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America City
1993

ENVIRONMENTAL PROTECTION
99 JAN 19 AM 8:41
CITY OF OAKLAND

ALZIEL 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

January 13, 1999

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

Subject: **Fourth Quarter (November 1998) Monitoring Report – City of Oakland Municipal Service Center (94407)**

Dear Mr. Chan:

Enclosed is one copy of the *Fourth Quarter (November 1998) Monitoring Report*, prepared by our consultant, Cambria Environmental Technology, Inc., for the City of Oakland's Municipal Service Center at 7101 Edgewater Drive.

Also enclosed is a copy of a letter documenting your discussion with David Elias on the proposed revisions to the sampling schedule as presented in the third quarter report. On the basis of your discussion, we will implement the proposed sampling schedule changes and adhere to the submittal schedule for the pipeline removal report and work plan for additional site characterization.

The first quarter 1999 groundwater monitoring will be performed in February. A report containing the results will be sent to you in April 1999.

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

Sincerely,

Mark B Hersh

Mark B. Hersh
Environmental Program Specialist

cc: Andrew Clark-Clough
David Elias, Cambria Environmental Technology, Inc.

CAMBRIA

January 8, 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: **Fourth Quarter 1998 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 fourth quarter 1998 groundwater monitoring report for the site referenced above. Presented below are the fourth quarter 1998 activities and results and the anticipated first quarter 1999 activities. Groundwater elevations and hydrocarbon concentrations are presented on Figure 1. Analytic results are tabulated in Table 1, 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.

FOURTH QUARTER 1998 ACTIVITIES AND RESULTS

On November 11, 1998, Cambria gauged wells MW-1 through MW-10 (Figure 1), and inspected the site wells for separate phase hydrocarbons (SPH). As per the ACHCSA approved schedule, Cambria collected groundwater samples from wells MW-8 through MW-10. Ground water samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline (TPHg), TPH as diesel (TPHd), TPH as kerosene (TPHk), TPH as motor oil (TPHmo), benzene, toluene, ethylbenzene and xylenes (BTEX), and methyl tert-butyl ether (MTBE) at CALTEST Analytical of Napa, California, a California state-certified laboratory.

Groundwater Flow Direction

Depth-to-water measurements collected on November 11, 1998 indicate a northern groundwater gradient of 0.006 ft/ft toward Damon Slough in the northern portion of the site and a south western groundwater gradient of 0.004 ft/ft toward San Leandro Bay in the southern portion of the site (Figure 1). Both the groundwater flow direction and gradient are similar to the third quarter 1998 results. Groundwater elevations, gradients, and flow direction are tidally influenced. All wells were

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gauged within a forty-five-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

The three wells sampled this quarter, MW-8, MW-9, and MW-10, are located west of the site, near the San Leandro Bay shoreline (Figure 1). No TPHd, TPHk, or MTBE were detected in any of the wells sampled. Maximum TPHmo, TPHg, and benzene concentrations of 230 parts per billion (ppb), 700 ppb, and 130 ppb, respectively, were detected in well MW-9. No TPHmo or TPHg were detected in MW-8, and BTEX concentrations in MW-8 were 0.9 ppb, 0.9 ppb, 0.6 ppb, and 0.3 ppb, respectively. No hydrocarbons were detected in MW-10. Well MW-6 located immediately downgradient of former USTs contained 0.05 inches of SPH; no other wells contained SPH.

In general, hydrocarbon concentrations in wells MW-8, 9, and 10 remained stable or decreased as compared to the third quarter 1998 analytic results. The heavier range hydrocarbons, TPHd, TPHmo, and TPHk, detected in MW-10 last quarter, were not detected this quarter. Concentrations detected in wells MW-8 and MW-9 are similar to those detected last quarter.

Piping Removal

During this quarter, the City of Oakland removed approximately 2,800 lineal ft of former fuel dispenser piping and excavated and off-hauled about 320 cubic yards of hydrocarbon-contaminated soil. The piping removal results and associated soil sampling procedures will be presented in a separate comprehensive report.

ANTICIPATED FIRST QUARTER 1999 ACTIVITIES

Cambria will gauge and measure any SPH detected in MW-1 through MW-10, and collect groundwater samples from wells MW-1, 2, and 5 through 10. Cambria plans to collect and analyze water samples according to the protocol tabulated below for future sampling events.

Planned 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.

Following field activities, Cambria will tabulate the analytic data, contour groundwater elevations, and write a quarterly monitoring report. Cambria will also present the piping removal analytic results in a report. This new data will be used in proposing the next steps for both site assessment and remediation.

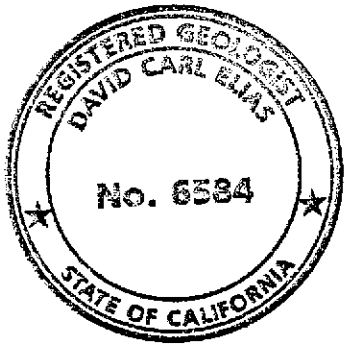
CLOSING

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



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

H:\City of Oakland\MSC\QM\4Q98\4q98.wpd

12/16/98

Groundwater Elevation Contour Map

November 11, 1998

EXPLANATION

- Monitoring well location
- TBW-1 — Tank Backfill Well
- NS — Not sampled for TPHg/TPHd/benzene
- NSV — Well Not Surveyed
- SPH — Separate Phase Hydrocarbons detected in well
- MW-8 / 2.58 / <50 / <50 / 0.9 — Monitoring Well Designation; Ground water elevation, feet above mean sea level (msl); TPHg, TPHd, and benzene concentrations in parts per billion (ppb)
- 0.004 — Approximate ground water flow direction and gradient
- Fence

DAMON SLOUGH

EDGEWATER DRIVE

SAN LEANDRO BAY

MW-4 / 1.64 / NS / NS / NS

MW-3 / NSV / NS / NS / NS

MW-2 / 3.10 / NS / NS / NS

MW-10 / 3.02 / <50 / <50 / <0.5

MW-1 / 4.56 / NS / NS / NS

MW-5 / 4.64 / NS / NS / NS

MW-7 / 4.11 / NS / NS / NS

MW-6 / 3.89 / SPH / SPH / SPH

MW-9 / 2.54 / 700 / <50 / 130

MW-8 / 2.58 / <50 / <50 / 0.9

TBW-1 TBW-2 TBW-3 TBW-4 TBW-5 TBW-6

911 Center

Admin.

Public Works Building

Crafts and Storage

Building No. 5

Active USTs

Former USTs

Former UST

Storage

2.0 2.0 3.0 3.0 4.0 4.0 4.0 4.0 3.0 3.0

0.008 0.004

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		1,200	---	---	780	69	4.1	0.84	8.5	<5.0	---
11/11/98	10.20	5.64	4.56	---		---	---	---	---	---	---	---	---	---	---
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	---	---
05/13/96	10.47	6.32	4.15	8020		---	---	---	---	2.0	<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															
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		330	---	---	<50	4.1	3.4	0.8	2.6	<5.0	<100
11/11/98	10.47	7.37	3.10	---		---	---	---	---	---	---	---	---	---	---
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	---	---	---	---		<50	<500	<50	---	---	---	---	---	---	---
08/19/98	---	4.66	---	---		---	---	---	---	---	---	---	---	---	---
11/11/98	---	5.83	---	---		---	---	---	---	---	---	---	---	---	---
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	---	---
08/19/98	7.89	4.98	2.91	---		---	---	---	---	---	---	---	---	---	---
11/11/98	7.89	6.25	1.64	---		---	---	---	---	---	---	---	---	---	---
MW-5															
12/13/91	11.15	---	---	8020		1,900	---	---	13,000	1,500	190	970	2,500	---	---
12/13/91	11.15	---	---	8020	Dup	---	---	---	16,000	1,400	180	870	2,500	---	---
12/13/91	11.15	---	---	8240		---	---	---	---	1,800	<250	1,000	3,800	---	---
12/13/91	11.15	---	---	8240	Dup	---	---	---	---	1,600	<250	980	3,500	---	---

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															
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	11.15	---	---	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	11.15	---	---	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		---	---	---	---	---	---	---	---	6,700	---
11/11/98	11.15	6.51	4.64	---		---	---	---	---	---	---	---	---	---	---
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	---	---
04/19/95	10.98	---	---	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	10.98	---	---	8020	Dup	2,600	---	---	6,300	420	15	200	600	---	---

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															
11/20/95	10.98	7.89	3.09	8020		850	---	---	6,800	160	4.6	8.0	240	---	---
11/20/95	10.98	---	---	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	10.98	---	---	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	---	---	---	FP	---	---	---	---	---	---	---	---	---	---
11/11/98	10.98	7.09	3.89	---		---	---	---	---	---	---	---	---	---	---
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	---	---
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	---		---	---	---	---	---	---	---	---	---	---

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-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		<50	<250	<50	<50	1.6	3.4	1.0	2.8	<5.0	---
11/11/98	12.22	9.64	2.58	8020		<50	<200	<50	<50	0.9	0.8	0.6	2.3	<5.0	---
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		190	<250	160	740	370	8.6	0.99	7.3	<5.0	---
11/11/98	10.77	8.23	2.54	8020		<50	230	<50	700	130	4.3	<0.5	3.9	<5.0	---
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		240	520	110	<50	<0.5	<0.5	<0.5	<0.5	<5.0	---
11/11/98	10.59	7.57	3.02	8020		<50	<200	<50	<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 ---------->									
TBW-3															
08/19/98	---	2.67	---	8020		810,000	---	---	920	3.2	<0.5	<0.5	0.77	<10	---
08/19/98	---	2.67	---	8260		---	---	---	---	---	---	---	---	<5.0	---
Trip Blank															
08/19/98	---	---	---	8020		---	---	---	<50	<0.5	<0.5	<0.5	<0.5	<5.0	---

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
FP = Free product observed in well
TBW = Tank backfill well

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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.: 9811-288

REPORT of ANALYTICAL RESULTS

Report Date: 03 DEC 1998
Received Date: 12 NOV 1998

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

Project: 153-1247

Sampled by: B.SCHULTZ

Lab Number	Sample Identification	Matrix	Sampled Date/Time
9811288-1	MW-8	AQUEOUS	11 NOV 98 11:58
9811288-2	MW-9	AQUEOUS	11 NOV 98 11:37
9811288-3	MW-10	AQUEOUS	11 NOV 98 11:12

William Svoboda, for
Todd M. Albertson
Project Manager

CAHorn
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.).
'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.: 9811-288

ORGANIC ANALYTICAL RESULTS

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: 9811288-1							
SAMPLE ID: MW-8							
SAMPLED: 11 NOV 98 11:58							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	12.01.98	T980250TPH	1,2
TPH-Extractable, quantitated as diesel	ND	50.	ug/L				
TPH-Extractable, quantitated as Motor Oil	ND	200.	ug/L				
Surrogate o-Terphenyl	61.		%				
Kerosene.Gc	ND	50.	ug/L				
LAB NUMBER: 9811288-1 (continued)							
SAMPLE ID: MW-8							
SAMPLED: 11 NOV 98 11:58							
METHOD: EPA 8015/8020							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX				1			3
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L		11.13.98	T980160TPG	
Benzene	0.9	0.5	ug/L		11.23.98	T980162TPG	
Toluene	0.8	0.5	ug/L		11.23.98	T980162TPG	
Ethylbenzene	0.6	0.5	ug/L		11.23.98	T980162TPG	
Xylenes (Total)	2.3	0.5	ug/L		11.23.98	T980162TPG	
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L		11.23.98	T980162TPG	
Surrogate 4-Bromofluorobenzene [FID]	108.		%		11.13.98	T980160TPG	
Surrogate 4-Bromofluorobenzene [PID]	85.		%		11.23.98	T980162TPG	
LAB NUMBER: 9811288-2							
SAMPLE ID: MW-9							
SAMPLED: 11 NOV 98 11:37							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	12.01.98	T980250TPH	1,2,4
TPH-Extractable, quantitated as diesel	ND	50.	ug/L				
TPH-Extractable, quantitated as Motor Oil	230.	200.	ug/L				

1) Sample Preparation on 11-19-98 using EPA 3510
2) There was a modified silica gel clean up performed on this sample.
3) Sample Preparation on 11-13-98 using EPA 5030
4) 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.: 9811-288

ORGANIC ANALYTICAL RESULTS

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: 9811288-2 (continued)							
SAMPLE ID: MW-9							
SAMPLED: 11 NOV 98 11:37							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS (continued)				1	12.01.98	T980250TPH	
Surrogate o-Terphenyl	56.		%				
Kerosene.Gc	ND	50.	ug/L				
LAB NUMBER: 9811288-2 (continued)							
SAMPLE ID: MW-9							
SAMPLED: 11 NOV 98 11:37							
METHOD: EPA 8015/8020							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX							1
Total Petroleum Hydrocarbons - Gasoline	700.	50.	ug/L	1	11.13.98	T980160TPG	
Benzene	130.	5.	ug/L	10	11.23.98	T980162TPG	
Toluene	4.3	0.5	ug/L	1	11.23.98	T980162TPG	
Ethylbenzene	ND	0.5	ug/L	1	11.23.98	T980162TPG	
Xylenes (Total)	3.9	0.5	ug/L	1	11.23.98	T980162TPG	
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L	1	11.23.98	T980162TPG	
Surrogate 4-Bromofluorobenzene [FID]	103.		%	1	11.13.98	T980160TPG	
Surrogate 4-Bromofluorobenzene [PID]	82.		%	1	11.23.98	T980162TPG	
LAB NUMBER: 9811288-3							
SAMPLE ID: MW-10							
SAMPLED: 11 NOV 98 11:12							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	12.02.98	T980250TPH	2,3
TPH-Extractable, quantitated as diesel	ND	50.	ug/L				
TPH-Extractable, quantitated as Motor Oil	ND	200.	ug/L				
Surrogate o-Terphenyl	58.		%				
Kerosene.Gc	ND	50.	ug/L				

1) Sample Preparation on 11-13-98 using EPA 5030
2) Sample Preparation on 11-19-98 using EPA 3510
3) There was a modified silica gel clean up performed on this sample.

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CERTIFIED ENVIRONMENTAL SERVICES
CALIFORNIA ELAP #1664

LAB ORDER No.: 9811-288

ORGANIC ANALYTICAL RESULTS

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: 9811288-3 (continued)							
SAMPLE ID: MW-10							
SAMPLED: 11 NOV 98 11:12							
METHOD: EPA 8015/8020							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX				1	11.13.98		1
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L			T980160TPG	
Benzene	ND	0.5	ug/L			T980162TPG	
Toluene	ND	0.5	ug/L			T980162TPG	
Ethylbenzene	ND	0.5	ug/L			T980162TPG	
Xylenes (Total)	ND	0.5	ug/L			T980162TPG	
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L			T980162TPG	
Surrogate 4-Bromofluorobenzene [FID]	98.		%			T980160TPG	
Surrogate 4-Bromofluorobenzene [PID]	87.		%			T980162TPG	

1) Sample Preparation on 11-13-98 using EPA 5030

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CERTIFIED ENVIRONMENTAL SERVICES
CALIFORNIA ELAP #1664

LAB ORDER No.: 9811-288

SUPPLEMENTAL QUALITY CONTROL (QC) DATA REPORT

Report Date: 03 DEC 1998
Received Date: 12 NOV 1998

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

Project: 153-1247

QC Batch ID	Method
T980160TPG	8015/8020
T980162TPG	8015/8020
T980250TPH	8015M

William Saxton
Todd M. Albertson
Project Manager

CAHorn
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
CALIFORNIA ELAP #1664

LAB ORDER No.: 9811-288

METHOD BLANK ANALYTICAL RESULTS

ANALYTE	RESULT	R.L.	UNITS	ANALYZED	NOTES
QC BATCH: T980160TPG					
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX				11.13.98	
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L		
Surrogate 4-Bromofluorobenzene [FID]	101.		%		
QC BATCH: T980162TPG					
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX				11.23.98	
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 [PID]	84.		%		
QC BATCH: T980250TPH					
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				12.01.98	1
Diesel Fuel	ND	50.	ug/L		
Motor Oil	ND	200.	ug/L		
Surrogate o-Terphenyl	52.		%		
Kerosene.Gc	ND	50.	ug/L		

1) There was a modified silica gel clean up performed on this sample.

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CALIFORNIA ELAP #1664

LAB ORDER No.: 9811-288

LABORATORY CONTROL SAMPLE ANALYTICAL RESULTS

ANALYTE	SPIKE AMOUNT	SPIKE\DUP RESULT	SPK\DUP %REC	ACCEPTANCE %REC \RPD	REL% DIFF	ANALYZED	NOTES
QC BATCH: T980160TPG							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX						11.13.98	
TPH-Purgeable, quantitated as gasoline	550	556.\	101\	69-117\			
Surrogate 4-Bromofluorobenzene [FID]	20.0	19.4\	97\	75-124\			
QC BATCH: T980162TPG							
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX						11.23.98	
Benzene	6.69	7.32\	109\	82-126\			
Toluene	39.0	36.1\	93\	49-117\			
Surrogate 4-Bromofluorobenzene [PID]	20.0	15.8\	79\	78-111\			
QC BATCH: T980250TPH							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS						12.01.98	1
Diesel Fuel	1000.	597.\	60\	57-122\			
Surrogate o-Terphenyl	100	53.9\	54\	51-109\			

1) There was a modified silica gel clean up performed on this sample.

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CERTIFIED ENVIRONMENTAL SERVICES
CALIFORNIA ELAP #1664

LAB ORDER No.: 9811-288

MATRIX SPIKE ANALYTICAL RESULTS

ANALYTE	ORIGINAL RESULT	SPIKE AMOUNT	SPIKE\DUP RESULT	SPK\DUP %REC	ACCEPTANCE %REC \RPD	REL% DIFF	ANALYZED	NOTES
QC BATCH: T980162TPG								
QC SAMPLE LAB NUMBER: 9811288-3								
TOTAL PURGEABLE PETROLEUM HYDROCARBONS WITH BTEX							11.23.98	
Benzene	ND	6.69	6.39\6.72	96\100	70-143\25	5.0		
Toluene	ND	39.0	36.9\38.3	95\98	27-142\15	3.7		
Surrogate 4-Bromofluorobenzene [PID]	87.%	20.0	16.3\16.6	82\83	54-126\			

M 12/10 K 9811288

CAMBRIA ENVIRONMENTAL TECHNOLOGY, INC.

CHAIN OF CUSTODY

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

Page 1 of 1

Cambria Manager: DCE
Cambria Sampler: Bob Schultz
Client: City of Oakland
Site Address: 7101 Edgewater
Project Number: 153-1247

LAB: Cal Test

SAMPLE ID	DATE	TIME	MATRIX	# OF SAMPLES	ANALYSES: TPHg/BTEX/MTBE	ANALYSES: TPH d, TPH mo, TPHg w/ Silica Gel Clean-up
MW-8	11/11/98	11:58	water	1 l amber 5 voas	X	X
MW-9	↓	11:37	↓	↓	X	X
MW-10	↓	11:12	↓	↓	X	X

Note: If MTBE is detected, pls confirm result w/ analysis by EPA Method 8260.
Please use Silica gel clean-up on all samples.

Relinquished by:	Relinquished by:	Relinquished by:	Relinquished by:
Received by:	Received by:	Received by:	Received by:
Time/Date: 1335 -11-12-98	Time/Date: 1747 11-12-98	Time/Date:	Time/Date:

2.9°C

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ATTACHMENT B

Well Sampling Forms

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WELL DEPTH MEASUREMENTS

Well ID	Time	Product Depth	Water Depth	Product Thickness	Well Depth	Comments
MW-8	945	–	9.64	–		
MW-9	953	–	8.23	–	13.81	
MW-10	1001	–	7.57	–	13.90	
MW-3	1011	–	5.83	–		odor from well -stinky decomposition - wetlands area
MW-4	1014	–	6.25	–		
MW-2	9:55	–	7.37	–		
MW-1	10:05	–	5.64	–		
MW-6	10:10	7.05	7.10	0.05'		All well vaults
MW-7	10:15	–	7.40	–		in good condition.
MW-5	10:25	–	6.51	–		

Measured By: John Riggi / Schultz

Date: 11/11/98

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WELL SAMPLING FORM

Project Name: C of O	Cambria Mgr: DCE	Well ID: MW-8
Project Number: 153-1247	Date: 11/11/98	Well Yield: /
Site Address: 7101 Edgewater Dr. Oakland CA	Sampling Method: disp bailer	Well Diameter: 2"
		Technician(s): JR/RS
Initial Depth to Water: 9.64	Total Well Depth: 15.40	Water Column Height: 5.76
Volume/ft: 0.16	1 Casing Volume: .92	3 Casing Volumes: 2.8
Purging Device: sub pump	Did Well Dewater?: /	Total Gallons Purged: 2.8
Start Purge Time: 1152	Stop Purge Time: 1157	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

Time	Casing Volume	Temp. °C	pH	Cond. mS	Comments
1152	1	18.2	7.2	>2000	36 mV
1153	2	18.4	7.0	>2000	22 mV
1156	3	18.4	7.0	>2000	-2 mV

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-8	11.11.98	1158	5 VOA's 1 Amb.	HCl/none	TPH-g BTEX, MTBE TPH-d	

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WELL SAMPLING FORM

Project Name: C.o.F.O	Cambria Mgr: DCS	Well ID: MW-9
Project Number: 153-1247	Date: 11/11/93	Well Yield: /
Site Address: 7101 Edgewater Dr. Oakland CH.F.	Sampling Method: disp. bailer	Well Diameter: 2"
		Technician(s): RS/JR
Initial Depth to Water: 8.23	Total Well Depth: 13.81	Water Column Height: 5.58
Volume/ft: 0.16	1 Casing Volume: 0.89 gals	3 Casing Volumes: 2.7 gals
Purging Device: sub pump	Did Well Dewater?: No	Total Gallons Purged: 3.0 gals
Start Purge Time: 11:25 am	Stop Purge Time: 11:35	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

Time	Casing Volume	Temp.	pH	Cond.	Comments
					mV
11:30		18.1°C	7.0	≥2000 µS	-089
11:32		18.7	6.9	≥2000 µS	-088
11:34		18.2°C	7.1	>2000 µS	-090

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-9	11/11	11:34	1l / Voa	— / HCl	TPH multi / TPHg/BTEX/MTBE	8015/8020

CAMBRIA

WELL SAMPLING FORM

Project Name: City of Oakland	Cambria Mgr: DCE	Well ID: MW-10
Project Number: 153-1247	Date: 11-11-98	Well Yield:
Site Address: 7101 Edgewater Dr. Oakland	Sampling Method: disp. bailer	Well Diameter: 2"
		Technician(s): JR/BS
Initial Depth to Water: 7.57	Total Well Depth: 13.90	Water Column Height: 6.33
Volume/ft: 0.16	1 Casing Volume: 1.00	3 Casing Volumes: 3.00
Purging Device: Sub pump	Did Well Dewater?: No	Total Gallons Purged: 3
Start Purge Time: 11:00	Stop Purge Time: 1105	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

Time	Casing Volume	Temp. °C	pH	Cond.	Comments
1100	1	17.2	7.4	>2000	→ -99 mV
1104	2	18.4	7.3	>2000	→ -105 mV
1105	3	18.4	7.4	>2000	→ -83 mV.

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-10	11-11-98	1112	5 VOA's 1 Amb.	HCl / None	TPH-g, BTEX, MTBE TPH-d	—

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ATTACHMENT C

Standard Field Procedures for Monitoring Wells

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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 analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.