					
Carbonate as CaCO3	ND	10.	mg/L					
Total Alkalinity as CaCO3	690.	10.	mg/L					
Nitrate as N	13.	1.	mg/L	10	300.0	02.24.99	I990021IC	
Sulfate	1.0	0.5	mg/L	1	300.0	02.24.99	I990021IC	

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CERTIFIED ENVIRONMENTAL SERVICES
CALIFORNIA ELAP #1664

LAB ORDER No.: 9902-533

ORGANIC ANALYTICAL RESULTS

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: 9902533-1							
SAMPLE ID: MW-1							
SAMPLED: 23 FEB 99 15:15							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1		T990046TPH	1,2,3
TPH-Extractable, quantitated as diesel	1200.	50.	ug/L		03.05.99		
TPH-Extractable, quantitated as Motor Oil	1600.	200.	ug/L		03.05.99		
Surrogate o-Terphenyl	52.		%		03.05.99		
Kerosene	ND	50.	ug/L		03.08.99		
LAB NUMBER: 9902533-1 (continued)							
SAMPLE ID: MW-1							
SAMPLED: 23 FEB 99 15:15							
METHOD: EPA 8015/8020							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX				1	03.01.99	V990022G9A	4,5
TPH-Purgeable, quantitated as gasoline	1100.	50.	ug/L				
Benzene	190.	0.5	ug/L				
Toluene	5.0	0.5	ug/L				
Ethylbenzene	3.0	0.5	ug/L				
Xylenes (Total)	12.	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	86.		%				
Surrogate 4-Bromofluorobenzene [PID]	107.		%				
LAB NUMBER: 9902533-2							
SAMPLE ID: MW-2							
SAMPLED: 23 FEB 99 12:40							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1		T990046TPH	1,2,3
TPH-Extractable, quantitated as diesel	200.	50.	ug/L		03.05.99		

1) Sample Preparation on 03-02-99 using EPA 3510
2) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on Diesel #2 standards.
3) An unidentified petroleum hydrocarbon mixture was present in the sample. An approximate concentration has been calculated based on motor oil standards.
4) Sample Preparation on 03-01-99 using EPA 5030
5) All BTEX results are estimated since BTEX standards did not bracket the samples.

CALTEST ANALYTICAL LABORATORY
1885 N. Kelly Rd. • Napa, California 94558
(707) 258-4000 • Fax: (707) 226-1001

CERTIFIED ENVIRONMENTAL SERVICES
CALIFORNIA ELAP #1664

LAB ORDER No.: 9902-533

ORGANIC ANALYTICAL RESULTS

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: 9902533-2 (continued)							
SAMPLE ID: MW-2							
SAMPLED: 23 FEB 99 12:40							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS (continued)				1		T990046TPH	
TPH-Extractable, quantitated as Motor Oil	900.	200.	ug/L		03.05.99		
Surrogate o-Terphenyl	59.		%		03.05.99		
Kerosene	ND	50.	ug/L		03.08.99		
LAB NUMBER: 9902533-2 (continued)							
SAMPLE ID: MW-2							
SAMPLED: 23 FEB 99 12:40							
METHOD: EPA 8015/8020							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX				1	03.01.99	V990022G9A	1,2
TPH-Purgeable, quantitated as gasoline	ND	50.	ug/L				
Benzene	3.5	0.5	ug/L				
Toluene	0.6	0.5	ug/L				
Ethylbenzene	0.6	0.5	ug/L				
Xylenes (Total)	1.2	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	102.		%				
Surrogate 4-Bromofluorobenzene [PID]	117.		%				
LAB NUMBER: 9902533-3							
SAMPLE ID: MW-5							
SAMPLED: 23 FEB 99 13:55							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1		T990046TPH	3,4,5
TPH-Extractable, quantitated as diesel	2000.	50.	ug/L		03.05.99		

1) Sample Preparation on 03-01-99 using EPA 5030
2) All BTEX results are estimated since BTEX standards did not bracket the samples.
3) Sample Preparation on 03-02-99 using EPA 3510
4) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on Diesel #2 standards.
5) An unidentified petroleum hydrocarbon mixture was present in the sample. An approximate concentration has been calculated based on motor oil standards.

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CERTIFIED ENVIRONMENTAL SERVICES
CALIFORNIA ELAP #1664

LAB ORDER No.: 9902-533

ORGANIC ANALYTICAL RESULTS

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: 9902533-3 (continued)							
SAMPLE ID: MW-5							
SAMPLED: 23 FEB 99 13:55							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS (continued)				1		T990046TPH	
TPH-Extractable, quantitated as Motor Oil	700.	200.	ug/L		03.05.99		
Surrogate o-Terphenyl	53.		%		03.05.99		
Kerosene	ND	50.	ug/L		03.08.99		
LAB NUMBER: 9902533-3 (continued)							
SAMPLE ID: MW-5							
SAMPLED: 23 FEB 99 13:55							
METHOD: EPA 8015/8020							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX				1	03.01.99	V990022G9A	1,2
TPH-Purgeable, quantitated as gasoline	6700.	50.	ug/L				
Benzene	300.	0.5	ug/L				
Toluene	26.	0.5	ug/L				
Ethylbenzene	800.	0.5	ug/L				
Xylenes (Total)	690.	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	1600.	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	103.		%				
Surrogate 4-Bromofluorobenzene [PID]	120.		%				
LAB NUMBER: 9902533-4							
SAMPLE ID: MW-7							
SAMPLED: 23 FEB 99 13:15							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1		T990046TPH	3
TPH-Extractable, quantitated as diesel	ND	50.	ug/L		03.05.99		
TPH-Extractable, quantitated as Motor Oil	ND	200.	ug/L		03.05.99		
Surrogate o-Terphenyl	67.		%		03.05.99		
Kerosene	ND	50.	ug/L		03.08.99		

1) Sample Preparation on 03-01-99 using EPA 5030
2) All BTEX results are estimated since BTEX standards did not bracket the samples.
3) Sample Preparation on 03-02-99 using EPA 3510

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CALIFORNIA ELAP #1664

LAB ORDER No.: 9902-533

ORGANIC ANALYTICAL RESULTS

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: 9902533-4 (continued)							
SAMPLE ID: MW-7							
SAMPLED: 23 FEB 99 13:15							
METHOD: EPA 8015/8020							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX				1	03.01.99	V990022G9A	1,2
TPH-Purgeable, quantitated as gasoline	80.	50.	ug/L				
Benzene	ND	0.5	ug/L				
Toluene	ND	0.5	ug/L				
Ethylbenzene	ND	0.5	ug/L				
Xylenes (Total)	1.	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	94.		%				
Surrogate 4-Bromofluorobenzene [PID]	104.		%				
LAB NUMBER: 9902533-5							
SAMPLE ID: MW-8							
SAMPLED: 23 FEB 99 10:00							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1		T990046TPH	3,4,5
TPH-Extractable, quantitated as diesel	700.	50.	ug/L		03.05.99		
TPH-Extractable, quantitated as Motor Oil	1500.	200.	ug/L		03.05.99		
Surrogate o-Terphenyl	57.		%		03.05.99		
Kerosene	ND	50.	ug/L		03.08.99		
LAB NUMBER: 9902533-5 (continued)							
SAMPLE ID: MW-8							
SAMPLED: 23 FEB 99 10:00							
METHOD: EPA 8015/8020							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX				1	03.01.99	V990022G9A	1
TPH-Purgeable, quantitated as gasoline	ND	50.	ug/L				

1) Sample Preparation on 03-01-99 using EPA 5030
2) All BTEX results are estimated since BTEX standards did not bracket the samples.
3) Sample Preparation on 03-02-99 using EPA 3510
4) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on Diesel #2 standards.
5) An unidentified petroleum hydrocarbon mixture was present in the sample. An approximate concentration has been calculated based on motor oil standards.

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LAB ORDER No.: 9902-533

ORGANIC ANALYTICAL RESULTS

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: 9902533-5 (continued)							
SAMPLE ID: MW-8							
SAMPLED: 23 FEB 99 10:00							
METHOD: EPA 8015/8020							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX (continued)				1	03.01.99	V990022G9A	
Benzene	ND	0.5	ug/L				
Toluene	ND	0.5	ug/L				
Ethylbenzene	ND	0.5	ug/L				
Xylenes (Total)	ND	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	103.		%				
Surrogate 4-Bromofluorobenzene [PID]	113.		%				
LAB NUMBER: 9902533-6							
SAMPLE ID: MW-9							
SAMPLED: 23 FEB 99 10:45							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1		T990046TPH	1,2,3
TPH-Extractable, quantitated as diesel	1100.	50.	ug/L		03.05.99		
TPH-Extractable, quantitated as Motor Oil	3700.	200.	ug/L		03.05.99		
Surrogate o-Terphenyl	54.		%		03.05.99		
Kerosene	ND	50.	ug/L		03.08.99		
LAB NUMBER: 9902533-6 (continued)							
SAMPLE ID: MW-9							
SAMPLED: 23 FEB 99 10:45							
METHOD: EPA 8015/8020							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX				1	03.01.99	V990022G9A	4,5
TPH-Purgeable, quantitated as gasoline	1100.	50.	ug/L				

1) Sample Preparation on 03-02-99 using EPA 3510
2) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on Diesel #2 standards.
3) An unidentified petroleum hydrocarbon mixture was present in the sample. An approximate concentration has been calculated based on motor oil standards.
4) Sample Preparation on 03-01-99 using EPA 5030
5) All BTEX results are estimated since BTEX standards did not bracket the samples.

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ORGANIC ANALYTICAL RESULTS

LAB ORDER No.: 9902-533

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: 9902533-6 (continued)							
SAMPLE ID: MW-9							
SAMPLED: 23 FEB 99 10:45							
METHOD: EPA 8015/8020							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX (continued)				1	03.01.99	V990022G9A	
Benzene	620.	0.5	ug/L				
Toluene	9.7	0.5	ug/L				
Ethylbenzene	1.5	0.5	ug/L				
Xylenes (Total)	7.7	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	104.		%				
Surrogate 4-Bromofluorobenzene [PID]	116.		%				
LAB NUMBER: 9902533-7							
SAMPLE ID: MW-10							
SAMPLED: 23 FEB 99 12:00							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1		T990046TPH	1,2,3
TPH-Extractable, quantitated as diesel	170.	50.	ug/L		03.05.99		
TPH-Extractable, quantitated as Motor Oil	1200.	200.	ug/L		03.05.99		
Surrogate o-Terphenyl	69.		%		03.05.99		
Kerosene	ND	50.	ug/L		03.08.99		
LAB NUMBER: 9902533-7 (continued)							
SAMPLE ID: MW-10							
SAMPLED: 23 FEB 99 12:00							
METHOD: EPA 8015/8020							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX				1	03.01.99	V990022G9A	4,5
TPH-Purgeable, quantitated as gasoline	ND	50.	ug/L				

1) Sample Preparation on 03-02-99 using EPA 3510
2) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on Diesel #2 standards.
3) An unidentified petroleum hydrocarbon mixture was present in the sample. An approximate concentration has been calculated based on motor oil standards.
4) Sample Preparation on 03-01-99 using EPA 5030
5) All BTEX results are estimated since BTEX standards did not bracket the samples.

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LAB ORDER No.: 9902-533

ORGANIC ANALYTICAL RESULTS

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: 9902533-7 (continued)							
SAMPLE ID: MW-10							
SAMPLED: 23 FEB 99 12:00							
METHOD: EPA 8015/8020							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX (continued)				1	03.01.99	V990022G9A	
Benzene	1.3	0.5	ug/L				
Toluene	ND	0.5	ug/L				
Ethylbenzene	ND	0.5	ug/L				
Xylenes (Total)	ND	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	105.		%				
Surrogate 4-Bromofluorobenzene [PID]	119.		%				
LAB NUMBER: 9902533-8							
SAMPLE ID: TBW-3							
SAMPLED: 23 FEB 99 16:15							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1		T990046TPH	1,2,3
TPH-Extractable, quantitated as diesel	3800.	50.	ug/L		03.05.99		
TPH-Extractable, quantitated as Motor Oil	3000.	200.	ug/L		03.05.99		
Surrogate o-Terphenyl	65.		%		03.05.99		
Kerosene	ND	50.	ug/L		03.08.99		
LAB NUMBER: 9902533-8 (continued)							
SAMPLE ID: TBW-3							
SAMPLED: 23 FEB 99 16:15							
METHOD: EPA 8015/8020							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX				1	03.01.99	V990022G9A	4,5
TPH-Purgeable, quantitated as gasoline	110.	50.	ug/L				

1) Sample Preparation on 03-02-99 using EPA 3510
2) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on Diesel #2 standards.
3) An unidentified petroleum hydrocarbon mixture was present in the sample. An approximate concentration has been calculated based on motor oil standards.
4) Sample Preparation on 03-01-99 using EPA 5030
5) All BTEX results are estimated since BTEX standards did not bracket the samples.

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LAB ORDER No.: 9902-533

ORGANIC ANALYTICAL RESULTS

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: 9902533-8 (continued)							
SAMPLE ID: TBW-3							
SAMPLED: 23 FEB 99 16:15							
METHOD: EPA 8015/8020							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX (continued)				1	03.01.99	V990022G9A	
Benzene	1.6	0.5	ug/L				
Toluene	ND	0.5	ug/L				
Ethylbenzene	ND	0.5	ug/L				
Xylenes (Total)	ND	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	105.		%				
Surrogate 4-Bromofluorobenzene [PID]	123.		%				
LAB NUMBER: 9902533-9							
SAMPLE ID: TBW-6							
SAMPLED: 23 FEB 99 17:20							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1		T990046TPH	1,2,3
TPH-Extractable, quantitated as diesel	160.	50.	ug/L		03.05.99		
TPH-Extractable, quantitated as Motor Oil	600.	200.	ug/L		03.05.99		
Surrogate o-Terphenyl	66.		%		03.05.99		
Kerosene	ND	50.	ug/L		03.08.99		
LAB NUMBER: 9902533-9 (continued)							
SAMPLE ID: TBW-6							
SAMPLED: 23 FEB 99 17:20							
METHOD: EPA 8015/8020							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX				1	03.01.99	V990022G9A	4
TPH-Purgeable, quantitated as gasoline	60.	50.	ug/L				
Benzene	ND	0.5	ug/L				

1) Sample Preparation on 03-02-99 using EPA 3510
2) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on Diesel #2 standards.
3) An unidentified petroleum hydrocarbon mixture was present in the sample. An approximate concentration has been calculated based on motor oil standards.
4) Sample Preparation on 03-01-99 using EPA 5030

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LAB ORDER No.: 9902-533

ORGANIC ANALYTICAL RESULTS

LAB NUMBER: 9902533-9 (continued)
SAMPLE ID: TBW-6
SAMPLED: 23 FEB 99 17:20
METHOD: EPA 8015/8020

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX (continued)				1	03.01.99	V990022G9A	
Toluene	ND	0.5	ug/L				
Ethylbenzene	ND	0.5	ug/L				
Xylenes (Total)	ND	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	107.		%				
Surrogate 4-Bromofluorobenzene [PID]	126.		%				

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CERTIFIED ENVIRONMENTAL SERVICES
CALIFORNIA ELAP #1664

LAB ORDER No.: 9902-533

SUPPLEMENTAL QUALITY CONTROL (QC) DATA REPORT

Report Date: 23 MAR 1999
Received Date: 24 FEB 1999

Client: David Elias
Cambria
1144 65th Street, Suite C
Oakland, CA 94608

Project: CITY OF OAKLAND, MSC 153-1247

QC Batch ID	Method
I990007ALK	310.1
I990008ALK	310.1
I990008ALK	SM2320B
I990021IC	300.0
T990046TPH	8015M
V990022G9A	8015/8020

Project Manager

Christine Horn
Laboratory Director

Results are specific to the sample as submitted and only to the parameters reported.
All analyses performed by EPA Methods or Standard Methods (SM) 18th Ed. except where noted.
Results of 'ND' mean not detected at or above the listed Reporting Limit (R.L.).
Analyte Spike Amounts reported as 'NS' mean not spiked and will not have recoveries reported.
'RPD' means Relative Percent Difference and RPD Acceptance Criteria is stated as a maximum.
'NC' means not calculated for RPD or Spike Recoveries.

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CERTIFIED ENVIRONMENTAL SERVICES
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LAB ORDER No.: 9902-533

METHOD BLANK ANALYTICAL RESULTS

ANALYTE	RESULT	R.L.	UNITS	ANALYZED	NOTES
QC BATCH: I990007ALK					
ALKALINITY				02.25.99	
Bicarbonate as CaCO3	ND	10.	mg/L		
Hydroxide as CaCO3	ND	10.	mg/L		
Carbonate as CaCO3	ND	10.	mg/L		
Total Alkalinity as CaCO3	ND	10.	mg/L		
QC BATCH: I990008ALK					
ALKALINITY				02.25.99	
Bicarbonate as CaCO3	ND	10.	mg/L		
Hydroxide as CaCO3	ND	10.	mg/L		
Carbonate as CaCO3	ND	10.	mg/L		
Total Alkalinity as CaCO3	ND	10.	mg/L		
QC BATCH: I990021IC					
Nitrate as N	ND	0.1	mg/L	02.24.99	
Sulfate	ND	0.5	mg/L	02.24.99	
QC BATCH: T990046TPH					
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS					
Diesel Fuel	ND	50.	ug/L	03.04.99	
TPH-Extractable, quantitated as diesel	ND	50.	ug/L	03.04.99	
Motor Oil	ND	200.	ug/L	03.04.99	
TPH-Extractable, quantitated as Motor Oil	ND	200.	ug/L	03.04.99	
Surrogate o-Terphenyl	77.		%	03.04.99	
Kerosene	ND	50.	ug/L	03.08.99	
QC BATCH: V990022G9A					
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX				03.01.99	
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L		
TPH-Purgeable, quantitated as gasoline	ND	50.	ug/L		
Benzene	ND	0.5	ug/L		
Toluene	ND	0.5	ug/L		
Ethylbenzene	ND	0.5	ug/L		
Xylenes (Total)	ND	0.5	ug/L		
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L		
Surrogate 4-Bromofluorobenzene [FID]	106.		%		
Surrogate 4-Bromofluorobenzene [PID]	118.		%		

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CERTIFIED ENVIRONMENTAL SERVICES
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LAB ORDER No.: 9902-533

LABORATORY CONTROL SAMPLE ANALYTICAL RESULTS

ANALYTE	SPIKE AMOUNT	SPIKE\DUP RESULT	SPK\DUP %REC	ACCEPTANCE %REC \RPD	REL% DIFF	ANALYZED	NOTES
QC BATCH: I990007ALK							
ALKALINITY						02.25.99	
Bicarbonate as CaCO3	100.	100.\	100\	80-120\20			
Total Alkalinity as CaCO3	100.	100.\	100\	80-120\20			
QC BATCH: I990008ALK							
ALKALINITY						02.25.99	
Bicarbonate as CaCO3	100.	100.\	100\	80-120\20			
Total Alkalinity as CaCO3	100.	100.\	100\	80-120\20			
QC BATCH: I990021IC							
Nitrate as N	6.25	5.99\	96\	80-120\20		02.24.99	
Sulfate	20.0	20.0\	100\	80-120\20		02.24.99	
QC BATCH: T990046TPH							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS						03.04.99	
Diesel Fuel	1000	865.\	86\	57-122\			
Surrogate o-Terphenyl	100	67.6\	68\	51-109\			
QC BATCH: V990022G9A							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX						03.01.99	
TPH-Purgeable, quantitated as gasoline	550.	482.\	88\	69-117\			
Benzene	6.69	E7.90\	118\	82-126\			
Toluene	39.0	E44.5\	114\	49-117\			
Surrogate 4-Bromofluorobenzene [FID]	20.0	17.8\	89\	52-140\			
Surrogate 4-Bromofluorobenzene [PID]	20.0	22.2\	111\	78-111\			

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CERTIFIED ENVIRONMENTAL SERVICES
CALIFORNIA ELAP #1664

LAB ORDER No.: 9902-533

DUPLICATE SAMPLES ANALYTICAL RESULTS

ANALYTE	R.L.	ORIGINAL RESULT	DUPLICATE RESULT	REL% DIFF	ACCEPT LIMIT	ANALYZED	NOTES
QC BATCH: I990007ALK							
QC SAMPLE LAB NUMBER: 9902324-1							
ALKALINITY						02.25.99	
Bicarbonate as CaCO3	10.	320.	320.	0.0	20		
Hydroxide as CaCO3	10.	ND	ND	NC	20		
Carbonate as CaCO3	10.	ND	ND	NC	20		
Total Alkalinity as CaCO3	10.	320.	320.	0.0	20		
QC BATCH: I990008ALK							
QC SAMPLE LAB NUMBER: 9902533-8							
ALKALINITY						02.25.99	
Bicarbonate as CaCO3	10.	406.	406.	0.0	20		
Hydroxide as CaCO3	10.	ND	ND	NC	20		
Carbonate as CaCO3	10.	ND	ND	NC	20		
Total Alkalinity as CaCO3	10.	406.	406.	0.0	20		

CALTEST ANALYTICAL LABORATORY
1885 N. Kelly Rd. • Napa, California 94558
(707) 258-4000 • Fax: (707) 226-1001

CERTIFIED ENVIRONMENTAL SERVICES
CALIFORNIA ELAP #1664

LAB ORDER No.: 9902-533

MATRIX SPIKE ANALYTICAL RESULTS

ANALYTE	ORIGINAL RESULT	SPIKE AMOUNT	SPIKE\DUP RESULT	SPK\DUP %REC	ACCEPTANCE %REC \RPD	REL% DIFF	ANALYZED	NOTES
QC BATCH: I990021IC								
QC SAMPLE LAB NUMBER: 9902495-1								
Nitrate as N	7.23	50.0	57.5\44.0	101\74	80-120\20	27.	02.24.99	
QC BATCH: I990021IC (continued)								
QC SAMPLE LAB NUMBER: 9902495-1								
Sulfate	ND	160.	159.\178.	99\111	80-120\20	11.	02.24.99	
QC BATCH: T990046TPH								
QC SAMPLE LAB NUMBER: 9902533-1								
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS							03.04.99	
TPH-Extractable, quantitated as diesel	1190.	2000.	3070.\3020.	94\92	45-129\21	1.6		
Surrogate o-Terphenyl	52.3%	200.	99.9\101.	50\50	49-106\			
QC BATCH: V990022G9A								
QC SAMPLE LAB NUMBER: 9902533-9								
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX							03.01.99	
TPH-Purgeable, quantitated as gasoline	64.3	550.	564.\558.	91\90	72-115\13	1.1		
Benzene	ND	6.69	E7.88\E8.31	118\124	70-143\25	5.3		
Toluene	ND	39.0	E44.7\E47.3	115\121	27-142\15	5.7		
Surrogate 4-Bromofluorobenzene [FID]	107.%	20.0	17.3\17.8	86\89	52-140\			
Surrogate 4-Bromofluorobenzene [PID]	126.%	20.0	21.2\21.9	106\110	54-126\			

CALTEST ANALYTICAL LABORATORY

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SAMPLE CHAIN OF CUSTODY

LAB ORDER #: [illegible]

PAGE 1 OF 4

PROJECT # / PROJECT NAME: City of Oakland, MSC 153-1247

P.O. #:

CLIENT: Cambria

CONTACT NAME: Bob Schultz

ADDRESS: 1144 65th St. CITY: Oakland STATE: CA ZIP: 94608

BILLING ADDRESS: Same as above

PHONE #: 510 420 3341 FAX PHONE: 510 420 9170 SAMPLER (PRINT & SIGN NAME): Bob Schultz [signature]

ANALYSES REQUESTED: TPHg/BTEX/MTBE; TPHd; TPHd,K,MO (multi range); nitrates; sulfates; alkalinity

TURN-AROUND TIME: ☒ STANDARD ☐ RUSH

DUE DATE:

CALTEST #	DATE SAMPLED	TIME SAMPLED	MATRIX	CONTAINER AMOUNT/TYPE	PRESERVATIVE	SAMPLE IDENTIFICATION SITE	CLIENT LAB #	COMP. or GRAB	TPHg/BTEX/MTBE	TPHd	TPHd,K,MO (multi range)	nitrates	sulfates	alkalinity	REMARKS
	2/23	15:15	water	2·1l amb	—	MW-1 *					✓	[crossed out]	[crossed out]	[crossed out]	
	"	"	"	1·1l plas	—	"					[crossed out]	✓	✓	✓	
	"	"	"	3·VOA	HCl	"			✓						
	2/23	12:40	water	2·1l amb	—	MW-2				✓					
	"	"	"	1·1l plas	—	"						✓	✓	✓	
	"	"	"	3·VOA	HCl	"			✓						
	2/23	13:55	water	2·1l amb	—	MW-5					✓				
	"	"	"	1·1l plas	—	"						✓	✓	✓	
	"	"	"	3·VOA	HCl	"			✓						

By submittal of sample(s), client agrees to abide by the Terms and Conditions set forth on the reverse of this document.

RELINQUISHED BY	DATE/TIME	RECEIVED BY	RELINQUISHED BY	DATE/TIME	RECEIVED BY
Bob Schultz [signature]	2/24 13:15	[signature]	[signature]	2/24/02 1600 1445	[signature]

FOR LAB USE ONLY

Samples: WC___ MICRO___ BIO___ AA___ pH? Y/N TEMP: 2.5 SEALED: Y/N INTACT: Y/N

BD: BIO___ WC___ AA___ MW-1 3 of 3 VOA w/ 6mm; 4.5mm; 2mm

CC: AA___ SV___ VOA___

SIL: HP___ PT___ QT___ VOA___

W/HNO_3___ H_2SO_4___ NaOH___

PIL: HNO_3___ H_2SO_4___ NaOH___ HCL___

MATRIX: AQ = Aqueous Nondrinking Water, Digested Metals; FE = Low R.L.s, Aqueous Nondrinking Water, Digested Metals; DW = Drinking Water; SL = Soil, Sludge, Solid; FP = Free Product

CONTAINER TYPES: AL = Amber Liter; AQL = 250 mL. Amber; PT = Pint (Plastic); QT=Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4 oz. BACT; BT = Brass Tube; VOA = 40 mL.VOA; OTC = Other Type Container

R___ PR___ M___ F___

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CALTEST ANALYTICAL LABORATORY

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SAMPLE CHAIN OF CUSTODY

LAB ORDER #: [illegible]

PROJECT # / PROJECT NAME: City of Oakland, MSC 153-1247

P.O. #:

CLIENT: Cambria

CONTACT NAME:

ADDRESS: CITY: STATE: ZIP:

BILLING ADDRESS:

PHONE #: FAX PHONE:

SAMPLER (PRINT & SIGN NAME): Bob Schultz [signature]

ANALYSES REQUESTED: TPHg/BTEX/MTBE; TPHd; TPHd, k, mo (multi range); Nitrates; Sulfates; alkalinity

TURN-AROUND TIME: ☐ STANDARD ☐ RUSH

DUE DATE:

CALTEST #	DATE SAMPLED	TIME SAMPLED	MATRIX	CONTAINER AMOUNT/TYPE	PRESERVATIVE	SAMPLE IDENTIFICATION SITE	CLIENT LAB #	COMP. or GRAB	TPHg/BTEX/MTBE	TPHd	TPHd, k, mo	Nitrates	Sulfates	alkalinity	REMARKS
	2/23	14:30	H_2O	1·1l plas	—	MW-6						✓	✓	✓	
	2/23	13:15	H_2O	2·1l amb	—	MW-7					✓				
	"	"	"	1·1l plas	—	"						✓	✓	✓	
	"	"	"	3·VOA	HCl	"			✓						
	2/23	10:00	H_2O	1·1l plas	—	MW-8 *						✓	✓	✓	
	"	"	"	2·1l amb	—	"					✓				
	"	"	"	3·VOA	HCl	"			✓						
	2/23	10:45	H_2O	1·1l plas	—	MW-9 *						✓	✓	✓	
	"	"	"	2·1l amb	—	"					✓				
	"	"	"	3·VOA	HCl	"			✓						

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RELINQUISHED BY	DATE/TIME	RECEIVED BY	RELINQUISHED BY	DATE/TIME	RECEIVED BY
[signature]	2/24 13:15	[signature]	[signature]	2/24/99 1405	[signature]

FOR LAB USE ONLY

Samples: WC ___ MICRO ___ BIO ___ AA ___	pH? Y/N	TEMP: 3.5	SEALED: Y/N INTACT: Y/N
BD: BIO ___ WC ___ AA ___	* 1 of 3 VOA w/ 2mm bubbles MW-8		
CC: AA ___ SV ___ VOA ___	2 of 3 VOA: 1, 4.5, 3, 8.5 mm bubbles MW-9		
SIL: HP ___ PT ___ QT ___ VOA ___			
W/HNO_3 ___ H_2SO_4 ___ NaOH ___			
PIL: HNO_3 ___ H_2SO_4 ___ NaOH ___ HCL ___			

MATRIX: AQ = Aqueous Nondrinking Water, Digested Metals; FE = Low R.L.s, Aqueous Nondrinking Water, Digested Metals; DW = Drinking Water; SL = Soil, Sludge, Solid; FP = Free Product

CONTAINER TYPES: AL = Amber Liter; AQL = 250 mL. Amber; PT = Pint (Plastic); QT=Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4 oz. BACT; BT = Brass Tube; VOA = 40 mL.VOA; OTC = Other Type Container

R ___ PR ___ M ___ F ___

REV. 11/97

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CALTEST ANALYTICAL LABORATORY

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SAMPLE CHAIN OF CUSTODY

PAGE 3 OF 4

LAB ORDER #: [illegible]

PROJECT # / PROJECT NAME: City of Oakland, MSC 153-1247

P.O. #:

CLIENT: Cambria

CONTACT NAME:

ADDRESS: 1111 65th St. CITY: Oakland STATE: CA ZIP: 94608

BILLING ADDRESS: Same

PHONE #: 510 420 3341 FAX PHONE: 510 420 9170 SAMPLER (PRINT & SIGN NAME): Bob Schultz [signature]

ANALYSES REQUESTED: TPHg/BTEX/MTBE; TPHd, k, mo; Nitrates; Sulfates; alkalinity

TURN AROUND TIME: ☒ STANDARD ☐ RUSH

DUE DATE:

CALTEST #	DATE SAMPLED	TIME SAMPLED	MATRIX	CONTAINER AMOUNT/TYPE	PRESERVATIVE	SAMPLE IDENTIFICATION SITE	CLIENT LAB #	COMP. or GRAB	TPHg/BTEX/MTBE	TPHd, k, mo	Nitrates	Sulfates	alkalinity		REMARKS
	2/23	17:00	Water	2·1l amb	—	MW-10				✓					
	11	11	11	1·1l plas	—	11					✓	✓	✓		
	11	11	11	3·voa	HCl	11			✓						
	2/23	16:45	water	1·1l plas	—	TBW-1 ~~*gdc~~					✓	✓	✓		
	2/23	16:15	water	2·1l amb	—	TBW-3 ~~*gdc~~				✓					
	11	11	11	1·1l plas	—	11					✓	✓	✓		
	11	11	11	3·voa	HCl	11			✓						
	~~2/23~~	~~18:00~~	~~water~~	~~1·1l plas~~	~~—~~	~~TBW-5~~ *					✓	✓	✓		~~did not rec'~~
						* DID rec; Freeproduct in AL /gdc									

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RELINQUISHED BY	DATE/TIME	RECEIVED BY	RELINQUISHED BY	DATE/TIME	RECEIVED BY
Bob Schultz	2/24 13:15	Michael Etchells	Michael Etchells	2/24 1405	[signature]

FOR LAB USE ONLY

Samples: WC __ MICRO __ BIO __ AA __ pH? Y/N TEMP: 2.5 SEALED: Y/N INTACT: Y/N

BD: BIO __ WC __ AA __

CC: AA __ SV __ VOA __

SIL: HP __ PT __ QT __ VOA __ Rec'd 2/24 as TB samples not

W/HNO₃ __ H₂SO₄ __ NaOH __ listed on COC Each had 2mm bubble

PIL: HNO₃ __ H₂SO₄ __ NaOH __ HCL __ Put on hold per WHS

MATRIX: AQ = Aqueous Nondrinking Water, Digested Metals; FE = Low R.L.s, Aqueous Nondrinking Water, Digested Metals; DW = Drinking Water; SL = Soil, Sludge, Solid; FP = Free Product

CONTAINER TYPES: AL = Amber Liter; AQL = 250 mL. Amber; PT = Pint (Plastic); QT=Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4 oz. BACT; BT = Brass Tube; VOA = 40 mL.VOA; OTC = Other Type Container

R __ PR __ M __ F __

REV. 11/97

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ATTACHMENT B

Well Sampling Forms

CAMBRIA

WELL DEPTH MEASUREMENTS

Well ID	Time	Product Depth (ft)	Water Depth (ft)	Product Thickness (ft)	Well Depth (ft)	Comments
MW-1	9:05	—	3.41	—	15.56	hc odor
MW-2	9:18	—	8.68	—	15.46	
MW-3	well submerged / covered by chucks					
MW-4	9:24	—	3.10	—	15.40	
MW-5	9:20	—	3.59	—	14.21	hc odor
MW-6	9:10	7.31	7.31	not measurable	—	FP
MW-7	9:15	—	5.57	—	14.10	
MW-8	9:00	—	11.53	—	15.14	
MW-9	9:04	—	6.65	—	13.91	hc? odor
MW-10	9:10	—	5.51	—	13.44	
TBW-1	16:40	6.15	6.25	0.10	—	FP
TBW-3	16:10	—	1.25	—	10.95	sheen + algae - shallow, cold H_2O - surface water in peat zone
TBW-5	17:55	8.24	9.72	1.48	—	FP
TBW-6	17:10	—	2.09	—	12.42	shallow, cold H_2O (surface water in peat gravel)

Measured By: RWS / JJ

Date: 2/23/99

CAMBRIA

WELL SAMPLING FORM

Project Name: City of Oakland	Cambria Mgr: DCE	Well ID: MW-1
Project Number: 153-1247	Date: 2/23/99	Well Yield: —
Site Address: 7101 Edgewater Dr.	Sampling Method: disposable bailer	Well Diameter: 2"
		Technician(s): Schultz / JJ
Initial Depth to Water: 3.41' @ 9:05	Total Well Depth: 15.56	Water Column Height: 12.15
Volume/ft: 0.16	1 Casing Volume: 1.94	3 Casing Volumes: 5.82 gals
Purging Device: sub pump	Did Well Dewater?: no	Total Gallons Purged: 6 gals
Start Purge Time: 259	Stop Purge Time: 304	Total Time: 5 min

1 Casing Volume = Water column height x Volume/ ft.

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

DO: 1.6 mg/L

Fe^{3+} = 75.0 mg/L

Time	Casing Volume	Temp. C°	pH	Cond. µS	Comments
300		15.1	7.2	1643	
301		15.5	7.1	1850	
302		15.8	6.9	1864	
303		16.3	6.9	1899	

ORP = — mV ORP meter is down.

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-1	2/23	15:15	VOA/amb/1L plas.	HCl/-/-	TPHg/BTEX/MTBE, nitrates, sulfates, alkalinity	TPHd, not ✓

CAMBRIA

WELL SAMPLING FORM

Project Name: City of Oakland	Cambria Mgr: DCE	Well ID: MW2
Project Number: 153-1247	Date: 2/23/99	Well Yield: —
Site Address: 7101 Edgewater Dr.	Sampling Method: disposable bailer	Well Diameter: 2"
		Technician(s): Schultz / JJ
Initial Depth to Water: 8.68	Total Well Depth: 15.46	Water Column Height: 6.78
Volume/ft: 0.16	1 Casing Volume: 1.08	3 4 Casing Volumes: 3.25
Purging Device: sub pump	Did Well Dewater?: no	Total Gallons Purged: 400
Start Purge Time: 1223	Stop Purge Time: 1227	Total Time: 4 min

1 Casing Volume = Water column height x Volume/ ft.

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

DO: 1.5 mg/L Fe^{3+} = >50 mg/L

Time	Casing Volume	Temp. °C	pH	Cond. uS	Comments
1225	1	16.9	7.1	77000	
1225	2	17.2	6.3	77000	
1226	3	17.2	6.3	77000	
1227	4	17.2	6.3	77000	

ORP = 50 mV

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-2	2/23	12:40	voa/amb	HCl/-/-	TPHg/BTEX/MTBE, TPHd, mo.c	
			1L plas		nitrate sulfate alkalinity	

CAMBRIA

WELL SAMPLING FORM

Project Name: City of Oakland	Cambria Mgr: DCE	Well ID: MW4
Project Number: 153-1247	Date: 2/23/99	Well Yield: —
Site Address: 7101 Edgewater Dr.	Sampling Method: disposable bailer	Well Diameter: 2"
		Technician(s): Schultz / JJ
Initial Depth to Water: 3.10	Total Well Depth: 15.40	Water Column Height: 12.30
Volume/ft: 0.16	1 Casing Volume: 1.97	3/4 Casing Volumes: 5.90
Purging Device: —	Did Well Dewater?: —	Total Gallons Purged: —
Start Purge Time: —	Stop Purge Time: —	Total Time: —

1 Casing Volume = Water column height x Volume/ ft.

DO: nm mg/L ORP Ferrous Iron } NM

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

Time	Casing Volume	Temp.	pH	Cond.	Comments

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
	nm		Sam		G&L	

CAMBRIA

WELL SAMPLING FORM

Project Name: City of Oakland	Cambria Mgr: DCE	Well ID: MW-5
Project Number: 153-1247	Date: 2/23/99	Well Yield: —
Site Address: 7101 Edgewater Dr.	Sampling Method: disposable bailer	Well Diameter: 2"
		Technician(s): Schultz / JJ
Initial Depth to Water: 3.59' @ 9:20	Total Well Depth: 14.21	Water Column Height: 10.62
Volume/ft: 0.16	1 Casing Volume: 1.70	3 Casing Volumes: 5.1 gals
Purging Device: sub pump	Did Well Dewater?: no	Total Gallons Purged: 5.1 gal
Start Purge Time: 137	Stop Purge Time: 140	Total Time: 3 min

1 Casing Volume = Water column height x Volume/ ft.

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

DO: 1.8 mg/l Fe^{3+} = 2.1 mg/L

Time	Casing Volume	Temp. °C	pH	Cond. µS	Comments
138		16.1	8.0	1735	
139		15.5	7.7	1660	
139		15.5	7.4	1086	
140		15.4	7.3	1412	
140		15.5	7.3	1381	

ORP = −55 mV

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-5	2/23	13:55	voa/amb/1l plas	HCl/-/-	TPHg/BTEX/MTBE, TPHd & mo	
					nitrate, sulfates, alkalinity	

CAMBRIA

WELL SAMPLING FORM

Project Name: City of Oakland	Cambria Mgr: DCE	Well ID: MW-6
Project Number: 153-1247	Date: 2/23/99	Well Yield:
Site Address: 7101 Edgewater Dr.	Sampling Method: disposable bailer	Well Diameter: 2"
		Technician(s): Schultz / JJ
Initial Depth to Water: 7.31' @ 9.10	Total Well Depth: —	Water Column Height: —
Volume/ft: 0.16	1 Casing Volume: —	3/4 Casing Volumes: —
Purging Device: —	Did Well Dewater?: —	Total Gallons Purged: —
Start Purge Time: —	Stop Purge Time: —	Total Time: —

1 Casing Volume = Water column height x Volume/ ft.

ORP 115 mV

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

DO: 6.4 mg/l Ferrous Iron 3.2 mg/l

Time	Casing Volume	Temp.	pH	Cond.	Comments
Free product — non-measurable thickness did not purge					

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-6	2/23	14:30	1 L plas	—	nitrates, sulfate, alkalinity	

CAMBRIA

WELL SAMPLING FORM

Project Name: City of Oakland	Cambria Mgr: DCE	Well ID: MW-7
Project Number: 153-1247	Date: 2/23/99	Well Yield: —
Site Address: 7101 Edgewater Dr.	Sampling Method: disposable bailer	Well Diameter: 2"
		Technician(s): Schultz / JJ
Initial Depth to Water: 5.57 @ 9:15	Total Well Depth: 14.10	Water Column Height: 8.53
Volume/ft: 0.16	1 Casing Volume: 1.36	3/4 Casing Volumes: 4.2 gals
Purging Device: sub pump	Did Well Dewater?: no	Total Gallons Purged: 4.50
Start Purge Time: 1256	Stop Purge Time: 100	Total Time: 4 min

1 Casing Volume = Water column height x Volume/ ft.

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

DO: 3.9 mg/L Fe^{3+} = 4.9 mg/L

Time	Casing Volume	Temp. °C	pH	Cond. mS	Comments
1257		15.8	6.6	1415	
1257		15.9	6.6	1836	
1258		16.5	6.6	1866	

ORP = 75 mV

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-7	2/23	13:15	voa/amb/1L plas	HCl/—/—	TPHg/BTEX/MTBE, TPHd, nitrate, sulfate, alkalinity	

CAMBRIA

WELL SAMPLING FORM

Project Name: City of Oakland	Cambria Mgr: DCE	Well ID: MW8
Project Number: 153-1247	Date: 2/23/99	Well Yield: —
Site Address: 7101 Edgewater Dr.	Sampling Method: disposable bailer	Well Diameter: 2"
		Technician(s): Schultz / JJ
Initial Depth to Water: 11.53'	Total Well Depth: 15.14'	Water Column Height: 3.61
Volume/ft: 0.16	1 Casing Volume: 0.58	3 Casing Volumes: 1.73
Purging Device: sub pump	Did Well Dewater?: no	Total Gallons Purged: 3.50
Start Purge Time: 950	Stop Purge Time: 954	Total Time: 4 min

1 Casing Volume = Water column height x Volume/ ft.

ORP = 75mV

DO: 5.3 mg/L Fe^{3+} = 5.0 mg/L

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

Time	Casing Volume	Temp. °C	pH	Cond. ms	Comments
950		14.0	8.3	1956	
951		14.3	7.9	1969	
952		14.6	7.5	72000	
953		14.6	7.3	>2000	

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-8	2/23	10:00	1 voa / amb	HCl / —	TPHg / BTEX / MTBE, TPHd, ka, mo	
			+ 1L plastic		nitrate, sulfate, alkalinity	

CAMBRIA

WELL SAMPLING FORM

Project Name: City of Oakland	Cambria Mgr: DCE	Well ID: MW9
Project Number: 153-1247	Date: 2/23/99	Well Yield:
Site Address: 7101 Edgewater Dr.	Sampling Method: disposable bailer	Well Diameter: 2"
		Technician(s): Schultz / JJ
Initial Depth to Water: 6.65	Total Well Depth: 13.91	Water Column Height: 7.26
Volume/ft: 0.16	1 Casing Volume: 1.16	3 Casing Volumes: 3.5 gals
Purging Device: sub pump	Did Well Dewater?: —	Total Gallons Purged: 4.0
Start Purge Time: 1032	Stop Purge Time: 1036	Total Time: 4 min

1 Casing Volume = Water column height x Volume/ ft.

ORP: -40 mv

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

DO: 1.1 mg/l Ferrous Iron: 4.9 mg/l

Time	Casing Volume	Temp. °C	pH	Cond. ms	Comments
1033		15.1	7.7	1544	smelly
1034		15.2	7.6	1790	silty
1034		15.3	7.3	1283	
1035		15.4	7.2	1810	

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-9	2/23	10:45	amb/voa 1l plastic	-/HCl/-	TPHg/BTEX/MTBE, TPHd, K, Mg, nitrate, sulfate, alkalinity	

CAMBRIA

WELL SAMPLING FORM

Project Name: City of Oakland	Cambria Mgr: DCE	Well ID: MW-10
Project Number: 153-1247	Date: 2/23/99	Well Yield: —
Site Address: 7101 Edgewater Dr.	Sampling Method: disposable bailer	Well Diameter: 2"
		Technician(s): Schultz / JJ
Initial Depth to Water: 5.51	Total Well Depth: 13.44	Water Column Height: 7.93
Volume/ft: 0.16	1 Casing Volume: 1.27	3 Casing Volumes: 3.81
Purging Device: Sub pump	Did Well Dewater?: no	Total Gallons Purged: 4.0 gals
Start Purge Time: 11:45	Stop Purge Time: 11:50	Total Time: 5 min

910

1 Casing Volume = Water column height x Volume/ ft.

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

$Fe^{3+} = 3.0$

DO: 1.90 mg/l

Time	Casing Volume	Temp.	pH	Cond.	Comments
11:48	1	15.2	1656 ↔ 7.3		
11:49	2	15.2	7.3	1728	
11:50	3	14.9	7.3	1663	

ORP = -10 mV

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-10	2/23	12:00	VOA/amb/	HCl/-/-	TPHg/BTEX/MTBE, TPHd, ca, mg,	
			1l plastic		nitrates, sulfates, alkalinity	

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WELL SAMPLING FORM

Project Name: City of Oakland	Cambria Mgr: DCE	Well ID: TBW-1
Project Number: 153-1247	Date: 2/23/99	Well Yield: —
Site Address: 7101 Edgewater Dr.	Sampling Method: disposable bailer	Well Diameter: 6"
	product thickness 0.10'	Technician(s): Schultz / JJ
Initial Depth to Water: 6.15 @ 16:40	Total Well Depth: BTW: 6.25	Water Column Height: —
Volume/ft: —	1 Casing Volume: —	3/4 Casing Volumes: —
Purging Device: —	Did Well Dewater?: —	Total Gallons Purged: —
Start Purge Time: —	Stop Purge Time: —	Total Time: —

1 Casing Volume = Water column height x Volume/ ft.

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

DO: NM mg/l due to heavy hc presence

Time	Casing Volume	Temp.	pH	Cond.	Comments
~~12:15~~	#				thick black product - unable to get "clear" sample from well

free product: no DO, ORP, ferrous iron measurement due to presence of heavy product

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
TBW-1	2/23	16:45	1L plastic	—	nitrate, sulfates, alkalinity	

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WELL SAMPLING FORM

Project Name: City of Oakland	Cambria Mgr: DCE	Well ID: TBW-3
Project Number: 153-1247	Date: 2/23/99	Well Yield:
Site Address: 7101 Edgewater Dr.	Sampling Method: disposable bailer	Well Diameter: 6"
		Technician(s): Schultz / JJ
Initial Depth to Water: 1.25' @ 16:10	Total Well Depth: 10.95	Water Column Height: 9.70
Volume/ft: 1.47	1 Casing Volume: 14.26	~~1~~ Casing Volumes: 14.26
Purging Device: Sub pump	Did Well Dewater?: no	Total Gallons Purged: 15.00
Start Purge Time: 3:56	Stop Purge Time: 4:10	Total Time: 14 min

1 Casing Volume = Water column height x Volume/ ft.

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

DO: 2.4 mg/L Fe^{3+} = 1.9 mg/L

Time	Casing Volume	Temp. °C	pH	Cond. mS	Comments
400	1	14.0	7.9	831	sheen
note: "globules" of stained dark brown		hc product present in well + casing is			

ORP: meter is down

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
TBW-3	2/23	16:15	voa/amb/1l plas	HCl/-/-	TPHg/BTEX/MTBE, TPHd, mno, fe	
					nitrates, sulfates, alkalinity	

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WELL SAMPLING FORM

Project Name: City of Oakland	Cambria Mgr: DCE	Well ID: TBW-5
Project Number: 153-1247	Date: 2/23/99	Well Yield: —
Site Address: 7101 Edgewater Dr.	Sampling Method: disposable bailer	Well Diameter: 6"
Initial Depth to Product: 8.24		Technician(s): Schultz / JJ
Initial Depth to Water: 9.72 @ 17:55	~~Total Well Depth:~~ Product Thickness: 1.48 ft	Water Column Height: —
Volume/ft: —	1 Casing Volume: —	3/4 Casing Volumes: —
Purging Device: —	Did Well Dewater?: —	Total Gallons Purged: —
Start Purge Time: —	Stop Purge Time: —	Total Time: —

1 Casing Volume = Water column height x Volume/ ft.

DO: NM mg/l

ORP NM
Ferrous Iron NM
} heavy product - little or no water in well

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

Time	Casing Volume	Temp.	pH	Cond.	Comments
* hand-bailed 3 gals of heavy product. collected one sample + stored in amber jar.					

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
TBW-5	2/23	18:00	1l amb	—	nitrates, sulfates, total alkalinity	

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WELL SAMPLING FORM

Project Name: City of Oakland	Cambria Mgr: DCE	Well ID: TBW-6
Project Number: 153-1247	Date: 2/23/99	Well Yield: —
Site Address: 7101 Edgewater Dr.	Sampling Method: disposable bailer	Well Diameter: 6"
		Technician(s): Schultz / JJ
Initial Depth to Water: 3.09 @ 17:16	Total Well Depth: 12.42	Water Column Height: 10.33
Volume/ft: 1.47	1 Casing Volume: 15.19	4 Casing Volumes: 15.19
Purging Device: Sub pump	Did Well Dewater?: NO	Total Gallons Purged: 16
Start Purge Time: 5:08	Stop Purge Time: 17:18	Total Time: 10 min

1 Casing Volume = Water column height x Volume/ ft.

Well Diam.	Volume/ft (gallons)
2"	0.16
4"	0.65
6"	1.47

DO: 1.1 mg/L Ferrous Iron 0.0 mg/L

Time	Casing Volume	Temp.	pH	Cond.	Comments
17:15	1	12.5°C	7.5	418 µS	Sheen
note: no reaction to ferrous iron reagent					

ORP: NM — meter is down

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
TBW-6	2/23	17:20	voa/amb/1L plas	HCl/-/-	TPHg/BTEX/MTBE, TPHd, TPHmo	
					nitrates/sulfates, alkalinity	

ATTACHMENT C

Standard Field Procedures for Monitoring Wells

CAMBRIA

STANDARD FIELD PROCEDURES FOR MONITORING WELLS

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

Well Construction and Surveying

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

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

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security. The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

Well Development

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

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

Ground Water Sampling

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