

C A M B R I A

ENVIRONMENTAL
PROTECTION

99 JAN 22 PM 3:02

January 19, 1999

Mr. Barney Chan
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Re: **Fourth Quarter 1998 Monitoring Report**
Former Exxon Service Station
3055 35th Avenue
Oakland, California
Cambria Project #130-0105-108



Dear Mr. Chan:

On behalf of Mr. Lynn Worthington of Golden Empire Properties, Cambria Environmental Technology, Inc., (Cambria) has prepared this fourth quarter 1998 ground water monitoring report for the site referenced above. Presented below are the results from fourth quarter 1998 activities and the anticipated first quarter 1999 activities.

FOURTH QUARTER 1998 ACTIVITIES

Ground Water Monitoring: On December 8, 1998, Cambria collected ground water samples from wells MW-1, MW-2, MW-3, and MW-4 (Figure 1). The samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg), total petroleum hydrocarbons as diesel (TPHd), benzene, toluene, ethylbenzene and xylenes (BTEX), and methyl tert-butyl ether (MTBE). Cambria also gauged the site wells and inspected the wells for separate-phase hydrocarbons (SPH).

Ground Water Flow Direction

Depth-to-water measurements collected on December 8, 1998, indicated a ground water gradient of 0.007 ft/ft toward the northwest (Figure 1). Since 1994, the primary ground water flow direction has been toward the northwest with a change toward the southwest usually occurring during the fourth quarter. Ground water elevation data are presented in Table 1.

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

**Cambria
Environmental
Technology, Inc.**

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

Hydrocarbon Distribution in Ground Water

No SPH were detected in any of the monitoring wells. TPHd concentrations ranged from 3,100 parts per billion (ppb) in MW-2 to 4,200 ppb in MW-3. Benzene concentrations ranged from 3,000 ppb in MW-1 to a maximum concentration of 9,200 ppb in MW-2. Benzene concentrations significantly decreased in wells MW-1, MW-3, and MW-4 since the third quarter sampling event. This may be due to a reversal in ground water flow direction. The analytical report and field data sheets are included as Attachment A.



ANTICIPATED FIRST QUARTER 1999 ACTIVITIES

Ground Water Monitoring: Cambria will gauge the site wells, measure DO concentrations, check the wells for SPH, and collect water samples from the wells. Cambria will tabulate the data and incorporate the results into a ground water monitoring report.


Corrective Action: Cambria is designing a Dual-Phase Vacuum Extraction remediation system and preparing a bid package for the construction of this system. System design will involve identification of electrical and sewer utilities and determination of proper permits required for system operation. Preparation of a bid package for system construction will begin once the system design has been finalized.


Barney Chan
January 19, 1999

CLOSING

If you have any questions or comments regarding this report or anticipated site activities, please call Bob Clark-Riddell at (510) 420-3303.

Sincerely,
Cambria Environmental Technology, Inc.


John A. Riggi
Senior Staff Geologist


Bob Clark-Riddell, P.E.
Principal Engineer



Attachments: Figure 1- Ground Water Elevation Contours

 Table 1- Ground Water Elevation and Analytical Data

 Attachment A - Analytical Report and Field Data Sheets

cc: Mr. Lynn Worthington, Golden Empire Properties, Inc.
 5942 MacArthur Boulevard, Suite B, Oakland, CA 94605

H:\SB-2004\Oakl-002 - Lynn\qm\Qm-4-98.wpd

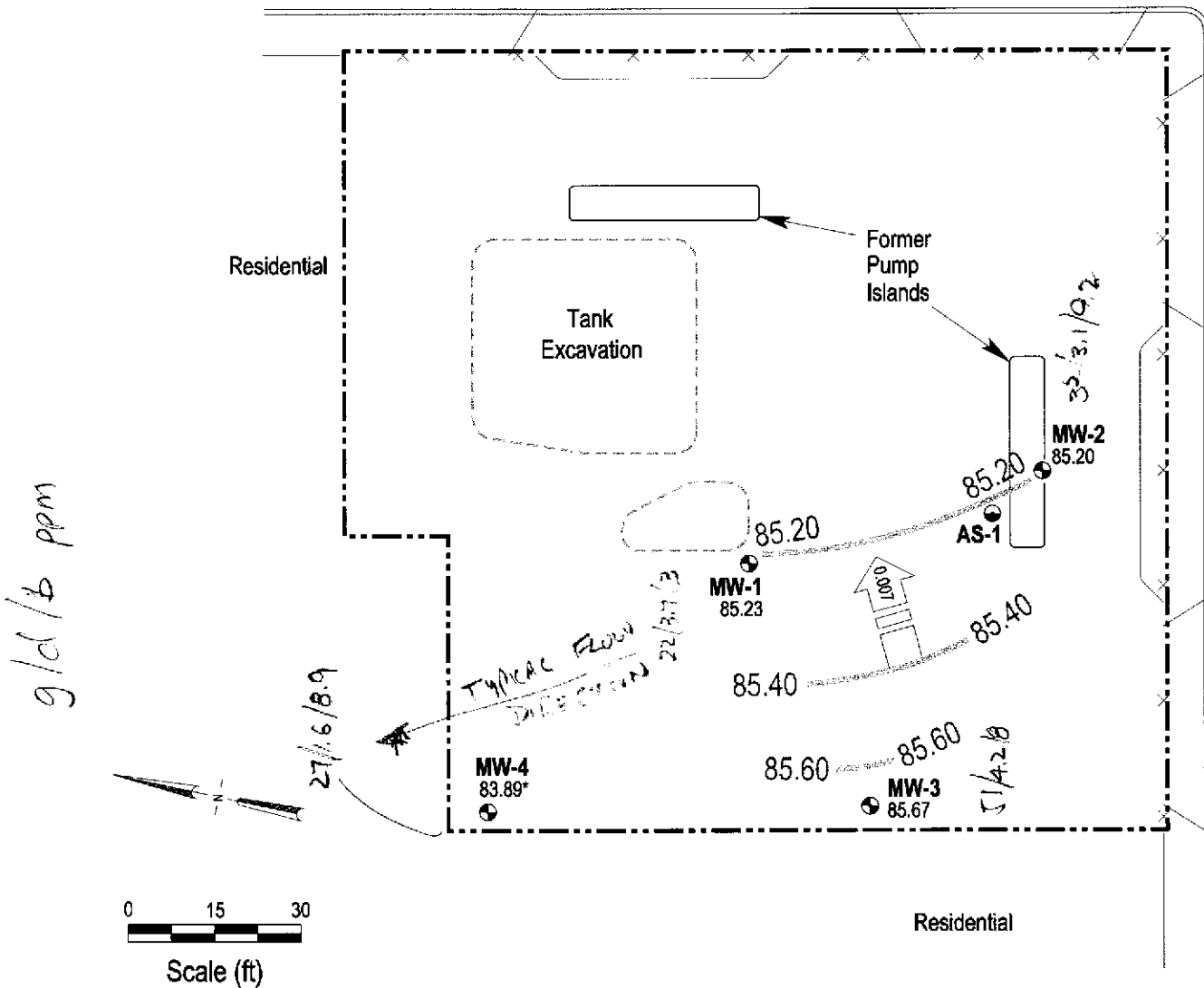
EXPLANATION

- MW-1** ● Monitoring well location
- 80.95 Ground water elevation (ft)
- AS-1** ● Air Sparging well location
- * Ground water elevation anomalous, not used for contouring
- Ground water elevation contour; dashed where inferred
- ← 0.007 Estimated ground water flow direction and gradient (ft./ft.)

Former
Texaco
Station

SCHOOL STREET

35th AVENUE



FIGURE

1

Worthington

3055 35th Avenue

Oakland, California



Ground Water Elevation Contours

C A M B R I A

December 8, 1998

H:\88-2004\CAK-002\FIGURES\1\CM88-MP.DWG

CAMBRIA

Table 1. Ground Water Elevation and Analytical Data - Former Exxon Service Station, 3055 35th Avenue, Oakland, California

Well ID	Date	GW Depth (ft)	SPH (ft)	GW Elev. (ft)	TPHg	TPHd	TPHmo	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	DO (mg/L)
					<----- Concentrations in parts per billion (µg/L) ----->								
<i>MW-1</i>	05/25/94	16.79	Sheen	84.06	120,000	25,000	<50,000	22,000	17,000	2,800	16,000	---	---
<i>TOC = 100.85</i>	07/19/94	20.77	---	80.08	---	---	---	---	---	---	---	---	---
	08/18/94	21.04	Sheen	79.81	925,000	---	---	16,500	6,200	1,000	9,400	---	---
	11/11/94	15.80	---	85.05	57,000	---	---	14,000	4,400	1,400	6,400	---	---
	02/27/95	15.53	---	85.32	45,000	---	---	2,900	2,500	760	4,100	---	---
	05/23/95	15.29	---	85.56	22,000	---	---	9,900	990	790	2,000	---	---
	08/22/95	20.90	---	79.95	23,000	---	---	6,900	340	1,200	1,900	---	---
	11/29/95	22.19	---	78.66	37,000	---	---	9,900	530	1,600	2,900	---	---
	02/21/96	11.69	---	89.16	33,000	4,300	---	10,000	480	1,000	1,800	3,300	---
	05/21/96	14.62	---	86.23	36,000	8,500	---	8,500	1,400	1,300	2,800	1,900	---
	08/22/96	22.30	---	78.55	41,000	6,200	---	8,600	1,300	1,500	2,900	<200	8.0
TOTAL TPH 44	11/27/96	17.24	Sheen	83.61	<u>38,000</u>	<u>6,100</u>	---	9,600	950	1,600	3,100	<400	5.6
	03/20/97	16.65	---	84.20	33,000	10,000	---	6,100	560	970	2,200	<400	8.5
	06/25/97	19.77	---	81.08	31,000	7,400 ^a	---	7,400	440	890	1,800	<400	3.7
	09/17/97	20.12	---	80.73	32,000 ^d	3,500 ^e	---	9,100	550	1,000	2,000	<1,000	2.1
34	12/22/97	12.95	---	87.90	26,000 ^d	5,800 ^e	---	7,900	370	920	1,500	<790	0.7
	03/18/98	12.34	Sheen	88.51	<u>30,000^d</u>	<u>4,200^{e,f}</u>	---	7,800	820	840	2,000	<1,100	1.3
	07/14/98	17.34	---	83.51	41,000 ^d	8,900 ^{e,f}	---	8,200	1,100	1,200	3,000	<200	1.8
	09/30/98	19.90	---	80.95	37,000	3,300	---	11,000	950	1,200	2,800	<20	2.0
	12/08/98	15.62	---	85.23	22,000	3,700	---	3,000	1,200	730	3,100	<900	---
<i>MW-2</i>	05/25/94	15.65	---	84.35	61,000	6,900	<5,000	9,900	7,400	960	4,600	---	---
<i>TOC = 100.00</i>	07/19/94	19.81	---	80.19	---	---	---	---	---	---	---	---	---
	08/18/94	20.37	---	79.63	88,000	---	---	10,750	10,500	1,850	9,600	---	---
	11/11/94	15.52	---	84.48	54,000	---	---	5,900	6,700	1,300	7,500	---	---
	02/27/95	14.46	Sheen	85.54	44,000	---	---	5,100	5,300	930	6,400	---	---
	05/23/95	14.17	---	85.83	33,000	---	---	8,200	5,600	900	6,600	---	---
	08/22/95	19.80	---	80.20	38,000	---	---	6,400	5,000	1,100	5,600	---	---
	11/29/95	21.05	---	78.95	46,000	---	---	7,100	5,300	1,300	6,000	---	---
	02/21/96	10.53	---	89.47	59,000	---	---	8,000	6,000	1,800	8,900	4,500	---
	05/21/96	13.47	---	86.53	51,000	3,400	---	8,200	5,200	1,300	6,600	2,400	---
	08/22/96	19.12	---	80.88	37,000	5,700	---	5,100	3,500	960	4,500	<200	3.0
	11/27/96	16.61	Sheen	83.39	54,000	10,000	---	9,800	7,000	1,800	7,900	<2,000	3.1
	03/20/97	15.39	---	84.61	27,000	6,100	---	3,700	2,300	580	2,800	<400	8.1
	06/25/97	18.62	---	81.38	42,000	7,800 ^b	---	7,400	3,800	1,200	5,700	<200	0.9

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Table 1. Ground Water Elevation and Analytical Data - Former Exxon Service Station, 3055 35th Avenue, Oakland, California

Well ID	Date	GW	SPH	GW	TPHg	TPHd	TPHmo	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	DO
		Depth (ft)	(ft)	Elev. (ft)	Concentrations in parts per billion (µg/L)								
	09/17/97	19.05	Sheen	80.95	41,000 ^d	8,900 ^e	---	5,200	3,400	1,300	5,900	<700	1.2
	12/22/97	14.09	---	85.91	47,000 ^d	6,100 ^e	---	8,500	4,600	1,800	8,400	<1,200	1.2
	03/18/98	10.83	Sheen	89.17	58,000 ^d	7,000 ^{e,f}	---	9,300	6,100	1,800	8,200	<1,100	1.1
	07/14/98	16.07	---	83.93	42,000 ^d	5,300 ^{e,f}	---	6,000	3,000	1,000	4,800	<200	1.5
	09/30/98	18.71	---	81.29	22,000	2,400	---	3,600	1,300	720	3,200	<30	1.8
	12/08/98	14.80	---	85.20	32,000	3,100	---	9,200	680	1,100	2,300	<2,000	---
MW-3	05/25/94	13.93	Sheen	82.94	56,000	14,000	<50,000	14,000	14,000	1,300	11,000	---	---
TOC = 96.87	07/19/94	17.04	---	79.83	---	---	---	---	---	---	---	---	---
	08/18/94	17.75	---	79.12	116,000	---	---	28,300	26,000	2,400	15,000	---	---
	11/11/94	17.80	---	79.07	89,000	---	---	1,600	1,900	1,900	14,000	---	---
	02/27/95	11.86	Sheen	85.01	250,000	---	---	22,000	26,000	7,800	21,000	---	---
	05/23/95	11.60	Sheen	85.27	310,000	---	---	18,000	17,000	4,500	2,800	---	---
	08/22/95	17.10	---	79.77	74,000	---	---	14,000	13,000	1,900	11,000	---	---
	11/29/95	16.34	---	80.53	220,000	---	---	25,000	25,000	3,500	19,000	---	---
	02/21/96	7.92	---	88.95	60,000	---	---	10,000	7,800	1,500	8,800	3,400	---
	05/21/96	10.86	Sheen	86.01	69,000	13,000	---	17,000	9,400	1,700	9,400	2,600	---
	08/22/96	16.50	---	80.37	94,000	16,000	---	17,000	15,000	2,100	12,000	330	2.0
	11/27/96	13.47	Sheen	83.40	82,000	24,000	---	14,000	13,000	2,400	13,000	<1,000	2.4
	03/20/97	12.86	---	84.01	56,000	11,000	---	9,900	6,900	1,300	8,000	3,500	9.0
	06/25/97	15.98	---	80.89	49,000	7,700 ^b	---	9,700	7,100	1,300	7,000	220	5.8
	09/17/97	16.34	Sheen	80.53	78,000 ^d	15,000 ^e	---	11,000	9,900	1,800	10,000	<1,200	0.7
	12/22/97	10.71	Sheen	86.16	49,000 ^d	14,000 ^e	---	7,300	5,300	1,400	7,500	<1,100	3.1
	03/18/98	8.41	Sheen	88.46	120,000 ^d	20,000 ^{e,f}	---	21,000	19,000	2,600	15,000	<1,600	1.6
	07/14/98	13.51	---	83.36	94,000 ^{d,g}	65,000 ^{e,f,g}	---	18,000	14,000	1,900	11,000	<1,400	1.8
	09/30/98	16.14	---	80.73	91,000	9,800	---	17,000	13,000	2,100	12,000	<1300	2.0
	12/08/98	11.20	---	85.67	51,000	4,200	---	8,000	6,800	1,400	7,500	<1,100	---

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Table 1. Ground Water Elevation and Analytical Data - Former Exxon Service Station, 3055 35th Avenue, Oakland, California

Well ID	Date	GW	SPH	GW	TPHg	TPHd	TPHmo	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	DO
		Depth (ft)	(ft)	Elev. (ft)	Concentrations in parts per billion (µg/L)								
MW-4	03/20/97	13.75	---	83.59	47,000	3,100	---	11,000	4,500	1,100	5,200	3,400	8.4
TOC = 97.34	06/25/97	16.15	---	81.19	61,000	5,800 ^b	---	16,000	6,100	1,500	5,900	780 ^c	1.4
	09/17/97	17.10	---	80.24	60,000 ^d	4,400 ^e	---	17,000	4,900	1,500	5,700	<1,500	1.5
	12/22/97	9.21	---	88.13	43,000 ^d	3,100 ^f	---	13,000	3,900	1,100	4,200	<960	3.7
	03/18/98	9.54	---	87.80	58,000 ^d	5,500 ^{e,f}	---	14,000	4,700	1,400	5,700	<1,200	0.8
	07/14/98	14.15	---	83.19	73,000 ^d	2,900 ^{e,f}	---	22,000	7,000	1,800	7,300	<200	1.0
	09/30/98	16.84	---	80.50	39,000	2,100	---	12,000	2,700	1,000	3,400	510	1.1
	12/08/98	13.45	---	83.89	27,000	1,600	---	8,900	1,600	730	2,300	<1,500	---
Trip Blank	07/14/98	---	---	---	<50	<50	---	<0.5	<0.5	<0.5	<0.5	<5.0	---
	09/30/98	---	---	---	<50	<50	---	<0.5	<0.5	<0.5	<0.5	<5.0	---
	12/08/98	---	---	---	<50	---	---	<0.5	<0.5	<0.5	<0.5	<5.0	---

Abbreviations:

TOC = Top of casing elevation relative to an arbitrary datum

GW = Ground water

SPH = Separate-phase hydrocarbons

--- = not observed/not analyzed

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

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

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

Benzene, Ethylbenzene, Toluene, and Xylenes by EPA Method 8020

MTBE = Methyl Tertiary-Butyl Ether by EPA Method 8020

DO = Dissolved oxygen

µg/L = Micrograms per liter, equivalent to parts per billion in water

mg/L = Milligrams per liter, equivalent to parts per million in water

Notes:

a = Result has an atypical pattern for diesel analysis

b = Result appears to be a lighter hydrocarbon than diesel

c = There is a >40% difference between primary and confirmation analysis

d = Unmodified or weakly modified gasoline is significant

e = Gasoline range compounds are significant

f = Diesel range compounds are significant

g = lighter than water immiscible sheen is present

TOC Elevation of Well MW-4 surveyed relative to an arbitrary site datum by David Hop,

Licensed Surveyor on April 19, 1997

ATTACHMENT A

Analytical Report and Field Data Sheets



McCAMPBELL ANALYTICAL INC.

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

Cambria Environmental Technology 1144 65 th Street, Suite C Oakland, CA 94608	Client Project ID: #130-0105; Worthington	Date Sampled: 12/08/98
	Client Contact: John Riggi	Date Received: 12/09/98
	Client P.O:	Date Extracted: 12/10/98
		Date Analyzed: 12/10/98

Volatile Halocarbons

EPA method 601 or 8010

Lab ID	99821			
Client ID	Comp			
Matrix	S			
Compound	Concentration			
Bromodichloromethane	ND			
Bromoform ^(b)	ND			
Bromomethane	ND			
Carbon Tetrachloride ^(c)	ND			
Chlorobenzene	ND			
Chloroethane	ND			
2-Chloroethyl Vinyl Ether ^(d)	ND			
Chloroform ^(e)	ND			
Chloromethane	ND			
Dibromochloromethane	ND			
1,2-Dichlorobenzene	ND			
1,3-Dichlorobenzene	ND			
1,4-Dichlorobenzene	ND			
Dichlorodifluoromethane	ND			
1,1-Dichloroethane	ND			
1,2-Dichloroethane	ND			
1,1-Dichloroethene	ND			
cis 1,2-Dichloroethene	ND			
trans 1,2-Dichloroethene	ND			
1,2-Dichloropropane	ND			
cis 1,3-Dichloropropene	ND			
trans 1,3-Dichloropropene	ND			
Methylene Chloride ^(f)	ND<10			
1,1,2,2-Tetrachloroethane	ND			
Tetrachloroethene	ND<10			
1,1,1-Trichloroethane	ND			
1,1,2-Trichloroethane	ND			
Trichloroethene	ND			
Trichlorofluoromethane	ND			
Vinyl Chloride ^(g)	ND			
% Recovery Surrogate	106			
Comments				

* water and vapor samples and all TCLP & SPLP extracts are reported in ug/L, soil and sludge samples in ug/kg, wipe samples in ug/wipe
 Reporting limit unless otherwise stated: water/TCLP/SPLP extracts, ND<0.5ug/L; soils and sludges, ND<5ug/kg; wipes, ND<0.2ug/wipe
 ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis

(b) tribromomethane; (c) tetrachloromethane; (d) (2-chloroethoxy) ethene; (e) trichloromethane; (f) dichloromethane; (g) chloroethene; (h) a lighter than water immiscible sheen is present; (i) liquid sample that contains greater than ~5 vol. % sediment; (j) sample diluted due to high organic content.

QC REPORT FOR HYDROCARBON ANALYSES

Date: 12/09/98

Matrix: WATER

Analyte	Concentration (mg/L)			Amount Spiked	% Recovery		
	Sample (#99495)	MS	MSD		MS	MSD	RPD
TPH (gas)	0.0	95.7	91.4	100.0	95.7	91.4	4.7
Benzene	0.0	9.5	9.8	10.0	95.0	98.0	3.1
Toluene	0.0	10.0	10.0	10.0	100.0	100.0	0.0
Ethyl Benzene	0.0	10.4	10.3	10.0	104.0	103.0	1.0
Xylenes	0.0	30.9	30.7	30.0	103.0	102.3	0.6
TPH(diesel)	0.0	173	160	150	115	106	7.9
TRPH (oil & grease)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) \times 2 \times 100$$

QC REPORT FOR HYDROCARBON ANALYSES

Date: 12/10/98-12/11/98

Matrix: WATER

Analyte	Concentration (mg/L)			Amount Spiked	% Recovery		RPD
	Sample (#99778)	MS	MSD		MS	MSD	
TPH (gas)	0.0	95.7	91.4	100.0	95.7	91.4	4.7
Benzene	0.0	9.5	9.8	10.0	95.0	98.0	3.1
Toluene	0.0	10.0	10.0	10.0	100.0	100.0	0.0
Ethyl Benzene	0.0	10.4	10.3	10.0	104.0	103.0	1.0
Xylenes	0.0	30.9	30.7	30.0	103.0	102.3	0.6
TPH (diesel)	0.0	161	159	150	108	106	1.6
TRPH (oil & grease)	0	23200	23000	23700	98	97	0.9

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) \times 2 \times 100$$

QC REPORT FOR HYDROCARBON ANALYSES

Date: 12/09/98

Matrix: SOIL

Analyte	Concentration (mg/kg) Sample (#97134)			Amount Spiked	% Recovery		
	MS	MSD			MS	MSD	RPD
TPH (gas)	0.000	2.171	2.099	2.03	107	103	3.4
Benzene	0.000	0.186	0.182	0.2	93	91	2.2
Toluene	0.000	0.200	0.190	0.2	100	95	5.1
Ethylbenzene	0.000	0.192	0.182	0.2	96	91	5.3
Xylenes	0.000	0.594	0.530	0.6	99	88	11.4
TPH(diesel)	0	316	327	300	105	109	3.4
TRPH (oil and grease)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

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

QC REPORT FOR HYDROCARBON ANALYSES

Date: 12/10/98

Matrix: SOIL

Analyte	Concentration (mg/kg) Sample (#97134)			Amount Spiked	% Recovery		
	MS	MSD			MS	MSD	RPD
TPH (gas)	0.000	1.873	2.177	2.03	92	107	15.0
Benzene	0.000	0.170	0.182	0.2	85	91	6.8
Toluene	0.000	0.178	0.198	0.2	89	99	10.6
Ethylbenzene	0.000	0.164	0.190	0.2	82	95	14.7
Xylenes	0.000	0.490	0.588	0.6	82	98	18.2
TPH(diesel)	0	315	315	300	105	105	0.1
TRPH (oil and grease)	0.0	22.7	23.3	20.8	109	112	2.6

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) \times 2 \times 100$$

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553
 Tele: 925-798-1620 Fax: 925-798-1622

QC REPORT FOR EPA 8010/8020/EDB

Date: 12/10/98-12/11/98

Matrix: SOIL

Analyte	Concentration (ug/kg)				% Recovery		
	Sample (#97134)	MS	MSD	Amount Spiked	MS	MSD	RPD
1,1-DCE	0	82	91	100	82	91	10.4
Trichloroethene	0	81	82	100	81	82	1.2
EDB	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chlorobenzene	0	88	89	100	88	89	1.1
Benzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Toluene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chlorobz (PID)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) \times 2 \times 100$$

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 925-798-1620 Fax: 925-798-1622

QC REPORT FOR ICP and/or AA METALS

Date: 12/10/98-12/11/98

Matrix: SOIL

Extraction: TTLC

Analyte	Concentration (mg/kg, mg/L)			Amount Spiked	% Recovery		RPD
	Sample	MS	MSD		MS	MSD	
Total Lead	0.0	4.92	4.95	5.0	98	99	0.6
Total Cadmium	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Chromium	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Nickel	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Zinc	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Copper	N/A	N/A	N/A	N/A	N/A	N/A	N/A
STLC Lead	N/A	N/A	N/A	N/A	N/A	N/A	N/A

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) \times 2 \times 100$$

WELL DEPTH MEASUREMENTS

Well ID	Time	Product Depth	Water Depth	Product Thickness	Well Depth	Comments
MW-2	11:32		14.8		27.35	
MW-1	11:37		15.62		27.2	
MW-3	11:40		11.2		24.92	
MW-4	11:47		13.95		30.	

Measured By: K. McDonald

Date: 12-8-98

WELL SAMPLING FORM

Project Name: Worthington	Cambria Mgr: RAS	Well ID: MW-1
Project Number: 130-0105	Date: 12-8-98	Well Yield:
Site Address: 3055 35th Street Oakland, CA	Sampling Method: Disposable bailers	Well Diameter: 2" pvc
		Technician(s): K. McDaniel
Initial Depth to Water: 15.62	Total Well Depth: 27.2	Water Column Height: 11.58
Volume/ft: 0.16	1 Casing Volume: 1.85	⁴ / ₅ Casing Volumes: 7
Purging Device: 'BAUER'	Did Well Dewater?: No	Total Gallons Purged: 75M
Start Purge Time: 12:40	Stop Purge Time: 1:00	Total Time: 18 MIN

1 Casing Volume = Water column height x Volume/ft. DO = Mg/L

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

Time	Casing Volume	Temp.	pH	Cond.	Comments
12:42	1.8	16.8	7.0	1152	
12:48	↓	15.2	6.8	1198	
12:54	↓	15.6	6.8	1164	
1:00	↓	15.2	6.8	1246	

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-1	12-8-98	2:10	4 VOA's	HCL	TPHg, BTEX, MTBE TPHd	8015/8020
↓	↓	↓	↓	↓		
			1 comb			

WELL SAMPLING FORM

Project Name: Worthington	Cambria Mgr: RAS	Well ID: NW-2
Project Number: 130-0105	Date: 12-8-98	Well Yield:
Site Address: 3055 35th Street Oakland, CA	Sampling Method: Disposable bailers	Well Diameter: 2" pvc
		Technician(s): K. McDonald
Initial Depth to Water: 14.8	Total Well Depth: 27.35	Water Column Height: 12.5
Volume/ft: 0.16	1 Casing Volume: 2.0	Casing Volumes: 8
Purging Device: Bailer	Did Well Dewater?: No	Total Gallons Purged: 89 gal.
Start Purge Time: 12:15	Stop Purge Time: 12:40	Total Time: 25 min

1 Casing Volume = Water column height x Volume/ ft. DO = Mg/L

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

Time	Casing Volume	Temp.	pH	Cond.	Comments
12:15	2.0	17.3	7.7	1160	
12:23	↓	16.1	7.3	876	
12:30	↓	17.3	7.2	1213	
12:37	↓	16.2	7.1	1214	

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-2	12-8	200	4 VOA's	HCL	TPHg, BTEX, MTBE TPHd	8015/8020
↓	↓	↓	↓	↓		

WELL SAMPLING FORM

Project Name: Worthington	Cambria Mgr: RAS	Well ID: MW-13
Project Number: 130-0105	Date: 12-8-98	Well Yield:
Site Address: 3055 35th Street Oakland, CA	Sampling Method: Disposable bailers	Well Diameter: 2" pvc
		Technician(s): K. McDaniel
Initial Depth to Water: 11.2	Total Well Depth: 24.92	Water Column Height: 13.72
Volume/ft: 0.16	1 Casing Volume: 2.20	Casing Volumes: 8
Purging Device: Bailers	Did Well Dewater?: N/O	Total Gallons Purged: 8 GAL.
Start Purge Time: 1:05	Stop Purge Time: 1:20	Total Time: 15 min

1 Casing Volume = Water column height x Volume/ft. DO = Mg/L

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

Time	Casing Volume	Temp.	pH	Cond.	Comments
1:05	2.2	16.1	6.8	1827	
1:12	↓	17.6	6.8	1840	
1:18		16.6	6.8	1850	
1:20		17.8	6.8	1801	

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-5	12-8	2:20	VOA's	HCL	TPHg, BTEX, MTBE TPHd	8015/8020

WELL SAMPLING FORM

Project Name: Worthington	Cambria Mgr: RAS	Well ID: MW-4
Project Number: 130-0105	Date: 12-8-98	Well Yield:
Site Address: 3055 35th Street Oakland, CA	Sampling Method: Disposable bailers	Well Diameter: 2" pvc
		Technician(s): K.M.D.-J
Initial Depth to Water: 13.45	Total Well Depth: 30	Water Column Height: 16.60
Volume/ft: 0.16	1 Casing Volume: 2.66	2 Casing Volumes: 10
Purging Device: Baz/ERD	Did Well Dewater?: No	Total Gallons Purged: 10 gal
Start Purge Time: 1:25	Stop Purge Time: 1:50	Total Time: 30 MIN

1 Casing Volume = Water column height x Volume/ ft. DO = Mg/L

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

Time	Casing Volume	Temp.	pH	Cond.	Comments
1:25	2.6	15.9	6.7	1118	
1:32	↓	16.4	6.7	1146	
1:40	↓	15.8	6.8	1147	
1:45	↓	15.8	6.8	1098	

Sample ID	Date	Time	Container Type	Preservative	Analytes	Analytic Method
MW-4	12-8	230	4 VOA's	HCL	TPHg, BTEX, MTBE TPHd	8015/8020
↓	↓	↓	↓			
↓	↓	↓	↓			
↓	↓	↓	1 hour			