



August 28, 1997

Mr. Steve Chrissanthos
Alameda Cellars
1709 Otis Drive
Alameda, California 94501

3952
LS

RE: Groundwater Monitoring Report
2425 Encinal Avenue, Alameda, California 94501
ACC Project No. 6039-002.05

Dear Mr. Chrissanthos:

The enclosed report describes work completed during groundwater monitoring at 2425 Encinal Avenue, Alameda, California. This work was performed to evaluate the areal extent of groundwater impact and evaluate petroleum hydrocarbon plume stability in accordance with requests from Alameda County Health Care Services Agency (ACHCSA).

The groundwater from wells MW-1 through MW-4 located at 2425 Encinal was sampled for petroleum hydrocarbons as gasoline. In addition, the groundwater was evaluated for indications of natural bioremediation.

Based on the sample analysis and in-field testing conducted, natural bioremediation is occurring at this site. However, natural bioremediation is occurring slowly. ACHCSA requested continued monitoring on a biannual basis to document decreasing concentrations of groundwater constituents. Once this is documented, ACC will present the "no further action" alternative to ACHCSA for consideration to obtain site closure.

If you have any comments regarding this report, please call me at (510) 638-8400.

Sincerely,

Misty C. Kaltreider
Senior Project Geologist

/mck:mcr

cc: Ms. Juliet Shin, ACHCSA ✓

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PROTECTION

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GROUNDWATER MONITORING REPORT

**2425 Encinal Avenue
Alameda, California**

ACC Project No. 6039-002.05

Prepared for:
Mr. Steve Chrissanthos
Alameda Cellars
1709 Otis Drive
Alameda, California

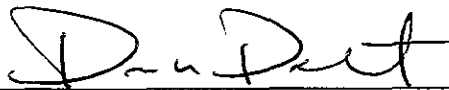
August 28, 1997

Prepared by:



Misty Kaltreider
Senior Project Geologist

Reviewed by:



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GROUNDWATER MONITORING REPORT
2425 Encinal Avenue
Alameda, California

1.0 INTRODUCTION

On behalf of Mr. Steve Chrissanthos of Alameda Cellars, ACC Environmental Consultants, Inc., (ACC) has prepared this report on groundwater monitoring performed at 2425 Encinal Avenue, Alameda, California. The site is located at the northern corner of Encinal and Park Avenues in Alameda, California (Figure 1). The property is occupied by Alameda Cellars, a commercial liquor store.

The project objectives were to: 1) measure the water levels and calculate the elevation of the groundwater in each monitoring well; 2) obtain groundwater samples from four of the six existing monitoring wells and analyze the water samples for total petroleum hydrocarbons as gasoline (TPHg), benzene, toluene, ethylbenzene, and total xylenes (BTEX), and methyl tert butyl ether (MTBE); 3) obtain measurements of intrinsic bioremediation; and 4) report the findings.

2.0 BACKGROUND

In March 1990, two 10,000-gallon gasoline underground storage tanks (USTs) were removed from the subject site. Analysis of the soil samples collected from beneath the USTs indicated concentrations up to 710 parts per million (ppm) TPHg.

In December 1992, ACC performed a subsurface investigation, including drilling five borings on site. Three of the borings were converted into monitoring wells MW-1, MW-2a, and MW-3. Analytical results of the soil collected during drilling and sampling indicated concentrations up to 1,365 ppm TPHg and up to 18.9 ppm benzene. Initial groundwater samples collected from the monitoring wells in January 1993 indicated concentrations up to 5,680 parts per billion (ppb) in well MW-2a and up to 1,560 ppb benzene in well MW-1.

An additional soil investigation was conducted in May 1993 to evaluate the extent of impact in the soil and groundwater. Findings of the additional investigation indicated the lateral extent of petroleum hydrocarbon impacted soil did not appear to extend beyond the property boundaries along the northern, western, and eastern sides. However, along the southern side, the impacted soil appeared to extend into Park and Encinal Avenues. Field observations made during the additional investigation and soil sample analytical results indicated impacted soil existed primarily around the former tank excavation and the former dispenser island. The vertical extent of petroleum hydrocarbons in soil occurs at the soil/groundwater interface.

Analysis of grab groundwater samples collected from borings drilled during the additional investigation indicates that residual petroleum hydrocarbons from the former tank excavation and dispenser island migrated off site via the groundwater.

In December 1993, three additional monitoring wells (MW-4, MW-5, and MW-6) were installed at the property to further evaluate the extent of petroleum hydrocarbon impact to groundwater. Locations of the monitoring wells are illustrated on Figure 2. Laboratory analysis of the soil samples collected from each boring indicated no detectable concentrations of constituents, which verifies the lateral extent of soil impact.

Laboratory analytical results of the groundwater samples collected from monitoring wells MW-5 and MW-6 have consistently indicated no detectable concentrations of constituents above reporting limits, indicating a lateral extent of groundwater impact. Laboratory analytical results of groundwater collected from monitoring well MW-4 indicated detectable concentrations of constituents. The location of the southern edge of the groundwater impact is just off site to the south. This crossgradient movement is attributed to the relatively flat gradient and possible recharge into the excavated area.

In a letter dated April 30, 1996, the Alameda County Health Care Services Agency (ACHCSA) requested that in-field testing and additional analyses be performed on groundwater samples collected at the site to evaluate whether natural bioremediation is occurring. ACC's report dated February 13, 1997, addresses the results of the additional analyses. ACC continues to perform in-field testing to evaluate natural bioremediation.

In December 1996, ACC prepared a risk assessment to evaluate the potential risk that impacted subsurface soil and groundwater on site have on usage of the property. Based on the risk assessment, the remaining impacted soil and groundwater at the site would not pose a significant risk to onsite workers. ACHCSA agreed with the findings. However, in its letter dated April 11, 1997, ACHCSA requested that area adjacent to the subject site be evaluated to determine whether the impacted groundwater is migrating toward residential area which may pose a human health risk. An offsite groundwater inspection was performed on August 4, 1997. The offsite investigation included collecting water samples from two borings drilled adjacent to the closest residential properties adjacent to the subject site. Result of the investigation indicated that no impacted groundwater is migrating from the subject site toward adjacent residences.

3.0 GROUNDWATER MONITORING AND SAMPLING

ACC conducted groundwater monitoring on August 8, 1997. Work at the site included measuring depth to water, subjectively evaluating groundwater in the wells, and purging and sampling four of the six onsite wells for laboratory analysis. In accordance with ACHSCSA's approved monitoring schedule for the site, wells MW-1 through MW-4 are sampled quarterly, and wells MW-5 and MW-6 are sampled biannually.

3.1 Groundwater Monitoring

Before groundwater sampling, the depth to the surface of the water table was measured from the top of the polyvinyl chloride well casing using a Solinst water level meter. The water level

measurements were recorded to the nearest 0.01 foot with respect to mean sea level (MSL). Groundwater monitoring data obtained at the site is included in Appendix 1. Information regarding well elevations and groundwater levels is summarized in Table 1.

TABLE 1 - GROUNDWATER DEPTH INFORMATION

Well ID Well Elevation	Date Monitored	Depth to Groundwater (feet)	Groundwater Elevation (feet above MSL)
MW-1 27.61	01/09/93	6.75	20.86
	02/09/93	6.41	21.20
	03/10/93	6.34	21.27
	04/12/93	6.52	21.09
	05/17/93	7.38	20.23
	06/28/93	8.42	19.19
	07/13/93	8.68	18.93
	08/10/93	8.25	19.36
	09/10/93	8.73	18.88
	10/12/93	9.04	18.57
	12/20/93	7.87	19.74
	03/18/94	6.96	20.65
	04/08/94	7.69	19.92
	06/22/94	8.55	19.06
	12/07/94	6.92	20.69
	03/16/95	5.54	22.07
	06/23/95	7.17	20.44
	09/14/95	8.17	19.44
	12/18/95	6.77	20.84
	3/19/96	5.34	22.27
06/27/96	7.45	20.16	
10/14/96	8.66	18.95	
04/30/97	7.20	20.41	
08/08/97	9.08	18.53	
MW-2a 27.98	01/09/93	7.06	20.92
	02/09/93	6.63	21.35
	03/10/93	6.57	21.41
	04/12/93	6.77	21.21
	05/17/93	7.61	20.37
	06/28/93	8.68	19.30
	07/13/93	8.94	19.04
	08/10/93	8.66	19.32
	09/10/93	8.95	19.03

Well ID Well Elevation	Date Monitored	Depth to Groundwater (feet)	Groundwater Elevation (feet above MSL)
MW-2a 27.98 (continued)	10/12/93	9.36	18.62
	12/20/93	8.24	19.74
	03/18/94	7.80	20.18
	04/08/94	7.67	20.31
	06/22/94	7.82	20.16
	12/07/94	7.23	20.75
	03/16/95	5.62	22.36
	06/23/95	7.35	20.63
	09/14/95	8.41	19.57
	12/18/95	7.05	20.93
	3/19/96	5.49	22.49
	06/27/96	7.67	20.31
	10/14/96	---	---
	04/30/97	7.41	20.57
	08/08/97	9.35	18.63
MW-3 27.89	01/09/93	6.68	21.21
	02/09/93	6.25	21.64
	03/10/93	6.18	21.71
	04/12/93	6.41	21.48
	05/17/93	7.37	20.52
	06/28/93	8.47	19.42
	07/13/93	8.74	19.15
	08/10/93	8.45	19.44
	09/10/93	8.52	19.37
	10/12/93	9.20	18.69
	12/20/93	7.95	19.94
	03/18/94	6.60	21.29
	04/08/94	7.70	20.19
	06/22/94	8.62	19.27
	12/07/94	6.92	20.97
	03/16/95	5.25	22.64
	06/23/95	6.99	20.90
	09/14/95	8.11	19.78
	12/18/95	6.58	21.31
	3/19/96	5.14	22.75
06/27/96	7.37	20.52	
10/14/96	8.62	19.27	
04/30/97	7.08	20.81	
08/08/97	9.18	18.71	

Well ID Well Elevation	Date Monitored	Depth to Groundwater (feet)	Groundwater Elevation (feet above MSL)
MW-4 26.97	12/20/93	7.25	19.72
	03/18/94	6.64	20.33
	04/08/94	7.12	19.85
	06/22/94	7.96	19.01
	12/07/94	6.32	20.65
	03/16/95	5.08	21.89
	06/23/95	6.65	20.32
	09/14/95	7.61	19.36
	12/18/95	6.20	20.77
	03/19/96	4.87	22.10
	06/27/96	6.93	20.04
	10/14/96	8.12	18.85
	04/30/97	6.66	20.31
08/08/97	8.48	18.49	
MW-5 27.34	12/20/93	8.01	19.33
	03/18/94	7.80	19.54
	04/08/94	7.82	19.52
	06/22/94	8.51	18.83
	12/07/94	7.08	20.26
	03/16/95	5.72	21.62
	06/23/95	7.38	19.96
	09/14/95	8.27	19.07
	12/18/95	7.17	20.17
	3/19/96	5.49	21.85
	06/27/96	7.55	19.79
	10/14/96	8.72	18.62
	04/30/97	7.34	20.00
08/08/97	8.97	18.37	
MW-6 28.03	12/20/93	8.00	20.03
	03/18/94	---	---
	04/08/94	7.72	20.31
	06/22/94	8.68	19.35
	12/07/94	---	---
	12/13/94	6.73	21.30
	03/16/95	5.04	22.99
	06/23/95	6.90	21.13
	09/14/95	8.07	19.96
	12/18/95	---	---
3/19/96	5.05	22.98	

Well ID Well Elevation	Date Monitored	Depth to Groundwater (feet)	Groundwater Elevation (feet above MSL)
MW-6 28.03 (continued)	06/27/96	7.55	19.79
	10/14/96	8.63	19.40
	04/30/97	7.02	21.01
	08/08/97	9.22	18.81

Note: Depth to groundwater measured from the top of well casing

In addition, groundwater monitoring was performed before, during, and after purging to evaluate the groundwater for intrinsic parameters of biodegradation. Monitoring included measuring dissolved oxygen (DO), salinity, turbidity, pH, and temperature with the use of a Horiba® flow-cell unit. The parameter results from August 8, 1997, are summarized in Table 2.

TABLE 2 - MONITORING PARAMETERS

Well No.- Gallons Removed	pH	Temp (°C)	Conductivity (µm/cm)	DO (mg/L)	Salinity	Turbidity (units)
MW-1 - 1.4	6.68	22.3	0.706	3.40	0.03	58
2.8	6.72	21.8	0.607	3.81	0.02	165
4.2	6.81	21.6	0.526	3.93	0.02	311
5.6	6.78	21.5	0.521	3.57	0.02	292
MW-2 - 0.8	6.87	22.2	0.538	3.43	0.02	74
1.6	6.91	21.9	0.581	3.18	0.02	148
2.4	6.88	21.8	0.542	3.16	0.02	281
3.2	6.85	21.2	0.551	3.68	0.02	311
MW-3 - 0.9	6.87	22.0	0.624	3.27	0.02	654
1.8	6.79	21.6	0.721	3.34	0.02	999
2.7	6.81	21.2	0.681	3.41	0.02	854
3.6	6.81	21.0	0.591	3.37	0.02	921
MW-4 - 1.5	6.74	23.1	0.555	3.84	0.02	121
3.0	6.88	23.0	0.533	4.30	0.02	206
4.5	6.87	22.8	0.514	4.55	0.02	186
6.0	6.87	22.6	0.518	4.33	0.02	218

Note: mg/L = milligrams per liter, equivalent to ppm

3.2 Groundwater Gradient

The groundwater flow direction, as calculated from monitoring well data obtained on August 8, 1997, is illustrated on Figure 3. Based on groundwater elevation calculations, groundwater flow is toward the southwest at an average gradient of 0.004 foot/foot. The groundwater flow direction, as

determined from monitoring well data, is similar to previous sampling events. Table 3 summarizes historical gradient and approximate flow directions calculated from water elevations.

TABLE 3 - HISTORICAL GRADIENT AND FLOW DIRECTION

Date Monitored	Gradient (foot/foot)	Direction
01/09/93	0.01	west
02/09/93	0.01	southwest
03/10/93	0.01	west/southwest
04/12/93	0.01	west/southwest
05/17/93	0.01	south/southwest
06/28/93	0.01	southwest
07/13/93	0.01	southwest
08/10/93	0.004	west
09/10/93	0.02	southwest
10/12/93	0.004	southwest
12/20/93	0.01	west
03/18/94	0.02	west
04/08/94	0.01	west
06/22/94	0.03	south/southwest
12/07/94	0.01 (average)	west/southwest
03/16/95	0.01	southwest
06/23/95	0.01-0.013 (varies)	southwest
09/14/95	0.008	southwest
12/18/95	0.011	southwest
03/19/96	0.011	southwest
06/27/96	0.013	southwest
10/14/96	0.007	southwest
04/30/97	0.01	southwest
08/08/97	0.004	southwest

3.3 Groundwater Sampling

Before groundwater sampling, the wells were purged using a new polyethylene disposable bailer and new string. Groundwater samples were collected when temperature, pH, and conductivity of the water stabilized and a minimum of four well-casing volumes of water had been removed. Following purging, each well was allowed to recharge prior to sampling. When recovery to 80 percent of the static water level was observed, a sample was collected for analysis. Groundwater conditions were monitored during purging and sampling. Well monitoring worksheets are included as Appendix 1.

Wells were sampled using a disposable polyethylene bailer attached to new string. From the monitoring wells, sample vials were filled to overflowing and sealed so that no air was trapped in the vial. Once filled, sample vials were inverted and tapped to test for air bubbles. Samples were collected in approved, laboratory-supplied vials. Sample containers were labeled with self-adhesive, preprinted tags and stored in a pre-chilled, insulated container pending delivery to a state-certified laboratory for analysis.

Water purged during the development and sampling of the monitoring wells was stored temporarily on site in Department of Transportation approved 55-gallon drums pending laboratory analysis and proper disposal.

4.0 RESULTS OF GROUNDWATER SAMPLING

Groundwater samples collected from the wells were submitted to Chromalab, Inc., following chain of custody protocol. Groundwater samples collected from wells MW-1 through MW-4 were analyzed for TPHg, BTEX, and methyl tertiary butyl ether (MTBE) by EPA Method 8015M/8020. Copies of the chain of custody record and laboratory analytical reports are included in Appendix 2. Dissolved gasoline constituents were detected in groundwater samples collected from wells MW-1, MW-2a, MW-3, and MW-4. A summary of groundwater sample results is presented in Table 4.

TABLE 4 - GROUNDWATER SAMPLE ANALYTICAL RESULTS

Well ID	Date Sampled	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
MW-1	01/09/93	5,360	1,560.0	1,026.6	641.0	2,706.2	---
	04/12/93	12,000	750.0	100.0	500.0	1,400.0	---
	07/13/93	720	119.6	32.7	70.8	262.0	---
	10/12/93	8,400	420.0	39.0	280.0	880.0	---
	12/20/93	5,200	270.0	58.0	170.0	590.0	---
	03/18/94	18,000	570.0	180.0	270.0	1,500.0	---
	04/08/94	NT	NT	NT	NT	NT	---
	06/22/94	4,800	160.0	56.0	130.0	310.0	---
	12/07/94	9,100	530.0	200.0	350.0	1,300.0	---

Well ID	Date Sampled	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
	03/16/95	230	15.0	4.5	9.4	38.0	---
	06/23/95	2,700	170.0	19.0	40.0	180.0	---
	09/14/95	1,700	160.0	12.0	69.0	100.0	---
	12/18/95	2,900	190.0	57.0	130.0	380.0	---
	03/19/96	14,000	910	280	400	2,100	---
	06/27/96	5,300	320	81	280	710	---
	10/14/96	1,000	58	4.2	40	25	---
	04/30/97	4,400	230	64	220	550	<50
	08/08/97	830	37	4.2	14	28	<5.0
MW-2a	01/09/93	5,680	801.6	598.6	840.2	2,196.1	---
	04/12/93	12,000	460.0	110.0	240.0	1,600.0	---
	07/13/93	550	145.2	47.5	126.8	127.4	---
	10/12/93	2,000	280.0	17.0	100.0	120.0	---
	12/20/93	3,300	450.0	40.0	200.0	350.0	---
	03/18/94	7,900	370.0	53.0	190.0	530.0	---
	04/08/94	NT	NT	NT	NT	NT	---
	06/22/94	3,800	420.0	37.0	140.0	290.0	---
	12/07/94	6,800	640.0	100.0	370.0	950.0	---
	03/16/95	6,500	590.0	96.0	360.0	1,000.0	---
	06/23/95	4,300	170.0	58.0	33.0	810.0	---
	09/14/95	1,700	270.0	17.0	76.0	160.0	---
	12/18/95	3,900	410.0	52.0	290.0	610.0	---
	03/19/96	9,000	470	70	540	1,400	---
	06/27/96	9,900	350	33	230	580	---
	10/14/96	---	---	---	---	---	---
04/30/97	4,400	230	64	220	550	<50	
08/08/97	3,500	330	27	100	310	<50	
MW-3	01/09/93	<50	<0.5	<0.5	<0.5	<0.5	---
	04/12/93	1,500	95.0	30.0	46.0	85.0	---
	07/13/93	540	18.3	106.2	75.7	128.0	---
	10/12/93	3,500	290.0	230.0	210.0	460.0	---
	12/20/93	690	31.0	10.0	31.0	25.0	---
	03/18/94	450	9.6	11.0	5.5	23.0	---
	04/08/94	NT	NT	NT	NT	NT	---
	06/22/94	2,500	150.0	130.0	81.0	280.0	---
	12/07/94	420	16.0	8.3	26.0	37.0	---
	03/16/95	490	19.0	2.7	24.0	46.0	---
	06/23/95	860	41.0	5.4	32.0	110.0	---
	09/14/95	720	43.0	3.7	50.0	86.0	---

Well ID	Date Sampled	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
	12/18/95	860	27.0	10.0	38.0	53.0	---
	03/19/96	570	28	2.2	21	30	---
	06/27/96	910	54	4.9	53	79	---
	10/14/96	610	48	3.6	31	37	---
	04/30/97	590	44	4.5	25	39	<5.0
	08/08/97	1,400	150	11	47	33	<5.0
MW-4	12/20/93	580	2.3	<0.5	1.4	1.1	---
	03/18/94	2,100	11.0	1.5	2.3	6.0	---
	04/08/04	NT	NT	NT	NT	NT	---
	06/22/94	1,600	39.0	7.5	13.0	16.0	---
	12/07/94	2,100	82.0	9.6	4.7	14.0	---
	03/16/95	3,400	140.0	12.0	45.0	29.0	---
	06/23/95	1,800	140.0	13.0	13.0	28.0	---
	09/14/95	3,900	250.0	6.1	3.8	11.0	---
	12/18/95	2,400	94.0	14.0	11.0	29.0	---
	03/19/96	1,300	68.0	8.2	25.0	21.0	---
	06/27/96	2,100	96.0	11.0	18.0	20.0	---
	10/14/96	2,300	130	8.4	3.4	5.6	---
	04/30/97	2,500	100	12	46	35	<50
08/08/97	2,100	92.0	8.1	7.2	20	<5.0	
MW-5	12/20/93	<50	<0.5	<0.5	<0.5	<0.5	---
	03/18/94	<50	<0.5	<0.5	<0.5	<0.5	---
	04/08/94	NT	NT	NT	NT	NT	---
	06/22/94	<50	<0.5	<0.5	<0.5	<0.5	---
	12/07/94	<50	<0.5	<0.5	<0.5	<0.5	---
	03/16/95	<50	<0.5	<0.5	<0.5	<0.5	---
	06/12/95	<50	<0.5	<0.5	<0.5	<0.5	---
	09/14/95	<50	<0.5	<0.5	<0.5	<0.5	---
	12/18/95	<50	<0.5	<0.5	<0.5	<0.5	---
	03/19/96	<50	<0.5	<0.5	<0.5	<0.5	---
	06/27/96	<50	<0.5	<0.5	<0.5	<0.5	---
	10/14/96	<50	<0.5	<0.5	<0.5	<0.5	---
04/30/97	<50	<0.5	<0.5	<0.5	<0.5	<5.0	
MW-6	12/20/93	<50	<0.5	<0.5	<0.5	<0.5	---
	03/13/94	NT	NT	NT	NT	NT	---
	04/08/94	<50	<0.5	<0.5	<0.5	<0.5	---
	06/22/94	<50	<0.5	<0.5	<0.5	<0.5	---
	12/13/94	<50	<0.5	<0.5	<0.5	<0.5	---
	03/16/95	<50	<0.5	<0.5	<0.5	<0.5	---

Well ID	Date Sampled	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
	06/23/95	<50	<0.5	<0.5	<0.5	<0.5	---
	09/14/95	<50	<0.5	<0.5	<0.5	<0.5	---
	03/19/96	<50	<0.5	<0.5	<0.5	<0.5	---
	06/27/96	<50	<0.5	<0.5	<0.5	<0.5	---
	10/14/96	<50	<0.5	<0.5	<0.5	<0.5	---
	04/30/97	<50	<0.5	<0.5	<0.5	<0.5	<5.0

Notes: µg/L = micrograms per liter (approximately equivalent to ppb)
NT = Not tested

5.0 DISCUSSION

This report documents the groundwater monitoring conducted for all six groundwater wells at Alameda Cellars, 2425 Encinal Avenue, Alameda, California. Groundwater sample results indicate detectable concentrations of gasoline constituents in the groundwater samples collected from wells MW-1, MW-2a, MW-3, and MW-4. The samples collected from wells MW-1, MW-2a and MW-4 indicated a decrease in TPHg compared with the previous sampling events. Concentrations of TPHg reported in well MW-1 have decreased 81 percent since the last sampling event. Concentrations of gasoline constituents in well MW-3 increased approximately 57 percent since the previous sampling event. Groundwater flow direction and gradient are consistent with the previous sampling events.

In addition to petroleum hydrocarbons, the groundwater was evaluated for indicator parameters of bioremediation. The water in each well was monitored before, during, and after purging to evaluate indications of biodegradation.

5.1 Dissolved Oxygen

DO concentrations can be used to evaluate the mass of constituents that can be biodegraded by aerobic processes. During aerobic biodegradation, DO levels are reduced and aerobic biodegradation can degrade BTEX components if sufficient DO (>1 to 2 mg/L) is present (Buscheck and O'Reilly, March 1995). Levels of DO varied throughout the site from 4.55 mg/L in well MW-4 to 3.18 mg/L in well MW-2. Water from well MW-3 (in which concentrations doubled compared with the previous event) indicated the low levels of DO. The DO levels increased in well MW-4 (which had a 16 percent decrease in TPHg concentrations from previous event sampling concentrations), indicating that the natural microbes are using the DO to degrade petroleum hydrocarbons.

6.0 CONCLUSIONS

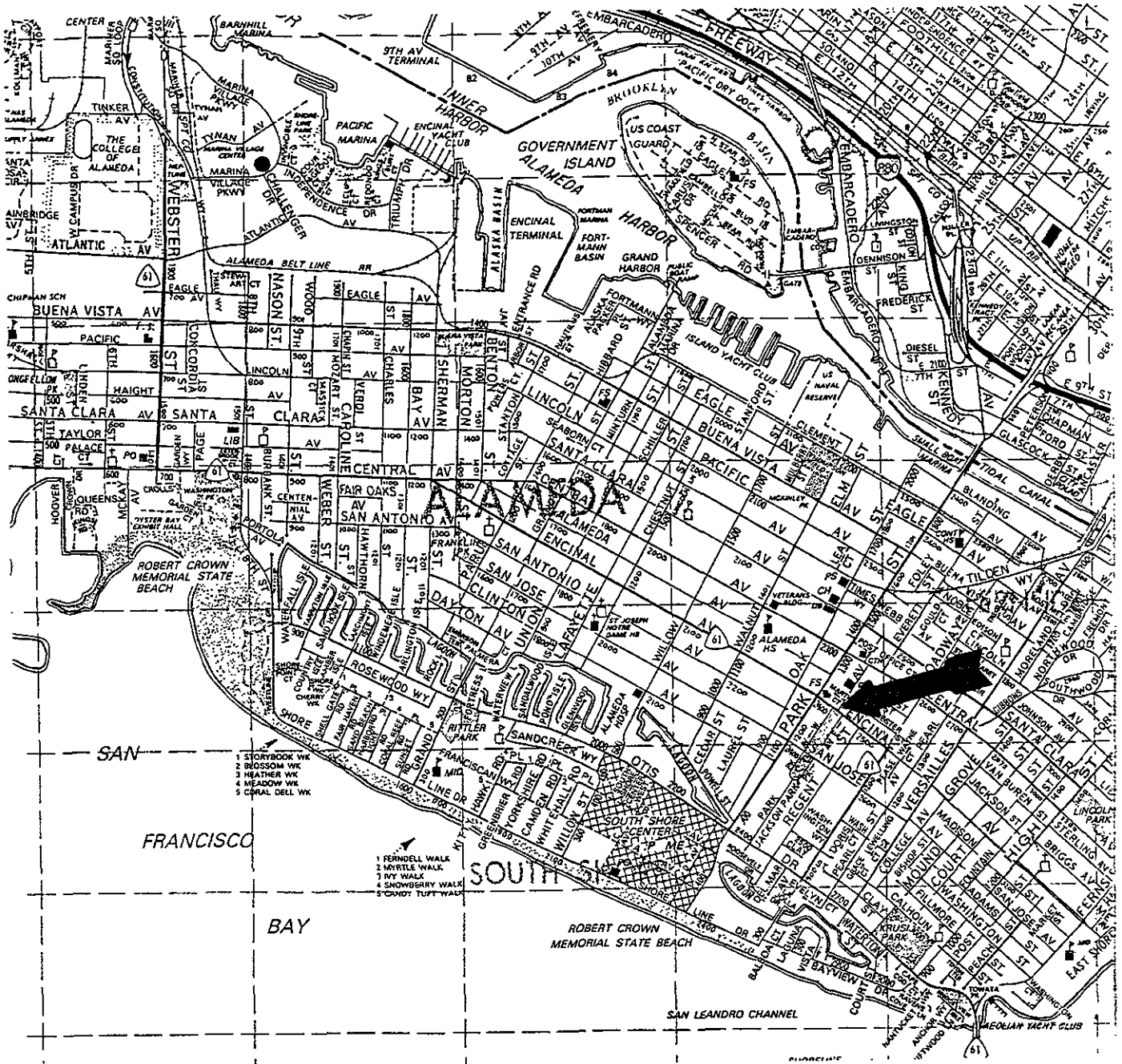
The extent of the groundwater impact has been identified and groundwater monitoring conducted since January 1993 has documented fluctuating concentrations of TPHg and BTEX. However, the overall concentrations within the groundwater are decreasing. Based on the work completed to date and the analytical results from groundwater monitoring, the following conclusions can be made:

- The findings from the groundwater monitoring and analysis indicate that natural biodegradation is occurring within the impacted groundwater plume. Due to the naturally occurring concentrations of DO in the groundwater, natural biodegradation is occurring aerobically.
- Because of the rate of aerobic biodegradation, petroleum hydrocarbon concentrations in the groundwater will continue to illustrate fluctuations as a result of fluctuating water levels, but the overall concentrations will decrease with time. This slow decrease has been illustrated in the groundwater sampling and analysis performed at the site since 1993.
- The most recent groundwater sampling indicates detectable concentrations of petroleum hydrocarbons in monitoring wells MW-1 through MW-4. TPHg concentrations decreased in wells MW-1, MW-2a, and MW-4 and benzene concentrations decreased in wells MW-1 and MW-4 during the current event. TPHg concentrations increased in monitoring well MW-2.
- The bulk of the source was removed with the tank removal; therefore, ACC believes that the detectable concentrations observed in the groundwater in wells MW-1 through MW-4 are the result of remnant impacted soil affecting the groundwater. Iso-contour maps of gasoline constituents in the groundwater on site also indicate that constituent migration in the groundwater is through simple diffusion.
- The area of impact is limited based on laboratory results from samples previously collected from well MW-5, which has historically indicated no detectable concentrations of constituents.
- Due to the relatively flat gradient, the potential for plume migration is limited. Impacted groundwater will likely degrade before any substantial downgradient migration occurs and a stable plume has been clearly demonstrated.

7.0 RECOMMENDATIONS

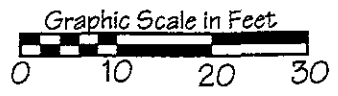
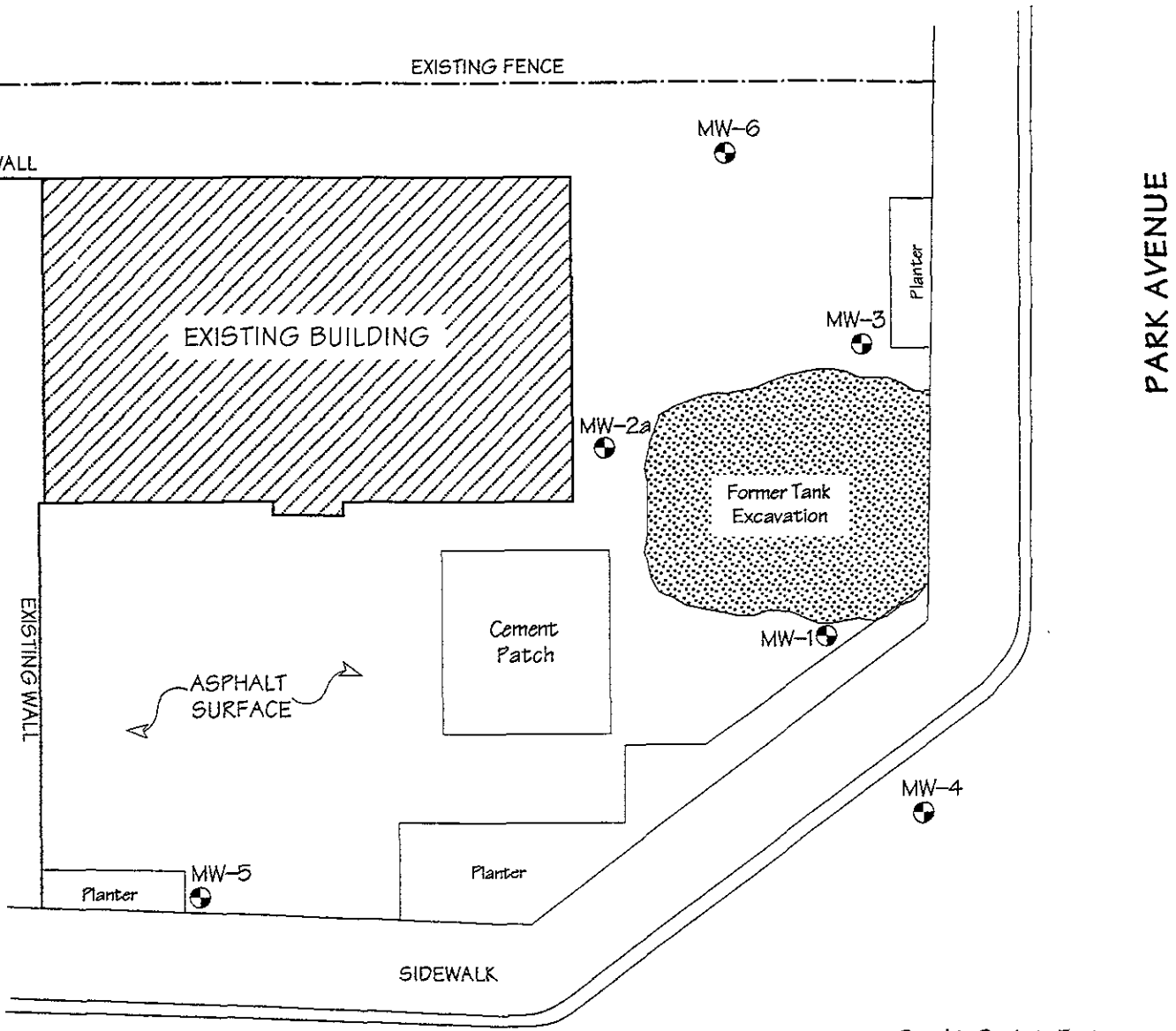
Based on the work completed to date and the laboratory results from the groundwater samples collected, ACC anticipates that the concentrations observed within the monitoring wells will fluctuate with seasonal precipitation then decline with time.

ACC recommends that the site be evaluated for final site closure with no further investigation or monitoring.



SOURCE: THOMAS BROTHERS GUIDE, 1990 ed.

Title: Location Map 2425 Encinal Avenue Alameda, California	
Figure Number: 1.0	Scale: 1" = 1/4 mi
Drawn By: JVC	Date: 3/19/96
Project Number: 6039-5	
ACC Environmental Consultants 7977 Capwell Drive, Suite 100 Oakland, California 94621 (510) 638-8400 Fax: (510) 638-8404	



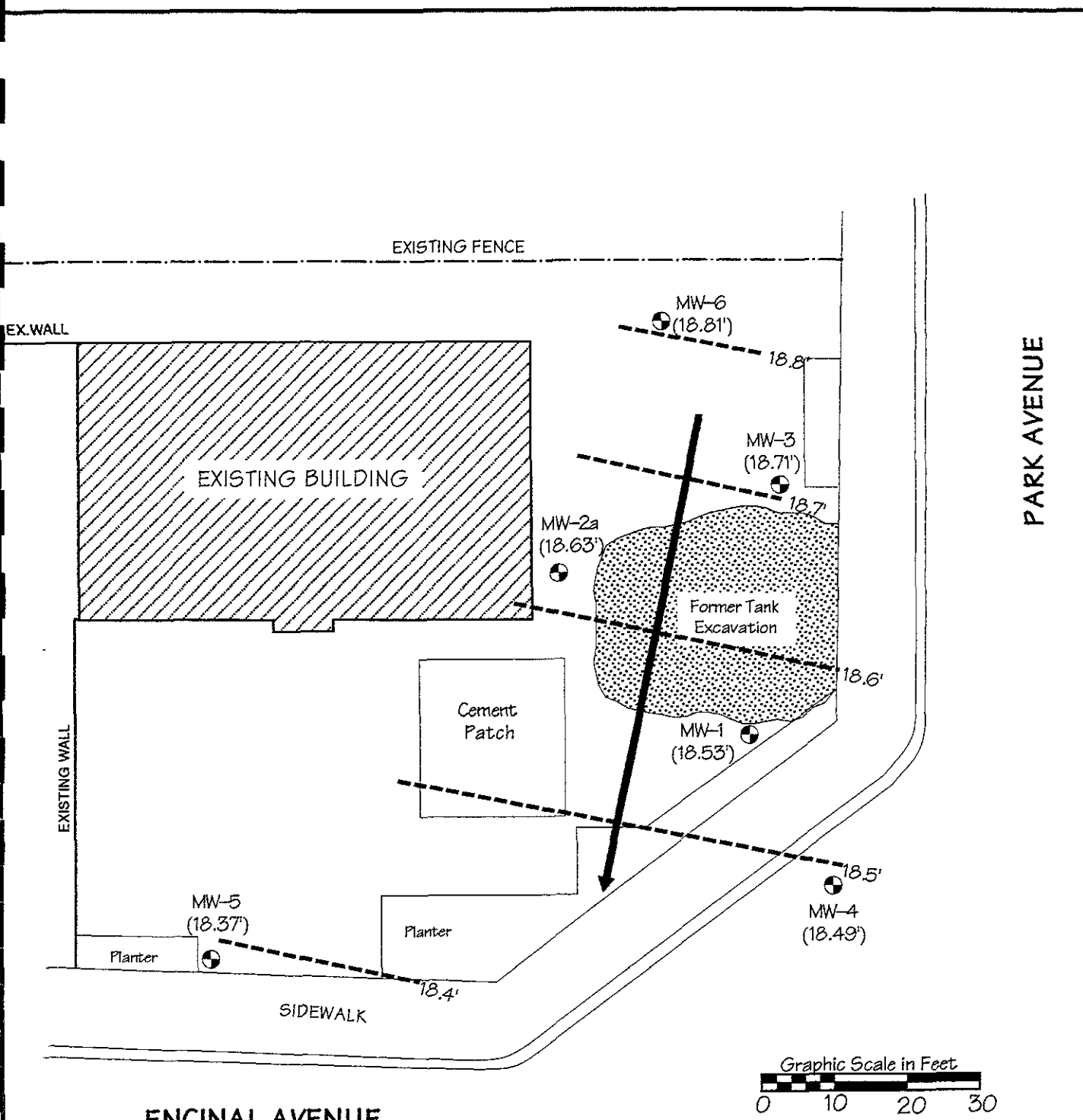
ENCINAL AVENUE

PARK AVENUE


Title: Site Plan 2425 Encinal Ave Alameda, California	
Figure Number: 2	Scale: 1" = 20"
Drawn By: JVC	Date: 11/18/96
Project Number: 6039-2.5	
ACC Environmental Consultants 7977 Capwell Drive, Suite 100 Oakland, CA 94621 (510) 638-8400 Fax: (510) 638-8404	


Legend


MW-5 - Groundwater Monitoring Well Location



Legend

MW-5  - Groundwater Monitoring Well Location

 - Groundwater Elevation Contour
(Contour Interval = 0.1 foot)

 - Approximate Groundwater Flow Direction 8/8/97

Title: **Groundwater Gradient**
2425 Encinal Avenue
Alameda, California

Figure Number: **3**

Scale: **1" = 20'**

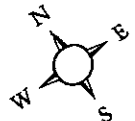
Drawn By: **JVC**

Date: **8/26/97**

Project Number: **6039-002.05**

ACC Environmental Consultants
 7977 Capwell Drive, Suite 100
 Oakland, CA 94621

(510) 638-8400 Fax: (510) 638-8404



WELL MONITORING WORKSHEET

JOB NAME: Alameda Cellars PURGE METHOD: Manual Bailing
 SITE ADDRESS: 2425 Encinal Ave SAMPLED BY: Eloy Cisneros
 JOB #: 6039-5.0 LABORATORY: Chromalab
 DATE: 8/7/97 ANALYSIS: TPHg, BTEX, MTBE
 Onsite Drum Inventory SOIL: MONITORING DEVELOPING
 EMPTY: WATER: 1=100% SAMPLING

WELL:	PURGE VOL:	PURGE WATER READINGS						OBSERVATIONS
		(Gal)	pH	Temp.(C)	Cond.	Sal.	Turb.	
WELL: <u>MW-1</u>								<input type="checkbox"/> Froth
DEPTH OF BORING: <u>17.52'</u>	<u>1.4</u>	<u>6.68</u>	<u>22.3</u>	<u>0.706</u>	<u>0.03</u>	<u>58</u>	<u>3.40</u>	<input type="checkbox"/> Sheen
DEPTH TO WATER: <u>9.08'</u>	<u>2.8</u>	<u>6.72</u>	<u>21.8</u>	<u>0.607</u>	<u>0.02</u>	<u>165</u>	<u>3.81</u>	<input checked="" type="checkbox"/> Odor Type <u>gas</u>
WATER COLUMN: <u>8.44'</u>	<u>4.2</u>	<u>6.81</u>	<u>21.6</u>	<u>0.526</u>	<u>0.02</u>	<u>311</u>	<u>3.93</u>	<input type="checkbox"/> Free Product
WELL DIAMETER: <u>2"</u>								Amount _____ Type _____
WELL VOLUME: <u>≈ 1.4 gal</u>								<input type="checkbox"/> Other
COMMENTS:								
	<u>5.6</u>	<u>6.78</u>	<u>21.5</u>	<u>0.521</u>	<u>0.02</u>	<u>292</u>	<u>3.57</u>	
WELL: <u>MW-2</u>								<input type="checkbox"/> Froth
DEPTH OF BORING: <u>14.13'</u>	<u>0.8</u>	<u>6.87</u>	<u>22.2</u>	<u>0.538</u>	<u>0.02</u>	<u>74</u>	<u>3.42</u>	<input type="checkbox"/> Sheen
DEPTH TO WATER: <u>9.35'</u>	<u>1.6</u>	<u>6.91</u>	<u>21.9</u>	<u>0.581</u>	<u>0.02</u>	<u>148</u>	<u>3.18</u>	<input checked="" type="checkbox"/> Odor Type <u>gas</u>
WATER COLUMN: <u>4.78'</u>	<u>2.4</u>	<u>6.88</u>	<u>21.8</u>	<u>0.542</u>	<u>0.02</u>	<u>281</u>	<u>3.61</u>	<input type="checkbox"/> Free Product
WELL DIAMETER: <u>2"</u>								Amount _____ Type _____
WELL VOLUME: <u>≈ 0.8 gal</u>								<input type="checkbox"/> Other
COMMENTS:								
	<u>3.2</u>	<u>6.85</u>	<u>21.2</u>	<u>0.551</u>	<u>0.02</u>	<u>311</u>	<u>3.68</u>	
WELL: <u>MW-3</u>								<input type="checkbox"/> Froth
DEPTH OF BORING: <u>14.80'</u>	<u>0.9</u>	<u>6.87</u>	<u>22.0</u>	<u>0.624</u>	<u>0.02</u>	<u>654</u>	<u>3.27</u>	<input type="checkbox"/> Sheen
DEPTH TO WATER: <u>9.18'</u>	<u>1.8</u>	<u>6.79</u>	<u>21.6</u>	<u>0.721</u>	<u>0.02</u>	<u>999</u>	<u>3.34</u>	<input checked="" type="checkbox"/> Odor Type <u>gas</u>
WATER COLUMN: <u>5.62'</u>	<u>2.7</u>	<u>6.81</u>	<u>21.2</u>	<u>0.681</u>	<u>0.02</u>	<u>854</u>	<u>3.41</u>	<input type="checkbox"/> Free Product
WELL DIAMETER: <u>2"</u>								Amount _____ Type _____
WELL VOLUME: <u>≈ 0.9 gal</u>								<input type="checkbox"/> Other
COMMENTS:								
	<u>3.6</u>	<u>6.81</u>	<u>21.0</u>	<u>0.591</u>	<u>0.02</u>	<u>921</u>	<u>3.37</u>	



ACC MONITORING WELL WORKSHEET

JOB NAME: Alameda Cellars PURGE METHOD: Manual Bailing
 SITE ADDRESS: 2425 Euclid Ave SAMPLED BY: Eloy Cisneros
 JOB #: 6039-5.0 LABORATORY: Chromalab
 DATE: 8/7/97 ANALYSIS: TPH, BTEX, MTBE
 Onsite Drum Inventory SOIL: MONITORING DEVELOPING
 EMPTY: WATER: 1=100% SAMPLING

WELL:	PURGE VOL:	PURGE WATER READINGS						OBSERVATIONS	
		(Gal)	pH	Temp.(C)	Cond.	Sal.	Turb.		D.O.
WELL: MW-4 DEPTH OF BORING: <u>17.51'</u> DEPTH TO WATER: <u>8.48'</u> WATER COLUMN: <u>9.03'</u> WELL DIAMETER: <u>2"</u> WELL VOLUME: <u>~1.5 gal</u> COMMENTS:								<input type="checkbox"/> Froth	
	1.5	6.74	23.1	0.555	0.02	121	3.84	<input type="checkbox"/> Sheen	
	3.0	6.88	23.0	0.533	0.02	206	4.30	<input checked="" type="checkbox"/> Odor Type <u>gas</u>	
	4.5	6.87	22.8	0.514	0.02	186	4.55	<input type="checkbox"/> Free Product	
								Amount _____ Type _____	
								<input type="checkbox"/> Other	
	6.0	6.87	22.6	0.518	0.02	218	4.33		
WELL: MW-5 DEPTH OF BORING: <u>17.50'</u> DEPTH TO WATER: <u>8.97'</u> WATER COLUMN: <u>8.53'</u> WELL DIAMETER: <u>2"</u> WELL VOLUME: COMMENTS:								<input type="checkbox"/> Froth	
								<input type="checkbox"/> Sheen	
									<input type="checkbox"/> Odor Type _____
									<input type="checkbox"/> Free Product
									Amount _____ Type _____
								<input type="checkbox"/> Other	
WELL: MW-6 DEPTH OF BORING: <u>17.52'</u> DEPTH TO WATER: <u>9.22'</u> WATER COLUMN: <u>8.30'</u> WELL DIAMETER: <u>2"</u> WELL VOLUME: COMMENTS:								<input type="checkbox"/> Froth	
								<input type="checkbox"/> Sheen	
									<input type="checkbox"/> Odor Type _____
									<input type="checkbox"/> Free Product
									Amount _____ Type _____
								<input type="checkbox"/> Other	

ANALYTICAL RESULTS AND CHAIN OF CUSTODY RECORD

CHROMALAB, INC.

Environmental Services (SDB)

August 15, 1997

Submission #: 9708111

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: 2425 ENCINAL AVE.

Project#: 6039-5.0

Received: August 8, 1997

re: One sample for Gasoline BTEX MTBE analysis.
Method: SW846 8020A Nov 1990 / 8015Mod

Client Sample ID: MW-1

Spl#: 143186

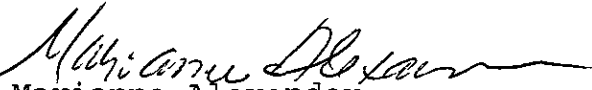
Matrix: WATER

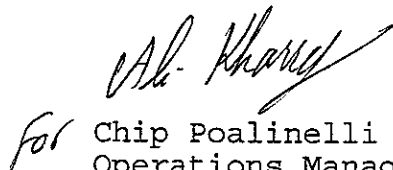
Sampled: August 8, 1997

Run#: 8162

Analyzed: August 11, 1997

ANALYTE	RESULT (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE (%)	DILUTION FACTOR
GASOLINE	830	50	N.D.	83	1
MTBE	N.D.	5.0	N.D.	106	1
BENZENE	37	0.50	N.D.	92	1
TOLUENE	4.2	0.50	N.D.	91	1
ETHYL BENZENE	14	0.50	N.D.	94	1
XYLENES	28	0.50	N.D.	92	1


Marianne Alexander
Gas/BTEX Supervisor


for Chip Poalinelli
Operations Manager

CHROMALAB, INC.

Environmental Services (SDB)

August 18, 1997

Submission #: 9708111

revised from 08/15/97

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: 2425 ENCINAL AVE.

Project#: 6039-5.0

Received: August 8, 1997

re: One sample for Gasoline BTEX MTBE analysis.

Method: SW846 8020A Nov 1990 / 8015Mod

Client Sample ID: MW-2

Spl#: 143187


Matrix: WATER

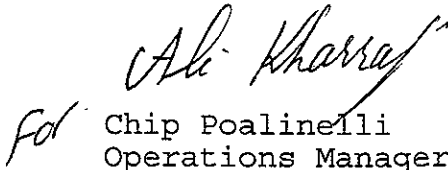
Sampled: August 8, 1997

Run#: 8162

Analyzed: August 11, 1997

ANALYTE	RESULT (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE (%)	DILUTION FACTOR
GASOLINE	3500	500	N.D.	83	10
MTBE	N.D.	50	N.D.	106	10
BENZENE	330	5.0	N.D.	92	10
TOLUENE	27	5.0	N.D.	91	10
ETHYL BENZENE	100	5.0	N.D.	94	10
XYLENES	310	5.0	N.D.	92	10


Marianne Alexander
Gas/BTEX Supervisor


Chip Poalinelli
Operations Manager

CHROMALAB, INC.

Environmental Services (SDB)

August 15, 1997

Submission #: 9708111

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: 2425 ENCINAL AVE.

Project#: 6039-5.0

Received: August 8, 1997

re: One sample for Gasoline BTEX MTBE analysis.

Method: SW846 8020A Nov 1990 / 8015Mod

Client Sample ID: MW-3

Spl#: 143188


Matrix: WATER

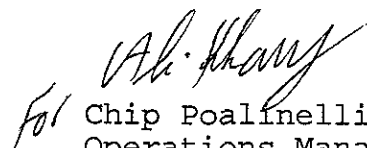
Sampled: August 8, 1997

Run#: 8162

Analyzed: August 12, 1997

ANALYTE	RESULT (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE (%)	DILUTION FACTOR
GASOLINE	1400	50	N.D.	83	1
MTBE	N.D.	5.0	N.D.	106	1
BENZENE	150	0.50	N.D.	92	1
TOLUENE	11	0.50	N.D.	91	1
ETHYL BENZENE	47	0.50	N.D.	94	1
XYLENES	33	0.50	N.D.	92	1


Marianne Alexander
Gas/BTEX Supervisor


For Chip Poalinelli
Operations Manager

CHROMALAB, INC.

Environmental Services (SDB)

August 18, 1997

Submission #: 9708111
revised from 08/15/97

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: 2425 ENCINAL AVE.
Received: August 8, 1997

Project#: 6039-5.0

re: One sample for Gasoline BTEX MTBE analysis.
Method: SW846 8020A Nov 1990 / 8015Mod

Client Sample ID: MW-4

Spl#: 143189


Matrix: WATER

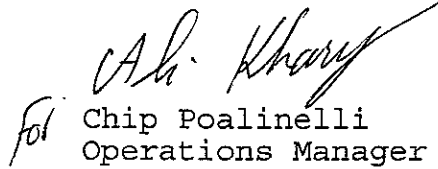
Sampled: August 8, 1997

Run#: 8202

Analyzed: August 13, 1997

ANALYTE	RESULT (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE (%)	DILUTION FACTOR
GASOLINE	2100	50	N.D.	84	1
MTBE	N.D.	5.0	N.D.	105	1
BENZENE	92	0.50	N.D.	93	1
TOLUENE	8.1	0.50	N.D.	91	1
ETHYL BENZENE	7.2	0.50	N.D.	92	1
XYLENES	20	0.50	N.D.	89	1


Marianne Alexander
Gas/BTEX Supervisor


Chip Poalinelli
Operations Manager

CHROMALAB, INC.

Environmental Services (SDB) (DOHS 1094)

CLIENT: ACC
DUE: 08/15/97
REF #: 35014

Chain of Custody

DATE 8/8/97 PAGE 1 OF 1

PROJ MGR Misty Kaltreider
COMPANY ACC Environmental
ADDRESS 7977 Capwell Dr., Suite 100
Oakland, Ca. 94621

SAMPLERS (SIGNATURE) [Signature] (PHONE NO.) (510) 638-8400
(FAX NO.) (510) 638-8404

ANALYSIS REPORT

SAMPLE ID.	DATE	TIME	MATRIX	PRESERV.	TPH - Gasoline (EPA 5030, 8015)	TPH - Gasoline (5030, 8015) w/BTEX (EPA 602, 8020)	TPH - Diesel, TEPH (EPA 3510/3550, 8015)	PURGEABLE AROMATICS BTEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601, 8010)	VOLATILE ORGANICS (EPA 624, 8240, 524.2)	BASE/NEUTRALS, ACIDS (EPA 625/627, 8270, 525)	TOTAL OIL & GREASE (EPA 5520, B+F, E+F)	PCB (EPA 608, 8080)	PESTICIDES (EPA 608, 8080)	TOTAL RECOVERABLE HYDROCARBONS (EPA 418.1)	MTBE	LUFT METALS: Cd, Cr, Pb, Zn, Ni	CAM METALS (17)	PRIORITY POLLUTANT METALS (13)	TOTAL LEAD	EXTRACTION (ICLP, STLC)	NUMBER OF CONTAINERS
MW-1	8/7/97	10:45	H ₂ O	Cold	X	X	X	X	X	X	X	X	X	X	X	X	X					3
MW-2	8/7/97	11:30	H ₂ O	Cold	X	X	X	X	X	X	X	X	X	X	X	X	X					3
MW-3	8/7/97	12:15	H ₂ O	Cold	X	X	X	X	X	X	X	X	X	X	X	X	X					3
MW-4	8/7/97	10:00	H ₂ O	Cold	X	X	X	X	X	X	X	X	X	X	X	X	X					3

PROJECT INFORMATION PROJECT NAME <u>2425 Encinal Ave</u> PROJECT NUMBER <u>6039-5.0</u> P.O. # <u>6039-005.00</u>				SAMPLE RECEIPT TOTAL NO OF CONTAINERS <u>12</u> HEAD SPACE _____ REC'D GOOD CONDITION/COLD _____ CONFORMS TO RECORD _____				RELINQUISHED BY 1 <u>[Signature]</u> 15:10 (TIME) (SIGNATURE) <u>Eloy Cisneros</u> 8/8/97 (DATE) (PRINTED NAME) <u>ACC Environmental</u> (COMPANY)				RELINQUISHED BY 2 <u>[Signature]</u> 16:35 (TIME) (SIGNATURE) <u>Gary Cook</u> 8/8/97 (DATE) (PRINTED NAME) <u>Chab</u> (COMPANY)				RELINQUISHED BY 3 (SIGNATURE) _____ (TIME) _____ (PRINTED NAME) _____ (DATE) _____ (COMPANY) _____			
TAT <u>STANDARD 5-DAY</u> 24 48 72 OTHER				RECEIVED BY 1 <u>[Signature]</u> 15:10 (TIME) (SIGNATURE) <u>Gary Cook</u> 8/8/97 (DATE) (PRINTED NAME) <u>Chab</u> (COMPANY)				RECEIVED BY 2 <u>[Signature]</u> 16:35 (TIME) (SIGNATURE) <u>Mike Noranjo</u> 8/8/97 (DATE) (PRINTED NAME) (COMPANY)				RECEIVED BY (LABORATORY) 3 (SIGNATURE) _____ (TIME) _____ (PRINTED NAME) _____ (DATE) _____ (LAB) _____							
SPECIAL INSTRUCTIONS/COMMENTS.																			

CHROMALAB, INC.

Environmental Service (SDB)

Sample Receipt Checklist

Client Name: ACC ENVIRONMENTAL CONSULTANTS Date/Time Received: 08/08/97 | 1570

Reference/Submis: 35014 | 9708111 Received by: AC

Checklist completed by: Chris Rowley 8/11/97 Reviewed by: W 8/11/97
Signature | Date Initials | Date

Matrix: H2O Carrier name: Client - C/L

Shipping container/cooler in good condition? Yes No Not Present

Custody seals intact on shipping container/cooler? Yes No Not Present

Custody seals intact on sample bottles? Yes No Not Present

Chain of custody present? Yes No

Chain of custody signed when relinquished and received? Yes No

Chain of custody agrees with sample labels? Yes No

Samples in proper container/bottle? Yes No

Sample containers intact? Yes No

Sufficient sample volume for indicated test? Yes No

All samples received within holding time? Yes No

Container/Temp Blank temperature in compliance? Temp: 4.0°C Yes No

Water - VOA vials have zero headspace? No VOA vials submitted Yes No

Water - pH acceptable upon receipt? Adjusted? Checked by: chemist for VOAs

Any No and/or NA (not applicable) response must be detailed in the comments section below.

Client contacted: _____ Date contacted: _____ Person contacted: _____

Contacted by: _____ Regarding: _____

Comments: _____

Corrective Action: _____