Aquatic & Environmental Applications

October 11, 1999

REF: 1004-3Q.99

Mr. Barney Chan
Environmental Health
Alameda County
1131 Harbor Bay Pkwy
Alameda, CA 94502-6577

SUBJECT: QUARTERLY MONITORING REPORT MOTOR PARTNERS, 1234 40TH AVE., OAKLAND, CA

Dear Barney:

We have enclosed a copy of the Quarterly Monitoring report prepared for the Motor Partners site, 1234 40th Ave., Oakland, California. Groundwater sampling results are presented for the 3rd quarterly monitoring event in 1999.

The five monitoring wells at the site were sampled on September 23, 1999 for the third quarter in 1999. As requested in your letter dated April 7, 1999, the ORC filter socks were removed from the wells prior to purging and sampling. All five wells were purged before sampling.

The results showed hydrocarbon contamination and/or BTEX contamination in groundwater samples from four of the five wells. However, TPH and BTEX contamination may now be low enough for the site to be considered a low risk groundwater site. It is recommended that a Tier 2 risk assessment be completed prior to the next quarterly monitoring event.

If you have any questions or comments regarding the report, please give me a call.

Sincerely,

Gary Rogers

Gary Rogers, Ph.D.

cc: Bill Owens

38053 Davy Ct. ❖ Fremont, CA 94536 ❖ 510-791-7157 ❖ E-mail: rogers1@ix.netcom.com

QUARTERLY MONITORING REPORT
3rd Quarter, 1999

PROJECT SITE:

MOTOR PARTNERS
1234 40TH AVE., OAKLAND, CALIFORNIA
StID #3682

PREPARED FOR:

Mr. Bill Owens
2221 Olympic Blvd.
Walnut Creek, CA 94595
510-935-3840

SUBMITTED TO:

Mr. Barney Chan
Environmental Health
Alameda County
1131 Harbor Bay Pkwy
Alameda, CA 94502-6577

PREPARED BY:

Gary Rogers, Ph.D.
Aquatic & Environmental Applications
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PROJECT NO. 1004.95

October 11, 1999

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INTRODUCTION

PROJECT DESCRIPTION

This report discusses the results of quarterly sampling for the third quarter in 1999 at the Motor Partners site, 1234 40th Ave., Oakland, California.

SITE LOCATION AND DESCRIPTION

The project site known as Motor Partners, 1234 40th Avenue, Oakland, California (Figure 1), is located in a commercial/light industrial area. The elevation of the site is approximately 30 feet above mean sea level.

Motor Partners is located near Nimitz Highway (880) in the Fruitvale District of Oakland, California (Figure 1). The BART rail tracks are about 500 feet west of the site and San Leandro Bay is less than one mile to the southwest.

Motor Partners utilized the site for auto repair shops. Two underground storage tanks were maintained outside the building. A 1,000-gallon underground gasoline tank and a 500-gallon underground waste oil tank were located below the sidewalk (Figure 2). No reliable records exist to determine if inventory was lost.

PREVIOUS SUBSURFACE INVESTIGATIONS

On Oct. 12, 1990, Semco, Inc. of Modesto, California removed both the 1,000-gallon gasoline tank and the 500-gallon waste oil tank. The concentration of total petroleum hydrocarbons in the gasoline range (TPH-G) below the 1,000-gallon tank was 1,600 mg/Kg. The TPH-G and TPH-D concentrations below the 500-gallon tank were 570 mg/Kg and 650 mg/Kg, respectively. There was no record of groundwater in the excavations. The excavations were backfilled to grade with original spoils.

In January, 1994, SEMCO re-excavated the area to remove contaminated soil, and dispose of the contaminated backfill. During the course of over excavation, it was noted that contamination extended beneath the building and into the street. Utilities prevented further excavation. The over excavation was halted and samples taken from the sidewalls of each excavation. An extraction well casing was installed in each excavation. Clean imported soil was used to backfill the two areas and the sidewalk was resurfaced with Christy boxes housing the two extraction casings.

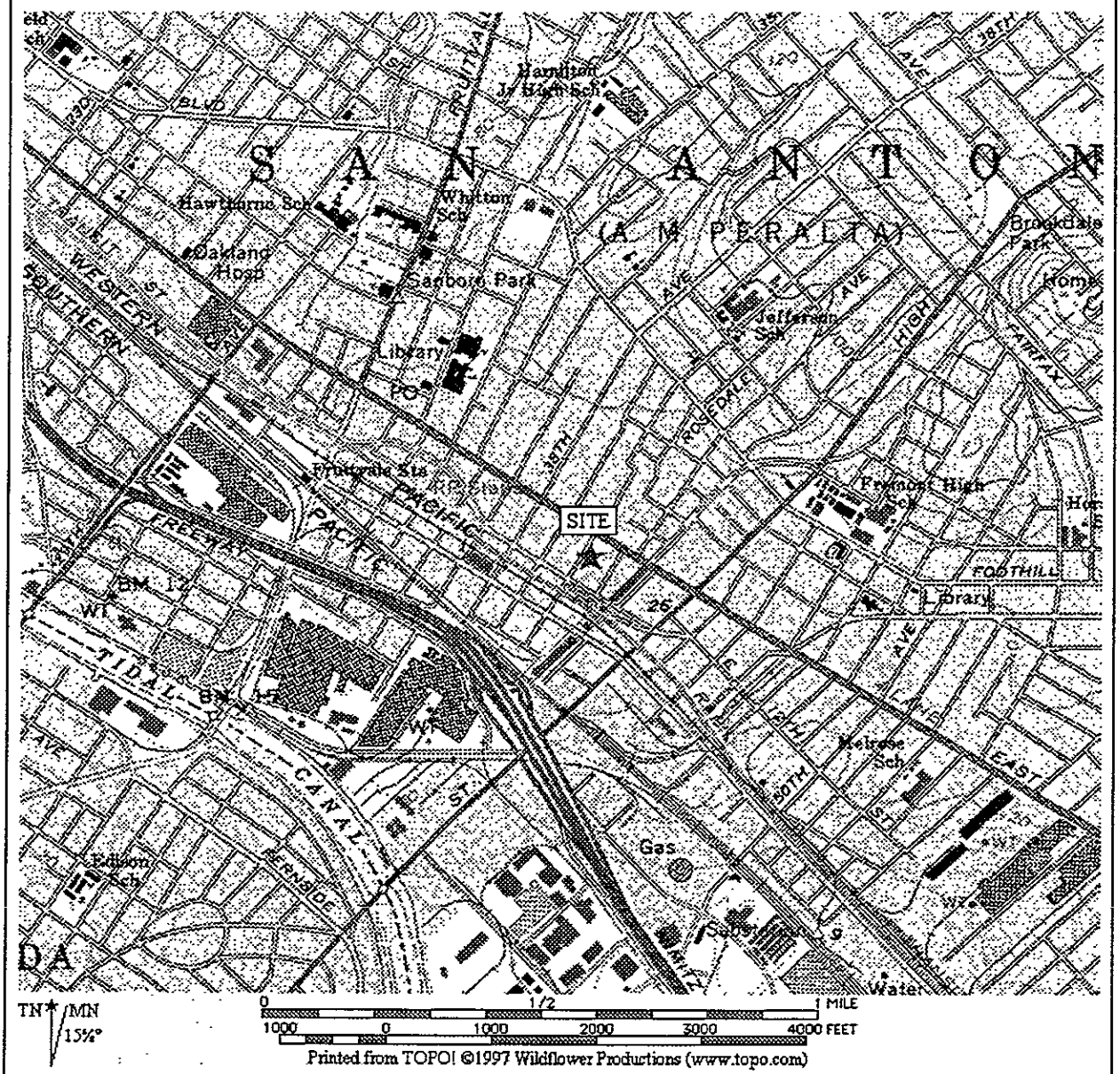
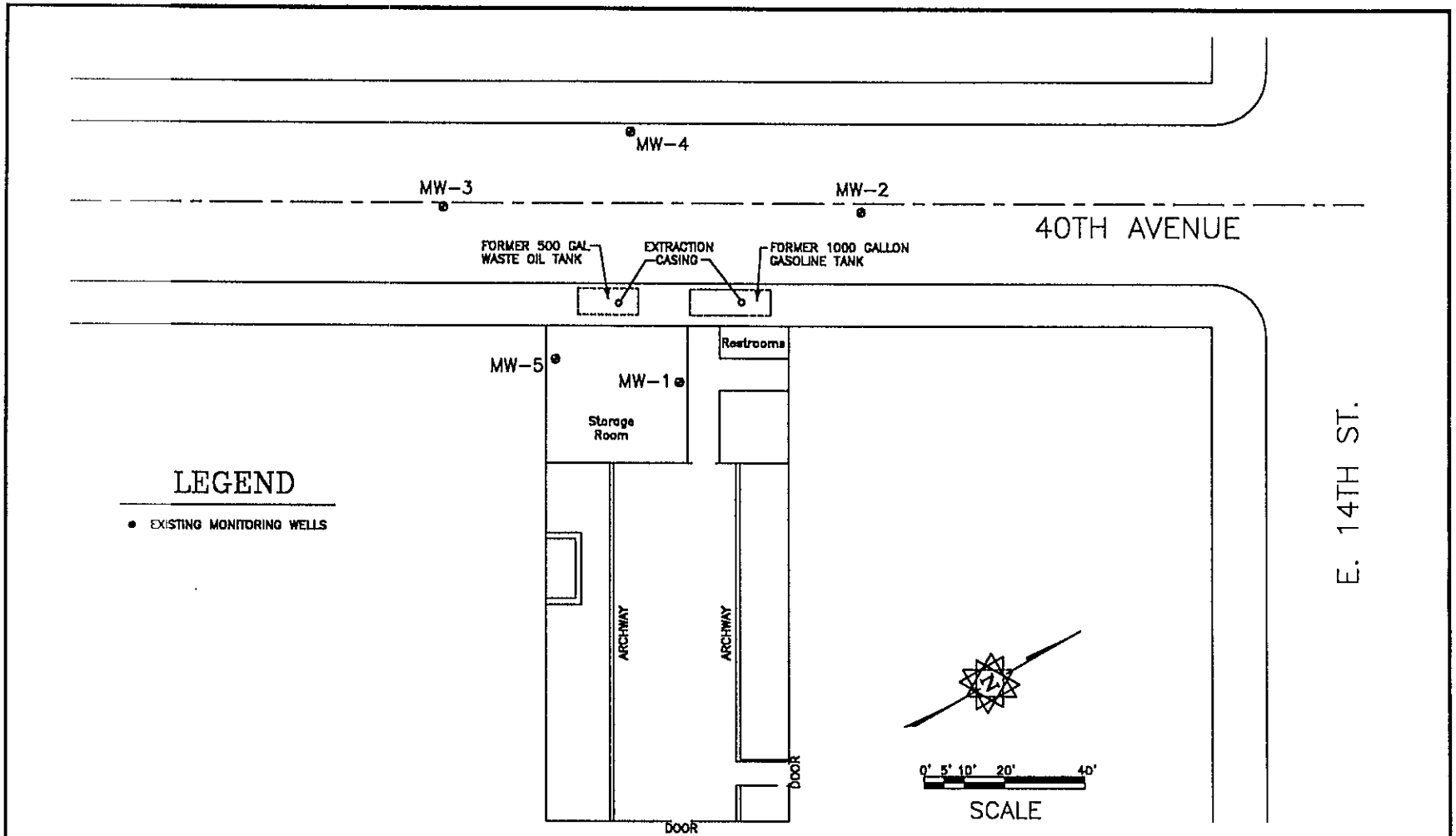


Figure 1. Site Location Map



AQUATIC & ENVIRONMENTAL APPLICATIONS 38053 DAVY CT. FREMONT, CA 94536 (510) 791-7157	DRAWN BY: GLR	PROJECT NUMBER: 1004	DESCRIPTION: Site Layout	FIGURE: 2
	DRAWING DATE: 9/29/99	FILE NAME: 1004-399.DWG		
	REVISION BY:	PROJECT MANAGER: GLR	PROJECT/LOCATION: Motor Partners 1234 40th Ave., Oakland	
	REVISION BY:	CHECKED BY:		

Sampling conducted on January 11, 1994 indicated levels of TPH-gasoline for the former waste oil tank area between 100 and 700 ppm. Levels of TPH-gasoline for the former gasoline tank area ranged from 150 to 1,200 ppm.

GROWTH Environmental completed soil borings at the property between May and June of 1994. Eleven borings were drilled and three monitoring wells were installed. Both soil and groundwater samples were collected from the borings. Soil and groundwater contamination was found in nearly every boring. Levels of TPH-D up to 2,700 ppm were observed on the west side of the building. A sample from inside the building had a TPH-D level of 520 ppm.

Groundwater samples had highest concentrations near the former tank excavations. The highest level of TPH-G was 64,000 ppb. BTEX compounds were found in groundwater samples from all the borings.

The monitoring wells were sampled on June 17, 1994 and December 7, 1994. Contamination was reported in all three wells. Levels of TPH-G were up to 17,000 ppb and Benzene levels were up to 1,200 ppb in MW-1.

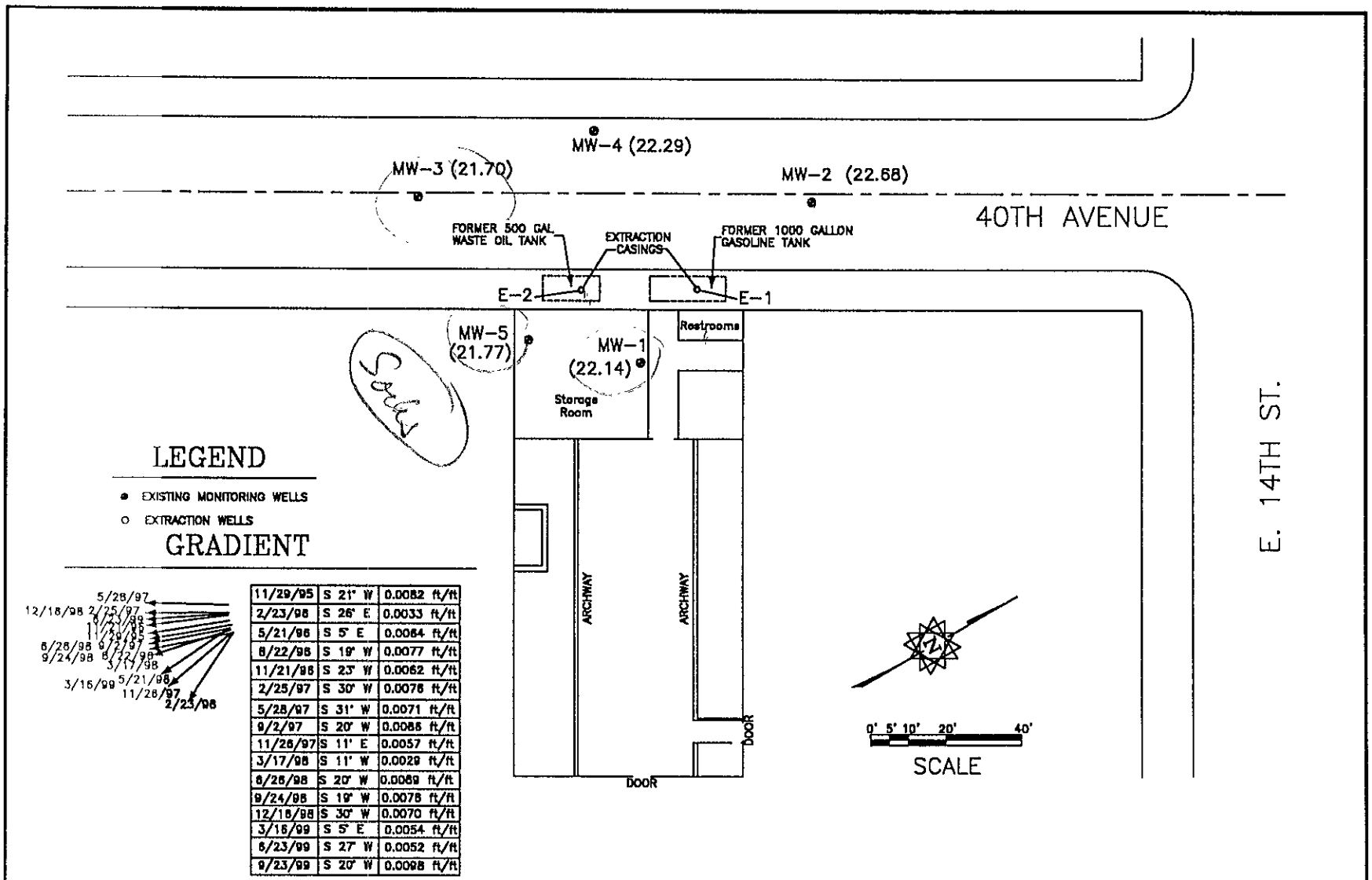
A quarterly monitoring sampling event was completed on November 29, 1995. All of the wells showed increased TPH-G and BTEX levels when compared to the previous sampling event. TPH-G levels were up to 67,000 ppb in MW-1. The groundwater gradient was calculated to be in a southwesterly direction.

Additional geoprobe borings were completed along 40th Avenue between November, 1995 and February, 1996 to determine the extent of contamination.

On February 1, 1996, Bay Area Exploration drilled a soil boring across the street from the former underground storage tank excavations at the Motor Partners site (location shown in Figure 3). A two-inch groundwater monitoring well (MW-4) was installed in the boring. The monitoring well was installed according to State of California Water Resource Control Board standards to a depth of 25 feet below grade surface (bgs) and screened from 5 to 25 feet bgs.

On February 11, 1998, HK2, Inc./SEMCO drilled a soil boring inside the building and down gradient from the former underground storage tank excavations (location shown in Figure 3). A two-inch groundwater monitoring well (MW-5) was installed in the boring. The monitoring well was installed to a depth of 21 feet below grade surface (bgs) and screened from 6 to 21 feet bgs.

After purging and sampling the wells on September 24, 1998, Aquatic & Environmental Applications implemented a program of enhanced natural attenuation at the site by installing Oxygen Release Compound (ORC®) filter packs in three of the five wells. Monitoring of microbiological and chemical parameters is on-going at the site.



11/29/95	S 21° W	0.0082 ft/ft
2/23/96	S 26° E	0.0033 ft/ft
5/21/96	S 5° E	0.0064 ft/ft
8/22/96	S 19° W	0.0077 ft/ft
11/21/96	S 23° W	0.0062 ft/ft
2/25/97	S 30° W	0.0076 ft/ft
5/28/97	S 31° W	0.0071 ft/ft
8/2/97	S 20° W	0.0085 ft/ft
11/26/97	S 11° E	0.0057 ft/ft
3/17/98	S 11° W	0.0029 ft/ft
6/26/98	S 20° W	0.0089 ft/ft
9/24/98	S 19° W	0.0078 ft/ft
12/16/98	S 30° W	0.0070 ft/ft
3/16/99	S 5° E	0.0054 ft/ft
6/23/99	S 27° W	0.0052 ft/ft
9/23/99	S 20° W	0.0098 ft/ft

AQUATIC & ENVIRONMENTAL APPLICATIONS
38053 DAVY CT.
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DRAWN BY: GLR	PROJECT NUMBER: 1004	DESCRIPTION: Ground Water Gradient	FIGURE: 3
DRAWING DATE: 9/29/99	FILE NAME: 1004-399.DWG		
REVISION BY:	PROJECT MANAGER: GLR	PROJECT/LOCATION: Motor Partners 1234 40th Ave., Oakland	
REVISION BY:	CHECKED BY:		

GEOLOGY AND HYDROGEOLOGY

REGIONAL GEOLOGY

The site is located on the East Bay Plain about 1.0 mile west of the Oakland Hills, about 1.0 mile east of the San Francisco Bay, and about 0.5 miles north of San Leandro Bay. The nearest cross street is 14th Street.

The site rests on Quaternary Deposits of various physical and compositional properties. The predominant formation is the Temescal Formation consisting of contemporaneous alluvial units of different origin, lithology, and physical properties. The material ranges from irregularly bedded clay, silt, sand and gravel to lenses of clay, silt, sand, and gravel with Claremont Chert.

The Hayward Fault is approximately 1.5 miles East of the site and is an active historic Fault. The Hayward Fault is the only active fault in the Oakland East Quadrangle.

REGIONAL HYDROGEOLOGY

The site is located within the East Bay Plain which makes up the ground water reservoir in the area. The water bearing capacity varies within the area due to the juxtaposed positions of the various types of soils and strata encountered underneath the East Bay Plain.

In general, the water bearing capacities of the Younger Alluvium range from moderately permeable to low permeable soils. Below the Younger Alluvium at a depth of approximately 70 feet lies the Older Alluvium, which yields large to small quantities of well water.

Site Geology. The site soils were characterized using the United Soil Classification System (USCS). During on-site subsurface drilling, CEC (GROWTH) encountered up to two feet of baserock (fill) followed by a 4 to 5 foot layer of dark sandy clay (CL). Below the dark clay to a depth between 7 and 15 feet, a grey sandy gravel was found. Below the sandy gravel the soil varied between a clayey sand to a sandy silty clay (SC). The gravels are poorly sorted, angular to rounded clasts ranging in size from 0.2 cm to 3.0 cm.

Site Hydrogeology. The depth of first water ranged from 8 to 10 feet below the ground surface (bgs) in the borings. Groundwater was encountered within the grey clayey sandy gravel layers.

Table 1
Monitoring Well Construction Data for Motor Partners Site
1234 40th Ave., Oakland, California

	MW-1	MW-2	MW-3	MW-4	MW-5
Date Drilled	6/15/94	6/14/94	6/14/94	2/1/96	2/11/98
Total Depth	22.5 ft.	22.0 ft.	23.0 ft.	23.0 ft.	21.0 ft.
Bore Diameter	10 inches	10 inches	10 inches	10 inches	6 inches
Casing Diameter	2 inch	2 inch	2 inch	2 inch	2 inch
Well Seal Type	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets	Bentonite Pellets
Well Seal Interval	5.0 - 6.0 bgs	5.0 - 6.0 bgs	5.0 - 6.0 bgs	3.0 - 4.0 bgs	4.0 - 5.0 bgs
Filter Pack Material	2/14 Lonestar Sand	2/14 Lonestar Sand	2/14 Lonestar Sand	2/14 Lonestar Sand	2/14 Lonestar Sand
Filter Pack Interval	6.0 - 17.0 bgs	9.0 - 20.0 bgs	6.5 - 20.0 bgs	4.0 - 25.0 bgs	5.0 - 21.0 bgs
Screen Slot Size	0.020 in.	0.020 in.	0.020 in.	0.010 in.	0.020 in.
Screened Interval	7.0 - 17.0 bgs	10.0 - 20.0 bgs	7.0 - 20.0 bgs	5.0 - 25.0 bgs	6.0 - 21.0 bgs
Well Elevation[1]	31.44 ft.	31.06 ft.	31.43 ft.	31.37 ft.	31.15 ft.

[1]TOC -Top of Casing Elevations for MW-1, MW-2, MW-3, and MW-4 were surveyed on 8/22/96 by Kier & Wright Civil Engineers & Surveyors, Inc. TOC. Elevation for MW-5 surveyed on 3/20/98 by AEA.

GROUNDWATER MONITORING

GROUNDWATER ELEVATION MEASUREMENTS

The static water level was measured in all five monitoring wells (MW-1, MW-2, MW-3, MW-4 and MW-5) on September 23, 1999 and the depths were recorded to the nearest 0.01 foot using an electronic water level sounder. All of the results were recorded on Quarterly Monitoring Data Sheets presented in Appendix B.

MONITORING WELL SAMPLING

The ORC filter socks were removed from wells MW-1, MW-3, and MW-5. Prior to sampling, each of the five wells were purged by withdrawing a minimum of three casing volumes from each well using a diaphragm pump. Purging continued until the turbidity was less than 100 NTU and the temperature, conductivity, and pH were relatively stable. The turbidity, temperature, electric conductivity, dissolved oxygen and ORP levels were recorded for each well sample.

Groundwater samples were collected using a disposable teflon bailer and placed into 40-ml VOA's, 500 ml plastic containers, and a one-liter amber bottle. The samples were labeled and stored on ice until delivered under a chain of custody to the state certified laboratory. Samples from all five wells (MW-1, MW-2, MW-3, MW-4, and MW-5) were analyzed for total petroleum hydrocarbons as diesel (TPH-D), using EPA methods modified 8015; as gasoline (TPH-G) using EPA methods 8015/5030; benzene, toluene, ethylbenzene, and xylenes (BTEX) using EPA methods 8020; and methyl t-butyl ether (MTBE) using EPA method 8020.

In addition to the petroleum hydrocarbon parameters, groundwater samples from each of the wells were also submitted to a state certified laboratory for analysis of nitrate, sulfate, iron, total phosphorus, and ammonia.

ANALYTICAL RESULTS

GROUNDWATER HYDRAULIC CONDITIONS

Groundwater Elevation. The groundwater elevation data for the monitoring wells is presented in Table 2. Based on groundwater level measurements collected on September 23, 1999, the depth to groundwater in the wells ranged from 8.1 to 9.4 feet below the top of the casing. The groundwater elevations for the wells were as follows; MW-1 was 22.14 feet above mean sea level (msl), MW-2 was 22.68 feet above msl, MW-3 was 21.70 feet above msl, MW-4 was 22.29 feet above msl, and MW-5 was 21.77 feet above msl.

Groundwater Flow Direction and Gradient. Groundwater flow direction was calculated using three wells (MW-1, MW-2, and MW-3). Groundwater flow direction trended to the southwest (S 20°W) at a gradient of 0.0098 ft/ft. The flow direction and gradient are shown in Figure 3.

LABORATORY DATA

A summary of the hydrocarbon analytical results for the quarterly sampling is presented in Table 3. Table 4 presents the results of on-site sampling for dissolved oxygen and redox potential. A summary of the other bio-parameters is presented in Table 5. The additional bio-parameters included the following; nitrate, sulfate, iron, total phosphorus, and ammonia. Copies of all the analytical data sheets from McCampbell Analytical Lab are presented in Appendix A.

In addition, microbiological analyses were completed in conjunction with enhanced natural attenuation activities for the site. Total aerobic hydrocarbon degraders and total anaerobic degraders were enumerated in groundwater samples collected from each of the 5 monitoring wells. The results are summarized in Table 6. Copies of the microbiological analytical data sheets from CytoCulture are presented in Appendix A.

TPH-Gasoline and Benzene contamination exists in groundwater on the property with the highest concentrations reported for groundwater samples collected at MW-1, MW-3, and MW-5. Groundwater flow direction for this sampling period was shown to be in a southwesterly direction.

Table 2
Groundwater Elevation Results at Motor Partners Site
1234 40th Ave., Oakland, California

	DATE	MW-1	MW-2	MW-3	MW-4	GRADIENT
TOC		31.44 ft	31.06 ft	30.43 ft.	30. 37 ft.	
SWL	11/29/95	10.13	9.31	9.53		S 21° W
GSE		21.31	21.75	20.90		0.0082 ft/ft
SWL	2/23/96	4.59	3.77	3.56	3.17	S 26° E
GSE		26.85	27.29	26.87	27.20	0.0033 ft/ft
SWL	5/21/96	6.04	5.24	5.29	4.68	S 5° E
GSE		25.40	25.82	25.14	25.69	0.0064 ft/ft
SWL	8/22/96	8.46	7.66	7.88	7.10	S 19° W
GSE		22.98	23.40	22.55	23.27	0.0077 ft/ft
SWL	11/21/96	8.44	7.73	7.76	7.31	S 23° W
GSE		23.00	23.33	22.67	23.06	0.0062 ft/ft
SWL	2/25/97	6.53	5.78	5.97	5.06	S 30° W
GSE		24.91	25.28	24.46	25.31	0.0076 ft/ft
SWL	5/28/97	8.08	7.38	7.53	6.94	S 31° W
GSE		23.36	23.68	22.90	23.43	0.0071 ft/ft
SWL	9/2/97	9.08	8.24	9.26	7.84	S 20° W
GSE		22.36	22.82	21.17	22.53	0.0086 ft/ft
SWL	11/26/97	7.98	7.24	7.06	6.64	S 11° E
GSE		23.46	23.82	23.37	23.73	0.0057 ft/ft

TOC - Top of Casing Elevations for MW-1, MW-2, MW-3, and MW-4 were surveyed on 8/22/96 by Kier & Wright Civil Engineers & Surveyors, Inc.
SWL - Static Water Level (ft)
GSE - Groundwater Surface Elevation (feet relative to mean sea level)

Table 2 (Continued)
Groundwater Elevation Results at Motor Partners Site
1234 40th Ave., Oakland, California

	DATE	MW-1	MW-2	MW-3	MW-4	MW-5	GRADIENT
TOC		31.44 ft	31.06 ft	30.43 ft.	30. 37 ft.	31.15 ft.	
SWL	3/17/98	5.84	5.05	5.11	4.52	5.80	S 11° W
GSE		25.60	26.01	25.32	25.85	25.35	0.0029 ft/ft
SWL	6/26/98	7.09	6.24	6.52	5.52	7.07	S 20° W
GSE		24.35	24.82	23.91	24.85	24.08	0.0089 ft/ft
SWL	9/24/98	8.74	7.94	8.13	7.23	8.76	S 19° W
GSE		22.70	23.12	22.30	23.14	22.39	0.0076 ft/ft
SWL	12/16/98	7.11	6.42	6.52	5.92	7.19	S 30° W
GSE		24.33	24.64	23.91	24.45	23.96	0.0070 ft/ft
SWL	3/16/99	5.26	4.54	4.36	4.12	5.14	S 5° E
GSE		26.18	26.52	26.07	26.25	26.01	0.0054 ft/ft
SWL	6/23/99	7.62	6.87	7.06	6.42	7.66	S 27° W
GSE		23.82	24.19	23.37	23.95	23.49	0.0052 ft/ft
SWL	9/23/99	9.30	8.38	8.73	8.08	9.38	S 20° W
GSE		22.14	22.68	21.70	22.29	21.77	0.0098 ft/ft
SWL							
GSE							
SWL							
GSE							

TOC - Top of Casing Elevations for MW-1, MW-2, MW-3, and MW-4 were surveyed on 8/22/96 by Kier & Wright Civil Engineers & Surveyors, Inc. Elevation for MW-5 surveyed on 3/20/98 by AEA.
SWL - Static Water Level (ft)
GSE - Groundwater Surface Elevation (feet relative to mean sea level)

Table 3
Quarterly Groundwater Sampling Results at Motor Partners
1234 40th Ave., Oakland, California

Sample I.D. Number	Date Collected	TPH-D (µg/L)	TPH-G (µg/L)	MTBE (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Total Xylenes (µg/L)
MW-1	6/17/94	2,400	17,000		1,200	220	1,000	2,600
	11/29/95	53,000	67,000		860	180	1,300	3,100
	2/23/96	25,000	16,000		360	ND	370	740
	5/21/96	650	11,000		290	37	600	1,300
	8/22/96	ND	13,000		270	51	540	1,400
	11/21/96	5,500	15,000		810	79	680	1,700
	2/25/97	3,900	15,000		430	36	760	1,200
	5/28/97	3,700	7,600		110	15	370	870
	9/2/97	8,200	18,000	ND	1,300	81	1,300	2,800
	11/26/97	14,000	24,000	81	760	75	660	2,100
	3/17/98	5,000	14,000	150	360	120	650	1,200
	6/26/98	1,200	2,500	ND	60	5.6	76	110
	9/24/98	2,200	5,100	310	220	27	300	590
ORC Filter Socks Installed 9/24/98 in MW-1, MW-3, and MW-5								
	12/16/98	450	1,400	ND	57	3.7	42	80
	3/16/99	270	580	ND	11	1.4	8.3	11
	6/23/99	2,600	5,400	ND<10	30	19	190	420
	9/23/99	470	1,100	ND	130	4.1	74	92
California Drinking Water MCL		None Listed	None Listed	None Listed	1.0	1,000	680	1,750
Reporting Limit		50	50	5	0.5	0.5	0.5	1.0

Notes: All results in µg/l (ppb)
ND = Not Detected
NA = Not Analyzed

Table 3 (Continued)
Quarterly Groundwater Sampling Results at Motor Partners
1234 40th Ave., Oakland, California

Sample I.D. Number	Date Collected	TPH-D (µg/L)	TPH-G (µg/L)	MTBE (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Total Xylenes (µg/L)
MW-2	6/17/94	370	990		ND	1.3	2.3	4.4
	12/07/94	ND	170		2.1	0.70	0.60	1.7
	11/29/95	200	400		ND	ND	ND	3
	2/23/96	ND	500		ND	ND	ND	ND
	5/21/96	ND	62		ND	ND	ND	1
	8/22/96	ND	120		0.58	0.62	ND	0.62
	11/21/96	89	89		0.60	0.78	ND	ND
	2/25/97	ND	250		1.2	1.0	ND	ND
	5/28/97	ND	ND		ND	ND	ND	ND
	9/2/97	ND	220	ND	ND	1.2	0.80	1.7
	11/26/97	ND	ND	ND	ND	ND	ND	ND
	3/17/98	ND	ND	ND	ND	ND	ND	ND
	6/26/98	170	260	ND	ND	0.86	ND	0.63
	9/24/98	130	240	ND	0.73	1.2	0.8	0.61
ORC Filter Socks Installed 9/24/98 in MW-1, MW-3, and MW-5								
	12/16/98	ND	ND	ND	ND	ND	ND	ND
	3/16/99	ND	ND	ND	ND	ND	ND	ND
	6/23/99	110	220	ND	0.52	0.88	0.72	ND
	9/23/99	ND	ND	ND	ND	ND	ND	ND
California Drinking Water MCL		None Listed	None Listed	None Listed	1.0	1,000	680	1,750
Reporting Limit		50	50	5	0.5	0.5	0.5	1.0

Notes: All results in µg/l (ppb)
ND = Not Detected
NA = Not Analyzed

Table 3 (Continued)
Quarterly Groundwater Sampling Results at Motor Partners
1234 40th Ave., Oakland, California

Sample I.D. Number	Date Collected	TPH-D (µg/L)	TPH-G (µg/L)	MTBE (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Total Xylenes (µg/L)
MW-3	6/17/95	2,200	9,500		330	40	100	74
	12/07/94	1,700	7,500		380	42	130	72
	11/29/95	14,000	9,000		300	49	300	16
	2/23/96	14,000	13,000		270	83	260	67
	5/21/96	350	6,600		220	48	160	66
	8/22/96	ND	4,800		120	34	44	44
	11/21/96	3,300	8,700		220	51	150	68
	2/25/97	ND	8,200		260	57	200	72
	5/28/97	1,800	7,000		140	22	44	31
	9/2/97	ND	8,100	65	240	50	170	72
	11/26/97	4,100	5,600	44	140	22	9.6	31
	3/17/98	2,100	10,000	330	270	67	260	96
	6/26/98	2,400	7,600	ND	280	56	160	73
	9/24/98	2,800	6,300	ND	260	65	130	80
ORC Filter Socks Installed 9/24/98 in MW-1, MW-3, and MW-5								
	12/16/98	1,600	4,500	ND	160	22	17	30
	3/16/99	1,900	8,000	ND	370	51	220	110
	6/23/99	2,200	7,400	ND<10	250	47	82	62
	9/23/99	1,500	3,700	ND<130	170	26	51	34
California Drinking Water MCL		None Listed	None Listed	None Listed	1.0	1,000	680	1,750
Reporting Limit		50	50	5	0.5	0.5	0.5	1.0

Notes: All results in µg/l (ppb)
ND = Not Detected
NA = Not Analyzed

Table 3 (Continued)
Quarterly Groundwater Sampling Results at Motor Partners
1234 40th Ave., Oakland, California

Sample I.D. Number	Date Collected	TPH-D (μg/L)	TPH-G (μg/L)	MTBE (μg/L)	Benzene (μg/L)	Toluene (μg/L)	Ethyl Benzene (μg/L)	Total Xylenes (μg/L)
MW-4	2/23/96	3,000	6,000		58	36	6	28
	5/21/96	78	1,200		18	2.5	6.2	12
	8/22/96	ND	400		8.6	3.4	1.8	2.6
	11/21/96	87	170		3.6	1.1	1.7	2.3
	2/25/97	ND	120		5.4	0.64	0.93	0.80
	5/28/97	55	150		5.6	0.64	4.4	8.8
	9/2/97	ND	100	ND	3.2	ND	ND	0.7
	11/26/97	ND	240	ND	6.8	ND	1.8	10
	3/17/98	200	300	8.9	4.4	5.1	5.1	20
	6/26/98	66	ND	ND	7.7	0.50	0.84	0.61
	9/24/98	84	66	ND	4.2	0.59	0.63	ND
ORC Filter Socks Installed 9/24/98 in MW-1, MW-3, and MW-5								
	12/16/98	ND	ND	ND	ND	ND	ND	ND
	3/16/99	ND	ND	ND	2.1	ND	ND	ND
	6/23/99	86	190	ND	11	1.1	2.3	1.6
	9/23/99	ND	ND	ND	1.7	ND	ND	ND
California Drinking Water MCL		None Listed	None Listed	None Listed	1.0	1,000	680	1,750
Reporting Limit		50	50	5	0.5	0.5	0.5	1.0

Notes: All results in μg/l (ppb)
ND = Not Detected
NA = Not Analyzed

Table 3 (Continued)
Quarterly Groundwater Sampling Results at Motor Partners
1234 40th Ave., Oakland, California

Sample I.D. Number	Date Collected	TPH-D (μg/L)	TPH-G (μg/L)	MTBE (μg/L)	Benzene (μg/L)	Toluene (μg/L)	Ethyl Benzene (μg/L)	Total Xylenes (μg/L)
MW-5	3/17/98	22,000	58,000	ND	320	590	790	2,300
	6/26/98	7,000	2,300	ND	54	20	14	41
	9/24/98	2,500	1,600	ND	31	10	6.3	22
ORC Filter Socks Installed 9/24/98 in MW-1, MW-3, and MW-5								
	12/16/98	ND	ND	ND	ND	ND	ND	ND
	3/16/99	ND	180	ND	22	0.52	ND	1.9
	6/23/99	8,400	3,200	ND<50	25	7.3	6.8	25
	9/23/99	470	490	ND<14	16	3.3	2.0	4.9
California Drinking Water MCL		None Listed	None Listed	None Listed	1.0	1,000	680	1,750
Reporting Limit		50	50	5	0.5	0.5	0.5	1.0

Notes: All results in μg/l (ppb)
ND = Not Detected
NA = Not Analyzed

Table 4
Dissolved Oxygen and Redox Results
Motor Partners, 1234 40th Ave., Oakland, California

Sample I.D. Number	Date Collected	Dissolved Oxygen (mg/L)	Redox Potential (mv)
MW-1	11/26/97	1.5	56
	3/17/98	0.9	-2.0
	6/26/98	1	-64
	9/24/98	1.1	-49
	12/16/98	1	-44
	3/16/99	3.2	155
	6/23/99	2.2	120
	9/23/99	2.9	34
MW-2	11/26/97	3	162
	3/17/98	2.7	90
	6/26/98	4.3	144
	9/24/98	4	175
	12/16/98	6.5	205
	3/16/99	2.7	156
	6/23/99	2.1	125
	9/23/99	2.1	168
MW-3	11/26/97	2	67
	3/17/98	1.5	18
	6/26/98	1.8	-72
	9/24/98	1.4	-10
	12/16/98	2.1	4
	3/16/99	1.6	-14
	6/23/99	1.5	-32
	9/23/99	1.2	-56

Table 4 (Continued)
Dissolved Oxygen and Redox Results
Motor Partners, 1234 40th Ave., Oakland, California

Sample I.D. Number	Date Collected	Dissolved Oxygen (mg/L)	Redox Potential (mv)
MW-4	11/26/97	2.4	114
	3/17/98	1.7	69
	6/26/98	2.8	99
	9/24/98	2.9	78
	12/16/98	9.2	265
	3/16/99	10.5	197
	6/23/99	5.7	175
	9/23/99	6	196
MW-5	3/17/98	1.5	40
	6/26/98	0.9	-33
	9/24/98	1.3	-9
	12/16/98	4	194
	3/16/99	2.4	144
	6/23/99	1.7	151
	9/23/99	2.9	236

Table 5. Results of Additional Bioremediation Parameters
Motor Partners, 1234 40th Ave., Oakland, California

Sample I.D. Number	Date Collected	Ferrous Iron (mg/L)	Ammonia-N (mg/L)	Nitrate-N (mg/L)	Sulfate (mg/L)	Total Phosphorus (mg/L)
MW-1	11/26/97	1.2	<0.05	<0.05	4200	0.06
	3/17/98	2.0	0.22	<0.05	97	0.14
	6/26/98	3.0	ND	ND	2000	ND
	9/24/98	0.25	ND	2	7	0.16
	12/16/98	3.2	ND	ND	17	0.07
	3/16/99	0.21	1.8	ND	36	ND
	6/23/99	2.4	ND	ND	35	ND
	9/23/99	ND	ND	19	21	ND
MW-2	11/26/97	ND	<0.05	1.1	3100	0.08
	3/17/98	0.21	0.08	11	41	0.13
	6/26/98	0.087	ND	7.2	33	ND
	9/24/98	ND	ND	37	38	0.08
	12/16/98	ND	ND	44	48	0.03
	3/16/99	ND	1.3	41	42	ND
	6/23/99	0.8	ND	41	65	0.11
	9/23/99	ND	ND	55	43	ND
MW-3	11/26/97	2.8	<0.05	<0.05	4100	0.45
	3/17/98	0.31	0.06	<0.05	<2.0	0.17
	6/26/98	3.0	ND	ND	ND	ND
	9/24/98	0.11	ND	ND	ND	0.24
	12/16/98	1.3	ND	ND	9	0.16
	3/16/99	2.5	1.2	ND	ND	0.23
	6/23/99	1.9	ND	ND	34	0.12
	9/23/99	0.46	ND	55	39	0.14

Table 5 continued. Results of Additional Bioremediation Parameters
Motor Partners, 1234 40th Ave., Oakland, California

MW-4	11/26/97	ND	<0.05	0.66	4900	0.16
	3/17/98	0.17	0.06	7.4	33	0.07
	6/26/98	0.21	ND	7.1	32	ND
	9/24/98	ND	ND	40	37	0.09
	12/16/98	ND	ND	44	45	0.11
	3/16/99	0.17	ND	40	37	ND
	6/23/99	0.8	ND	46	44	0.23
	9/23/99	ND	ND	55	39	ND
MW-5	3/17/98	0.49	0.06	0.83	40	0.13
	6/26/98	0.26	ND	1.7	22	ND
	9/24/98	ND	ND	5	24	0.29
	12/16/98	ND	ND	17	35	0.06
	3/16/99	ND	4.1	9	18	ND
	6/23/99	0.97	ND	8	48	0.54
	9/23/99	0.11	ND	12	23	ND

Notes: All results in mg/L (ppm)
ND = Not Detected

Table 6. Results of Microbiological Analyses
Motor Partners, 1234 40th Ave., Oakland, California

Sample I.D. Number	Date Collected	Aerobic Hydrocarbon Degraders (cfu/ml)	Anaerobic Hydrocarbon Degraders (cfu/ml)
MW-1	9/24/98	$<1 \times 10^1$	4.6×10^2
	12/16/98	2.3×10^3	3.8×10^4
	3/16/99	3.3×10^1	8.2×10^2
	6/23/99	1.1×10^4	2.5×10^4
	9/23/99	7.0×10^1	2.2×10^3
MW-2	9/24/98	5.4×10^2	3.4×10^3
	12/16/98	4.0×10^2	3.0×10^3
	3/16/99	8.0×10^1	2.9×10^1
	6/23/99	2.9×10^3	1.4×10^4
	9/23/99	1.1×10^1	4.0×10^1
MW-3	9/24/98	6.5×10^2	4.3×10^3
	12/16/98	6.1×10^2	3.5×10^4
	3/16/99	1.2×10^3	2.6×10^3
	6/23/99	4.4×10^3	9.0×10^3
	9/23/99	1.3×10^3	6.0×10^3
MW-4	9/24/98	3.6×10^1	5.1×10^2
	12/16/98	1.2×10^3	2.0×10^3
	3/16/99	5.5×10^2	2.2×10^3
	6/23/99	1.3×10^3	7.5×10^3
	9/23/99	3.0×10^2	3.5×10^3
MW-5	9/24/98	3.9×10^1	5.1×10^3
	12/16/98	6.2×10^3	1.1×10^4
	3/16/99	2.7×10^2	2.3×10^3
	6/23/99	6.2×10^2	8.5×10^3
	9/23/99	8.0×10^1	1.7×10^3

cfu/ml = colony forming units per milliliter

SUMMARY AND RECOMMENDATIONS

Summary

The five monitoring wells at Motor Partners were sampled on September 23, 1999 for the third quarter in 1999. The results showed hydrocarbon and/or BTEX contamination in groundwater samples from four of the wells (the sample from MW-2 was "non-detect" for the parameters tested). Groundwater flow direction for this sampling period was shown to be in a southwesterly direction.

Recommendations

It appears that ORC treatment has been effective in reducing hydrocarbon contamination on-site. Total hydrocarbon levels have been reduced at both monitoring wells MW-1 and MW-5. It is believed that levels of contamination are now low enough that the site may be considered a low risk groundwater case.

It is recommended that a full Tier 2 risk assessment be completed for the site. The Tier 2 evaluation should be completed prior to the next quarterly monitoring event.

LIMITATIONS

This report has been prepared in accordance with generally accepted environmental, geological and engineering practices. No warranty, either expressed or implied is made as to the professional advice presented herein. The analysis, conclusions, and recommendations contained in this report are based upon site conditions as they existed at the time of the investigation and they are subject to change.

The conclusions presented in this report are professional opinions based solely upon visual observations of the site and vicinity, and interpretation of available information as described in this report. The scope of services performed in execution of this investigation may not be appropriate to satisfy the needs of other users and any use or reuse of this document or its findings, conclusions or recommendations presented herein is at the sole risk of the said user.

Stanley L. Klemetson Ph.D., P.E.

APPENDICES

APPENDIX A

Analytical Results

McCAMPBELL ANALYTICAL INC.
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Aquatic & Environmental Applications 38053 Davy Court Fremont, CA 94536	Client Project ID: #1004; Motor Partners	Date Sampled: 09/23/99
		Date Received: 09/23/99
	Client Contact: Gary Rogers	Date Extracted: 09/26-09/28/99
	Client P.O:	Date Analyzed: 09/26-09/28/99

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

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

Lab ID	Client ID	Matrix	TPH(g)[*]	MTBE	Benzene	Toluene	Ethylben -zene	Xylenes	% Recovery Surrogate
19874	MW-2	W	ND	ND	ND	ND	ND	ND	110
19875	MW-4	W	ND	ND	1.7	ND	ND	ND	104
19876	MW-3	W	3700,a	ND<130	170	26	51	34	---[#]
19877	MW-5	W	490,a	ND<14	16	3.3	2.0	4.9	107
19878	MW-1	W	1100,a	ND	130	4.1	74	92	99
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	5.0	0.5	0.5	0.5	0.5	
		S	1.0 mg/kg	0.05	0.005	0.005	0.005	0.005	

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

[#] cluttered chromatogram, sample peak coelutes with surrogate peak

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

DHS Certification No 1644

Edward Hamilton, Lab Director

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	Client Contact: Gary Rogers	Date Extracted: 09/23/99
	Client P.O:	Date Analyzed: 09/26-09/28/99

Diesel Range (C10-C23) Extractable Hydrocarbons as Diesel *

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

Lab ID	Client ID	Matrix	TPH(d)+	% Recovery Surrogate
19874	MW-2	W	ND	99
19875	MW-4	W	ND	97
19876	MW-3	W	1500,d	109
19877	MW-5	W	470,d,g	100
19878	MW-1	W	470,d	100
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	50 ug/L	
		S	1.0 mg/kg	

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

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

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

DHS Certification No 1644

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Aquatic & Environmental Applications 38053 Davy Court Fremont, CA 94536	Client Project ID: #1004; Motor Partners	Date Sampled: 09/23/99
		Date Received: 09/23/99
	Client Contact: Gary Rogers	Date Extracted: 09/24/99
	Client P.O:	Date Analyzed: 09/24/99

Ferrous Iron

EPA Method 6010,200.7

Lab ID	Client ID	Matrix	Fe
19874	MW-2	W	ND
19875	MW-4	W	ND
19876	MW-3	W	0.46
19877	MW-5	W	0.11
19878	MW-1	W	ND
Reporting Limit unless otherwise stated, ND means not detected above the reporting limit		W	0.08 mg/L
		S	5.0 mg/kg

* water samples are reported in mg/L, soil and sludge samples in mg/kg and wipes in mg/wipe

DHS Certification No. 1644

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Aquatic & Environmental Applications 38053 Davy Court Fremont, CA 94536	Client Project ID: #1004; Motor Partners	Date Sampled: 09/23/99
		Date Received: 09/23/99
	Client Contact: Gary Rogers	Date Extracted: 09/24/99
	Client P.O:	Date Analyzed: 09/24/99

Phosphorus by ICP*

EPA analytical methods 6010, 200.7

Lab ID	Client ID	Matrix	Extraction°	Total Phosphorus
19874	MW-2	W	TTLC	ND
19875	MW-4	W	TTLC	ND
19876	MW-3	W	TTLC	0.14
19877	MW-5	W	TTLC	ND
19878	MW-1	W	TTLC	ND
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit		W	TTLC	0.06 mg/L
		S	TTLC	5.0mg/kg
		---	STLC,TCLP	0.5 mg/L

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

° EPA extraction methods 1311(TCLP), 3010/3020(water,TTLC), 3040(organic matrices,TTLC), 3050(solids,TTLC), STLC - CA Title 22

& reporting limit raised due to matrix interference

1) liquid sample that contains greater than ~2 vol. % sediment, this sediment is extracted with the liquid, in accordance with EPA methodologies and can significantly effect reported metal concentrations, j) dissolved iron assumed to be equal to ferrous iron

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Edward Hamilton, Lab Director

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QC REPORT FOR HYDROCARBON ANALYSES

Date: 09/26/99-09/27/99 Matrix: WATER

Analyte	Concentration (ug/L) Sample (#19660)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	0.0	100.0	97.8	100.0	100.0	97.8	2.2
Benzene	0.0	9.0	9.1	10.0	90.0	91.0	1.1
Toluene	0.0	9.2	9.3	10.0	92.0	93.0	1.1
Ethyl Benzene	0.0	9.6	9.6	10.0	96.0	96.0	0.0
Xylenes	0.0	28.7	28.4	30.0	95.7	94.7	1.1
TPH(diesel)	0.0	8634	8290	7500	115	111	4.1
TRPH (oil & grease)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

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

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QC REPORT FOR ICP and/or AA METALS

Date: 09/23/99-09/24/99 Matrix: WATER

Extraction: TTLC

Anal	Concentration (mg/L)			Amount	% Recovery		RPD
	Sample	MS	MSD		MS	MSD	
Total Iron	0.00	0.49	0.49	0.50	97	98	0.6
Total Manganese	0.00	0.50	0.50	0.50	99	100	0.9
Total Aluminum	0.00	0.49	0.49	0.50	98	98	0.2
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
Organic Lead	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

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

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QC REPORT FOR ICP and/or AA METALS

Date: 09/24/99-09/25/99 Matrix: WATER

Extraction: TTLC

Analyte	Concentration (mg/L)			Amount	% Recovery		RPD
	Sample	MS	MSD		MS	MSD	
Total Phosphorus	0.00	5.08	5.16	5.00	102	103	1.6
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
Total Silver	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

GeoAnalytical Laboratories, Inc.

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CERTIFICATE OF ANALYSIS

Report # K267-03

Date: 9/29/99

McCampbell Analytical
110 2nd Avenue #D7
Pacheco CA 94553-5560

Project: 16846 A.F.A.

PO#

Date Rec'd: 9/24/99
Date Started: 9/24/99
Date Completed: 9/28/99

Date Sampled: 9/23/99
Time:
Sampler:

Sample ID	Lab ID	PQL	MDL	Method	Analyte	Results	Units
MW-2	K35713		1.0	300	Nitrate (NO3)	55	mg/L
			0.5	350.2	Ammonia	ND	mg/L
			1.0	300	Sulfate	43	mg/L
MW-4	K35714		1.0	300	Nitrate (NO3)	55	mg/L
			0.5	350.2	Ammonia	ND	mg/L
			1.0	300	Sulfate	39	mg/L
MW-3	K35715		1.0	300	Nitrate (NO3)	2	mg/L
			0.5	350.2	Ammonia	ND	mg/L
			1.0	300	Sulfate	3	mg/L
MW-5	K35716		1.0	300	Nitrate (NO3)	12	mg/L
			0.5	350.2	Ammonia	ND	mg/L
			1.0	300	Sulfate	23	mg/L
MW-1	K35717		1.0	300	Nitrate (NO3)	19	mg/L
			0.5	350.2	Ammonia	ND	mg/L
			1.0	300	Sulfate	21	mg/L

Ramiro Salgado
Chemist

Certification # 1157

Donna Keller
Laboratory Director

GeoAnalytical Laboratories, Inc.

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Report# K267-03

QC REPORT

McCampbell Analytical
110 2nd Avenue #D7
Pacheco CA 94553-5560

Dates Analyzed 9/24/99-9/28/99

Analyte	Batch #	Method	MS % Recovery	MSD % Recovery	RPD	Blank
Nitrate (NO3)	I03685	300	96.0	98.0	2.1	ND
Ammonia	I03694	350.2	96.3	99.8	3.5	ND
Sulfate	I03686	300	92.2	95.0	3.0	ND

Ramiro Salgado
Chemist

Certification # 1157

Donna Keller
Laboratory Director

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CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HOUR ☐ 48 HOUR ☒ 5 DAY ☐ ROUTINE

Report To: Ed Hamilton Bill To: MAL

Project #: 16846 Project Name: A.E.A.

Project Location:

SAMPLE ID	LOCATION	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX: Water	Soil	Air	Sludge	Other	METHOD PRESERVED: Ice	HCl	HNO_3	Other	EPA 601/8010	EPA 602/8020	EPA 608/808	EPA 608/8080-PCB's only	EPA 624/8240/8260	EPA 625/8270	CAM – 17 Metals	EPA – Priority Pollutant Metals	LUFT Metals	LEAD (7240/7421/239.2/6010)	ORGANIC LEAD	RCI	OTHER: Nitrate	Ammonia	Sulfate				COMMENTS
MW-2		9/23/99				X					X																X	X	X	K35743			19874
MW-4		↓				↓					↓																X	X	X	K35714			19875
MW-3																											X	X	X	K35715			19876
MW-5																											X	X	X	K35716			19877
MW-1		↓				↓					↓																X	X	X	K35717			19878

Relinquished By	Date	Time	Received By
Gina A Butler	9/23/99		FED EX
Fed Ex	9/24/99	1615	Jennifer Hoffmeen

Remarks:

16846 ZAEA2

McCAMPBELL ANALYTICAL INC.

110 2nd AVENUE SOUTH, #D7
PACHECO, CA 94553-5560
Telephone: (925) 798-1620 Fax: (925) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HOUR ☐ 48 HOUR ☒ 5 DAY

Report To: Gary Rogers Bill To: same

Company: Aquatic & Environmental Applications
38053 Davy Ct
Fremont CA 94536

Tele: (510) 791-7157 Fax: (510) 791-7157

Project #: 1004 Project Name: Motor Partners

Project Location: 1234 40th Ave Oakland, CA

Sampler Signature: Gary Rogers

SAMPLE ID	LOCATION	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX: Water	Soil	Air	Sludge	Other	METHOD PRESERVED: Ice	HCl	HNO_3	Other	BTEX & TPH as Gas (602/8020 + 8015)/ MTBE	TPH as Diesel (8015)	Total Petroleum Oil & Grease (5520 E&F/B&F)	Total Petroleum Hydrocarbons (418.1)	EPA 601 / 8010	BTEX ONLY (EPA 602 / 8020)	EPA 608 / 8080	EPA 608 / 8080 PCB's ONLY	EPA 624 / 8240 / 8260	EPA 625 / 8270	PAH's / PNA's by EPA 625 / 8270 / 8310	CAM-17 Metals	LUFT 5 Metals	Lead (7240/7421/239.2/6010)	RCI	Other: Nitrate, Ammonia, Sulfate	Ferrous Iron	Total Phosphorus	Comments
(+) MW-2		9-23	10:00	7		X					X				X	X		-												X	X	X	19874
(+) MW-4		9-23	10:35	7		X					X				X	X														X	X	X	19875
(+) MW-3		9-23	11:05	7		X					X				X	X														X	X	X	19876
+ MW-5		9-23	11:35	7		X					X				X	X														X	X	X	19877
+ MW-1		9-23	12:15	7		X					X				X	X														X	X	X	19878

Relinquished By:	Date:	Time:	Received By:
Gary Rogers	9-23	4:45	Lina M Butler
Relinquished By:	Date:	Time:	Received By:
Relinquished By	Date:	Time:	Received By:

Remarks:

CytoCulture
ENVIRONMENTAL
BIOTECHNOLOGY
CytoCulture International, Inc. 1986

Gary Rogers
Aquatic & Environmental Applications
38053 Davy Ct.
Fremont, CA 94536

Reporting Date: October 11, 1999
Cyto Lab #: 99-71
Project Description: Motor Partners
Project #: 1004
Fax: (510) 791-7157

SAMPLES: 5 water samples were received on 9/23/99. Aerobic and anaerobic bacteria enumeration plates were poured on the next day.

AEROBIC
Hydrocarbon-Degrading Bacteria Enumeration Assays

ANALYSIS REQUEST: Bacterial enumeration for aerobic petroleum hydrocarbon-degraders (broad range petroleum hydrocarbons: diesel, gasoline and jet fuel).

CARBON SOURCES: Petroleum hydrocarbons were added as the sole carbon and energy sources for the growth of hydrocarbon-degrading aerobic bacteria on agar plates. Chevron #2 Diesel gasoline, and JP-4 Jet Fuel were blended into the agar to provide dissolved phase aliphatic and aromatic hydrocarbons in the growth matrix.

PROTOCOLS: ***Hydrocarbon Degraders:*** Sterile agar plates (100 x 15 mm) were prepared with with 1.0 ml of sample, or a log dilution of the sample, at dilutions of 10^{0}, 10^{-1}, 10^{-2}, and 10^{-3} The hydrocarbon plates were poured on 9/24/99 and counted on 10/1/99. The plate count data are reported as colony forming units (cfu) per milliliter (ml) of sample. Each bacteria population value represents a statistical average of the plate count data obtained with inoculations for at least two of the three log dilutions tested.

AEROBIC
Hydrocarbon-Degrading and Heterotrophic Bacteria Enumeration Results

CLIENT SAMPLE NUMBER	SAMPLE DATE	HYDROCARBON DEGRADERS (CFU/ML)	TOTAL HETEROTROPHS (CFU/ML)
MW-2	9/23/99	1.1×10^1	NT
MW-4	9/23/99	3.0×10^2	NT
MW-3	9/23/99	1.3×10^3	NT
MW-1	9/23/99	7.0×10^1	NT
MW-5	9/23/99	8.0×10^1	NT
+ Control	NA	$> 1 \times 10^9$	NT

1.0×10^1 cfu/ml is the lowest detection level for this assay

On 9/24/99, a positive control sample was run concurrently with these samples, and the plate count results obtained were $>1 \times 10^9$ cfu/ml. The positive control sample used was a mixed culture of hydrocarbon-degrading bacteria from California groundwater sites.

ANAEROBIC
Bacterial Plate Count Enumeration Assays

ANALYSIS REQUEST: Anaerobic bacterial plate count enumerations for total petroleum hydrocarbon-degraders (broad range petroleum hydrocarbons: diesel, gasoline and jet fuel).

PROTOCOLS:

Anaerobic Hydrocarbon Degraders

These assays are similar in principle to our aerobic assays, except that they are performed in the absence of oxygen. Alternate electron acceptors such as sulfate, nitrate, and ferric iron are added to the media to meet anaerobic respiration needs. A mixture of Chevron No. 2 diesel, gasoline and jet fuel is added to the media to provide the sole carbon sources. A minimal salts mixture and trace elements are added to meet growth requirements.

Triplicate plates were inoculated with sample log dilutions of 10^{-0}, 10^{-1}, 10^{-2}, and 10^{-3} .The plates were poured on 9/24/99 and counted on 10/8/99. The plate count data are reported as colony forming units (cfu) per milliliter (ml) of sample. Each microbial population value represents a statistical average of the plate count data obtained with inoculations for two of the three log dilutions tested.

A positive control sample was run concurrently with these samples, and the data obtained from this is reported with your results. The positive control sample used was a composite of anaerobic slurries obtained from hydrocarbon-contaminated San Francisco Bay sediment and a Pt. Richmond, CA soil/ wastewater mixture.

Anaerobic
Hydrocarbon-Degrading and Heterotrophic Bacteria Enumeration Results

CLIENT SAMPLE NUMBER	SAMPLE DATE	HYDROCARBON DEGRADERS (CFU/ML)	TOTAL HETEROTROPHS (CFU/ML)
MW-2	9/23/99	4.0×10^1	NT
MW-4	9/23/99	3.5×10^3	NT
MW-3	9/23/99	6.0×10^3	NT
MW-1	9/23/99	2.2×10^3	NT
MW-5	9/23/99	1.7×10^3	NT
+ Control	NA	$>1 \times 10^6$	NT

1.0×10^1 cfu/ml is the lowest detection level for this assay

Bacterial enumerations were performed by Stephen Gehlbach and Randall von Wedel. CytoCulture is available on a consulting basis to assist in the interpretation of these data and their application to bioremediation protocols in the field.

Stephen Gehlbach
Technician
Laboratory Services

Randall von Wedel, Ph.D.
Principal Biochemist and
Director of Research

Aquatic & Environmental Applications

Subcontracted Microbiology Assays

performed by

CytoCulture Environmental Biotechnology

Cyto log 99-71

CHAIN OF CUSTODY FORM

Project Name: Motor Partners — Project No. 1004	Purchase Order / LOG IN #:
Client Organization: Aquatic & Environmental Apps.	Project Manager: Gary Rogers
Address to Send Results: 38053 Davy Ct Fremont CA 94536	
Client Fax for Sending Data: 510-791-7157	Client Contact / Project Manager:
Client Tel for Follow-up: 510-791-7157	Client Sampler / Recorder: G. Rogers

Sample I.D. Indicate target Hydrocarbon range	Sampling Date	Time	Matrix Soil	Matrix Water	Analyses Requested: Hydrocarbon Degrading Bacteria Plate Count	Total Heterotrophic Bacteria Plate Count	pH	DO	NH_3	PO_4	NO_3	SO_4	Other Tests or Comments
A MW-2	9-23-99	10:00		X	X								Aerobic + Anaerobic
MW-4	〃	10:35		X	X								〃
MW-3	〃	11:05		X	X								〃
MW-5	〃	11:35		X	X								〃
MW-1	9-23-99	12:15		X	X								Aerobic + Anaerobic

Chain of Custody Record	Signature of this form constitutes a firm Purchase Order for services.		Payment DUE on Reporting Date.
Relinquished by: Gary Rogers	Date/Hr: 9-23-99 4:00 pm	Received by:	Date/Hr:
Received for CytoCulture Lab by: for Arthur Ruiz	Date/Hr: 9-23-99 4:00 pm	CytoCulture Tel: 510-233-0102 Lab Services Fax: 510-233-3777	Please fax Chain of Custody form to CytoCulture prior to delivery.

APPENDIX B

Quarterly Monitoring Data Sheets

Quarterly Monitoring Data Sheet

Date: 9/23/99
Project Location: Motor Partners Site
1234 40th Ave., Oakland
Sampler: G. Rogers

Well Diameter: 2 Inches Well ID: MW-1
Well Type: Monitoring Well
Total Depth as Built: 19 ft
Screened Interval: 7 ft to 17 ft

Water Level Data

Time Depth Sounded: 11:50 AM
Measured Depth to Water: 9.30 ft.
Measured Total Depth: 18.34 ft.

Purge Calculation(Min 3 Casing Volumes)

gal/ft X ft = gal X 3 = gal

0.163 X 9.04 = 1.5 X 3 = 4.4

Purge Data

Time	Flowrate (gpm)	Volume (gal)	Temp (°F)	EC (μs/cm)	pH	Turbidity (NTU)	
11:55		0	65.9	805	9.24	163.4	
11:59		2	65.9	827	7.54	62.0	
12:04		4	66.0	767	7.38	4.7	
12:06		5	65.9	778	7.88	47.4	

Observations/Comments:

Inside Building

Laboratory Analysis:

Sample at 12:15 PM
Water depth - 10.82 ft.
Analyze for TPH-D, TPH-G, BTEX, and MTBE; Nitrate, Ammonia, Total Phosphorus, Ferrous Iron, Sulfate, REDOX, and Dissolved Oxygen.

Data for Volume Calculation:

1 cu ft = 7.48 gal = 62.4 lbs (approx)
2" well = 0.163 gal/linear ft.
4" well = 0.653 gal/linear ft.

1 gal = 0.134 cu. ft. = 8.34 lbs (approx)
3" well = 0.367 gal/linear ft.
6" well = 1.469 gal/linear ft.

Quarterly Monitoring Data Sheet

Date: 9/23/99	Well Diameter: 2 Inches Well ID: MW-2
Project Location: Motor Partners Site 1234 40th Ave., Oakland	Well Type: Monitoring Well
	Total Depth as Built: 22 ft
Sampler: G. Rogers	Screened Interval: 10 ft to 20 ft

Water Level Data	Purge Calculation(Min 3 Casing Volumes)
Time Depth Sounded: 9:25 AM	gal/ft X ft = gal X 3 = gal
Measured Depth to Water: 8.38 ft.	
Measured Total Depth: 19.6 ft.	0.163 X 11.2 = 1.8 X 3 = 5.5

Purge Data

Time	Flowrate (gpm)	Volume (gal)	Temp (°F)	EC (μs/cm)	pH	Turbidity (NTU)
9:28		0	66.5	630	7.02	28.3
9:32		2	66.4	639	7.03	6.6
9:36		4	66.4	636	6.99	3.0
9:40		6	66.0	630	6.98	1.9

Observations/Comments:

Overcast - foggy

Laboratory Analysis:

Sample at 10:00 AM
Water depth - 8.54 ft.
Analyze for TPH-D, TPH-G, BTEX and MTBE; Nitrate, Ammonia, Total Phosphorus, Ferrous Iron, Sulfate, REDOX, and Dissolved Oxygen.

Data for Volume Calculation:

1 cu. ft. = 7.48 gal = 62.4 lbs (approx)	1 gal = 0.134 cu. ft. = 8.34 lbs (approx)
2" well = 0 163 gal/linear ft.	3" well = 0.367 gal/linear ft.
4" well = 0.653 gal/linear ft	6" well = 1.469 gal/linear ft.

Quarterly Monitoring Data Sheet

Date: 9/23/99	Well Diameter: 2 Inches Well ID: MW-3
Project Location: Motor Partners Site	Well Type: Monitoring Well
1234 40th Ave., Oakland	Total Depth as Built: 23 ft
Sampler: G. Rogers	Screened Interval: 7 ft to 20 ft

Water Level Data	Purge Calculation(Min 3 Casing Volumes)
Time Depth Sounded: 10:45 AM	gal/ft X ft = gal X 3 = gal
Measured Depth to Water: 8.73 ft.	
Measured Total Depth: 21.42 ft.	0.163 X 12.69 = 2.07 X 3 = 6.2

Purge Data

Time	Flowrate (gpm)	Volume (gal)	Temp (°F)	EC (μs/cm)	pH	Turbidity (NTU)	
10:52		0	66.3	817	7.02	80.0	
10:56		2	66.7	812	6.98	33.6	
10:59		4	66.9	810	6.98	12.3	
11:03		6	67.1	806	6.98	5.1	

Observations/Comments:

Overcast - Foggy

Laboratory Analysis:

Sample at 11:05 AM
Water depth - 8.78 ft.
Analyze for TPH-D, TPH-G, BTEX and MTBE; Nitrate, Ammonia, Total Phosphorus, Ferrous Iron, Sulfate, REDOX, and Dissolved Oxygen.

Data for Volume Calculation:

1 cu. ft. = 7.48 gal = 62.4 lbs (approx)	1 gal = 0.134 cu. ft. = 8.34 lbs (approx)
2" well = 0.163 gal/linear ft.	3" well = 0.367 gal/linear ft
4" well = 0.653 gal/linear ft.	6" well = 1.469 gal/linear ft.

Quarterly Monitoring Data Sheet

Date: 9/23/99	Well Diameter: 2 Inches Well ID: MW-4
Project Location: Motor Partners Site 1234 40th Ave., Oakland	Well Type: Monitoring Well
	Total Depth as Built: 25 ft
Sampler: G. Rogers	Screened Interval: 5 ft to 25 ft

Water Level Data	Purge Calculation(Min 3 Casing Volumes)
Time Depth Sounded: 10:10 AM	gal/ft X ft = gal X 3 = gal
Measured Depth to Water: 8.08 ft.	
Measured Total Depth: 24.54 ft.	0.163 X 16.46 = 2.68 X 3 = 8.0

Purge Data

Time	Flowrate (gpm)	Volume (gal)	Temp (°F)	EC (μs/cm)	pH	Turbidity (NTU)
10:15		0	65.9	678	7.25	17.2
10:19		2	66.0	681	7.27	7.5
10:24		4	66.5	694	7.20	3.3
10:28		6	66.7	688	7.15	3.2
10:31		8	66.7	688	7.14	2.6

Observations/Comments:

Overcast - Foggy

Laboratory Analysis:

Sample at 10:35 AM
Water depth - 8.52 ft.
Analyze for TPH-D, TPH-G, BTEX and MTBE; Nitrate, Ammonia, Total Phosphorus, Ferrous Iron, Sulfate, REDOX, and Dissolved Oxygen.

Data for Volume Calculation:

1 cu. ft. = 7.48 gal = 62.4 lbs (approx) — 1 gal = 0.134 cu. ft. = 8.34 lbs (approx)
2" well = 0.163 gal/linear ft. — 3" well = 0.367 gal/linear ft
4" well = 0 653 gal/linear ft. — 6" well = 1.469 gal/linear ft.

Quarterly Monitoring Data Sheet

Date: 9/23/99	Well Diameter: 2 Inches Well ID: MW-5
Project Location: Motor Partners Site 1234 40th Ave., Oakland	Well Type: Monitoring Well
	Total Depth as Built: 21 ft
Sampler: G. Rogers	Screened Interval: 6 ft to 21 ft

Water Level Data	Purge Calculation(Min 3 Casing Volumes)
Time Depth Sounded: 11:15 AM	gal/ft X ft = gal X 3 = gal
Measured Depth to Water: 9.38 ft.	
Measured Total Depth: 19.66 ft.	0.163 X 10.28 = 1.68 X 3 = 5.0

Purge Data

Time	Flowrate (gpm)	Volume (gal)	Temp (°F)	EC (μs/cm)	pH	Turbidity (NTU)	
11:20		0	65.8	660	9.49	> 200	
11:24		2	66.0	730	7.61	139.2	
11:28		4	66.1	706	7.30	48.0	
11:32		6	66.0	703	7.11	19.5	

Observations/Comments:

Inside Building

Laboratory Analysis:

Sample at 11:35 AM
Water depth - 9.60 ft.
Analyze for TPH-D, TPH-G, BTEX and MTBE; Nitrate, Ammonia, Total Phosphorus, Ferrous Iron, Sulfate, REDOX, and Dissolved Oxygen.

Data for Volume Calculation:

1 cu. ft. = 7.48 gal = 62.4 lbs (approx)
2" well = 0.163 gal/linear ft.
4" well= 0.653 gal/linear ft.
1 gal = 0.134 cu. ft. = 8.34 lbs (approx)
3" well = 0.367 gal/linear ft.
6" well = 1.469 gal/linear ft.