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July 25, 1996

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

RE: Quarterly Groundwater Monitoring Report
2425 Encinal Avenue, Alameda, California
ACC Project No. 6039-2.5

Dear Mr. Chrissanthos:

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

The groundwater from each well 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, natural bioremediation is occurring at this site. Therefore, ACC proposes to reduce the groundwater monitoring from quarterly to semiannually to document degrading trends of groundwater constituents and possibly 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 Kaltreider

Misty C. Kaltreider
Project Geologist

/mck:mcr

cc: Ms. Juliet Shin, ACHCSA

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GROUNDWATER MONITORING REPORT

2425 Encinal Avenue
Alameda, California

ACC Project No. 6039-2.5

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

July 25, 1996

Prepared by: Misty Kaltreider
Misty Kaltreider
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2425 Encinal Avenue
Alameda, California

1.0 INTRODUCTION

On behalf of Mr. Steve Chrissanthos and Alameda Cellars, ACC Environmental Consultants, Inc., (ACC) has prepared this report on groundwater monitoring performed at the above referenced site. 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 purpose of the work was to evaluate changes in the groundwater flow direction and gradient and monitor for the presence of petroleum hydrocarbons in groundwater in the vicinity of two former 10,000-gallon gasoline underground storage tanks (USTs). The project objectives were to: 1) measure the water levels and calculate the elevation of the groundwater in each monitoring well; 2) conduct in-field testing to evaluate indications of natural bioremediation; 3) obtain groundwater samples from the six existing monitoring wells and analyze the water samples for total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) and biodegradation indicator parameters; and 4) report the findings.

2.0 BACKGROUND

In March 1990, two 10,000-gallon gasoline 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 in January 1993 from the monitoring wells 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 analysis indicated impacted soil existed primarily around the former tank excavation and the former dispenser island. The vertical extent of petroleum hydrocarbons in the soil occurs at the soil/groundwater interface.

Analysis of grab groundwater samples collected from borings drilled during the additional investigation indicate that residual petroleum hydrocarbons from the former tank excavation and dispenser island are migrating 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 below detectable concentrations of constituents evaluated, 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 analytical analysis be performed on the groundwater at the site to evaluate whether natural bioremediation is occurring. This report documents the findings from the groundwater monitoring evaluation.

3.0 GROUNDWATER MONITORING AND SAMPLING

ACC conducted groundwater monitoring on June 27, 1996. Work at the site included measuring depth to water, subjectively evaluating groundwater in the wells, and purging and sampling the wells for laboratory analysis.

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	01/09/93	6.75	20.86
27.61	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

Well ID Well Elevation	Date Monitored	Depth to Groundwater (feet)	Groundwater Elevation (feet above MSL)
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
	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

Well ID Well Elevation	Date Monitored	Depth to Groundwater (feet)	Groundwater Elevation (feet above MSL)
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

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
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

Well ID Well Elevation	Date Monitored	Depth to Groundwater (feet)	Groundwater Elevation (feet above MSL)
MW-6	12/20/93	8.00	20.03
28.03	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
	06/27/96	7.28	20.75

Note: Depth to groundwater measured from the top of well casing
--- = Depth to groundwater not measured.

In addition, groundwater monitoring was performed before, during, and after purging to evaluate the groundwater for intrinsic parameters of biodegradation. Monitoring included measuring for temperature and dissolved oxygen (DO) with the use of a YSI® down-hole probe and conductivity and pH with the use of a Hydac® meter. In addition, samples were collected for analysis of nitrate, sulfate, total iron, soluble iron, and total dissolved solids (TDS). The parameter results are summarized in Table 2.

TABLE 2 - MONITORING PARAMETERS

Well No.- Gallons Removed	pH	Temp (°C)	Conductivity (µn/cm)	DO (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Total Iron (mg/L)	Soluble Iron (mg/L)	TDS (mg/L)
MW-1 - 0	6.8	21.0	4.20	1.4	---	---	---	---	---
2	6.9	21.0	4.51	1.6	---	---	---	---	---
4	6.9	21.2	4.60	1.4	---	---	---	---	---
6	7.0	21.0	4.20	0.8	0.56	30	4.6	2.2	660
MW-2a- 0	6.7	22.0	4.38	0.2	---	---	---	---	---
2	6.8	22.0	4.26	0.6	---	---	---	---	---
3	6.9	21.8	4.29	0.9	---	---	---	---	---
4	6.9	21.8	4.24	1.4	<0.05	11	8.4	4.4	290

Well No.- Gallons Removed	pH	Temp (°C)	Conductivity (µn/cm)	DO (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	Total Iron (mg/L)	Soluble Iron (mg/L)	TDS (mg/L)
MW-3 - 0	6.6	20.8	5.50	1.4	—	—	—	—	—
2	6.8	21.0	5.60	1.3	—	—	—	—	—
3	6.8	21.5	5.38	1.0	—	—	—	—	—
4	6.8	21.0	5.30	1.6	<0.05	31	5.3	2.6	330
MW-4 - 0	6.8	22.0	3.19	0.5	—	—	—	—	—
2	6.9	22.0	4.45	0.5	—	—	—	—	—
4	7.0	22.0	4.42	0.5	—	—	—	—	—
6	7.0	22.0	4.45	0.4	0.50	19	8.9	3.3	330
MW-5 - 0	6.6	224	4.2	1.3	—	—	—	—	—
2	6.9	220	4.01	2.6	—	—	—	—	—
4	6.8	22.0	4.09	2.0	—	—	—	—	—
6	6.8	22.2	4.14	2.6	2.9	61	1.1	<0.1	320
MW-6 - 0	6.6	20.5	2.11	1.2	—	—	—	—	—
2	6.7	20.1	2.14	1.0	—	—	—	—	—
4	6.9	20.8	2.08	0.8	—	—	—	—	—
6	6.9	20.9	2.10	0.8	2.9	59	5.5	<0.1	180

Notes: mg/L = milligrams per liter, equivalent to parts per million

3.2 Groundwater Gradient

The groundwater flow direction, as calculated from monitoring well data obtained on June 27, 1996, is illustrated on Figure 3. Based on groundwater elevation calculations, groundwater flow is toward the southwest at an average gradient of 0.010 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

Date Monitored	Gradient (foot/foot)	Direction
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	0.01	southwest

3.3 Groundwater Sampling

Before groundwater sampling, each well was 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 each monitoring well, sample vials were filled to overflowing and sealed so that no air was trapped in the vial. In addition, samples intended for soluble iron analysis were filtered through a 0.45 micron filter for collection. 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 were 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 each well were submitted to Chromalab, Inc., following chain of custody protocol. Groundwater samples collected from wells MW-1 through MW-6 were analyzed for TPHg and BTEX by EPA Method 8015M/8020, nitrate and sulfate by EPA Method 300.0, total and soluble iron by EPA Method 3010A/6010A, and TDS by EPA method 160.1. 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. Laboratory analysis of water samples collected from wells MW-5 and MW-6 indicated no detectable concentrations of constituents. A historic 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)	Ethyl-benzene (µg/L)	Total Xylenes (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
	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

Well ID	Date Sampled	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)
MW-2	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
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
	12/18/95	860	27.0	10.0	38.0	53.0
	03/19/96	570	28	2.2	21	30

Well ID	Date Sampled	TPHg (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)
MW-3	06/27/96	910	54	4.9	53	79
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
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

Well ID	Date Sampled	TPHg (μg/L)	Benzene (μg/L)	Toluene (μg/L)	Ethyl-benzene (μg/L)	Total Xylenes (μg/L)
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
	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

Note: μg/L = micrograms per liter (approximately equivalent to parts per billion)
NT = Not tested

5.0 DISCUSSION

This report documents the quarterly monitoring conducted in the 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. No detectable concentrations of TPHg and BTEX were reported in samples collected from wells MW-5 and MW-6, which is consistent with previous sampling events.

The samples collected from wells MW-2a, MW-3, and MW-4 indicated an increase in gasoline constituents compared with the previous sampling event conducted in March 1996. Concentrations of petroleum hydrocarbons reported in well MW-1 have decreased since the previous sampling event. Groundwater flow direction and gradient are consistent with the previous sampling events.

Groundwater elevations were calculated to be approximately 2.0 feet below the levels measured in March 1996. Dissolved TPHg concentrations appear to correspond with fluctuating groundwater elevations.

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. Results of each parameter monitored is discussed below.

5.1 Dissolved Oxygen

Dissolved oxygen 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 0.4 mg/L in well MW-4 to 2.6 mg/L in well MW-5. Water from wells MW-1, MW-2a, MW-3, and MW-4 (with elevated concentrations of petroleum hydrocarbons) indicated the lowest levels of DO. Water from wells MW-5 and MW-6 (with no detectable concentrations of petroleum hydrocarbons) indicated the highest levels of DO. This indicates that sufficient DO is present in the non-impacted groundwater and aerobic degradation of the petroleum hydrocarbons is occurring The measured reduction in DO from non-impacted groundwater indicates that the natural microbes are using the DO to degrade the petroleum hydrocarbons.

5.2 pH

The pH of groundwater affects the presence and activity of microbes. Microbes capable of degrading petroleum hydrocarbons prefer pH values varying from 6 to 8. A difference in pH between the impacted groundwater and uncontaminated groundwater indicates biological activity (Buscheck and O'Reilly, March 1995). Values for pH were reported to be very slightly acidic but well within levels conducive to microbial growth.

5.3 Nitrate and Sulfate

After DO has been depleted in the groundwater, nitrate and sulfate can be used as electron acceptors for anaerobic biodegradation in processes known as denitrification and sulfanogenesis (Buscheck and O'Reilly, March 1995). The reported nitrate and sulfate results in the groundwater collected from impacted wells (MW-1, MW-2a, MW-3, and MW-4) were lower than those in the groundwater collected from non-impacted wells (MW-5 and MW-6). This indicates anaerobic degradation is occurring within the petroleum hydrocarbon plume.

5.4 Iron

Total iron (ferric iron) in the groundwater can be used as an electron acceptor, which aids biodegradation of petroleum hydrocarbons in aerobic conditions (Buscheck and O'Reilly, March 1995). In this process, ferric iron is reduced to ferrous iron, which is soluble in water. The presence of ferrous iron in the groundwater is an indicator of anaerobic degradation of petroleum hydrocarbons. Detectable concentrations of ferrous iron was reported in the groundwater collected from the impacted wells. No detectable concentrations of soluble iron were reported in the groundwater collected the non-impacted wells. This further indicates natural anaerobic biodegradation.

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 analysis 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 relatively low naturally occurring concentrations of DO in the groundwater, aerobic biodegradation is suppressed; therefore, the petroleum hydrocarbons in the groundwater also appear to be degrading by anaerobic means. Therefore, natural biodegradation is occurring both aerobically and anaerobically within the groundwater at the site.

- Because of the relatively slow rate of anaerobic 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 increased in wells MW-2a, MW-3, and MW-4. TPHg concentrations have decreased in monitoring well MW-1.

- Since January 1993, varying concentrations of petroleum hydrocarbons in wells MW-1 through MW-4 appear to be a result of residual hydrocarbons from the former excavation that continue to impact the groundwater through fluctuating groundwater levels.

- The bulk of the source was removed with the tank removal; therefore, ACC believes that the detectable concentrations observed in the groundwater are the result of remnant impacted soil affecting the groundwater.

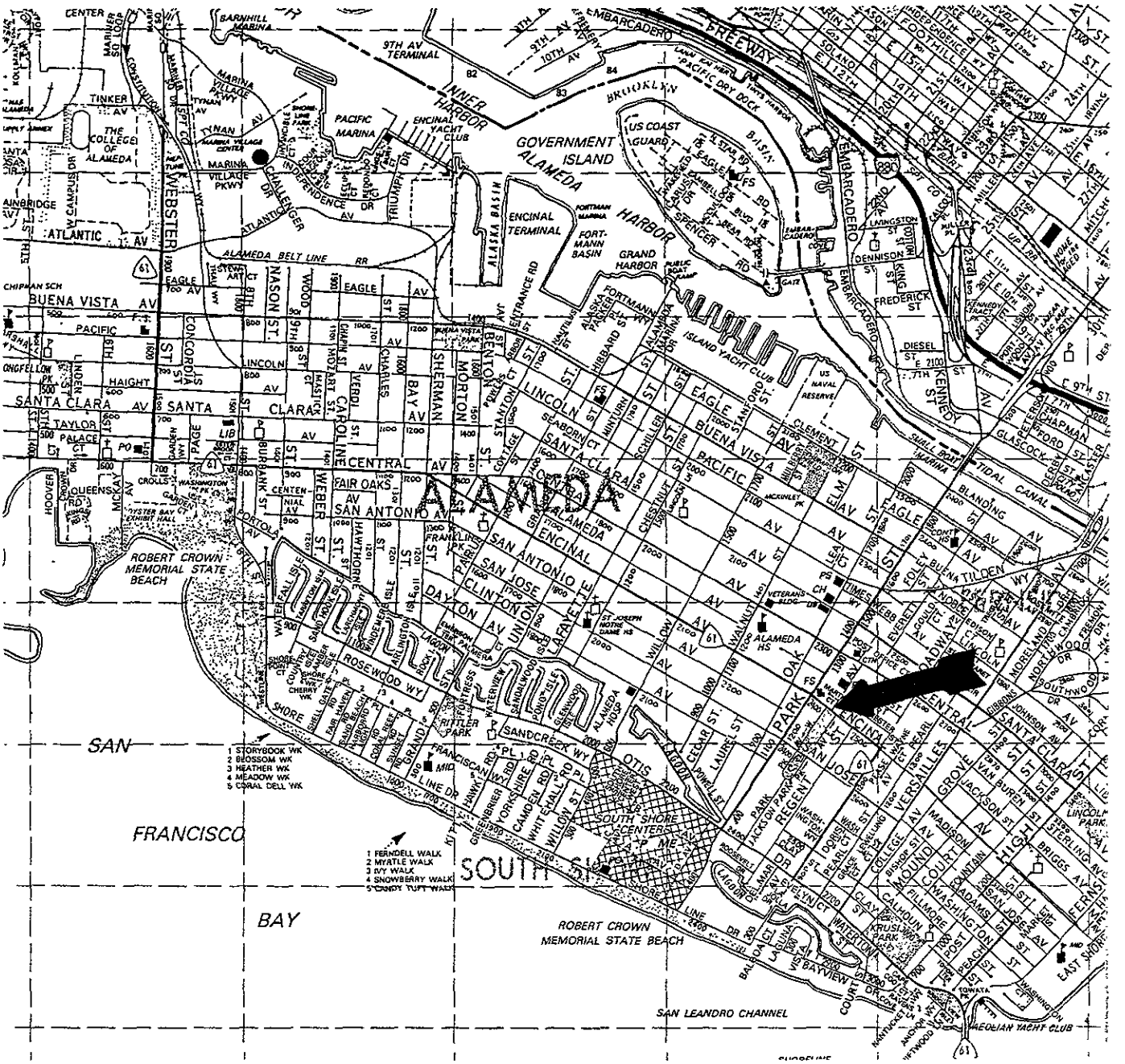
- The area of impact is limited based on laboratory results from samples collected from well. MW-5, which has continually indicated no detectable concentrations of constituents.

- Due to the relatively flat gradient, the potential for plume migration is limited. Impacted groundwater will likely degrade before any substantial downgradient migration occurs.

7.0 RECOMMENDATIONS

The Executive Director of the State Water Resources Control Board (SWRCB) has recommended that the Lawrence Livermore National Laboratory dated November 1995 report be implemented aggressively. ACC recommends that the SWRCB direction be followed and no further investigation be performed. 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 will continue to decline with time.

ACC recommends that the groundwater monitoring of all six wells be reduced to semiannually in order to document decreasing trends.



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

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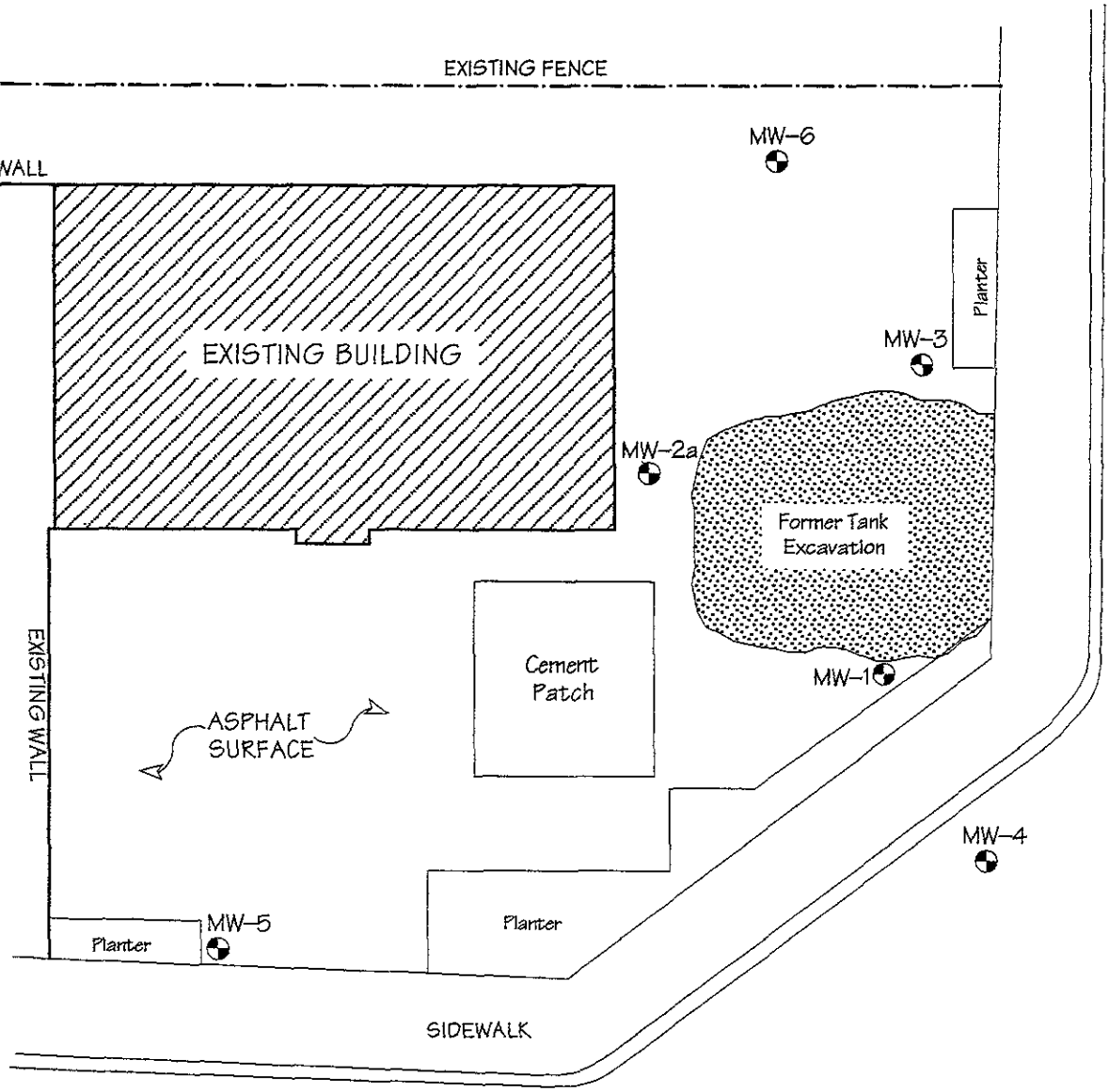


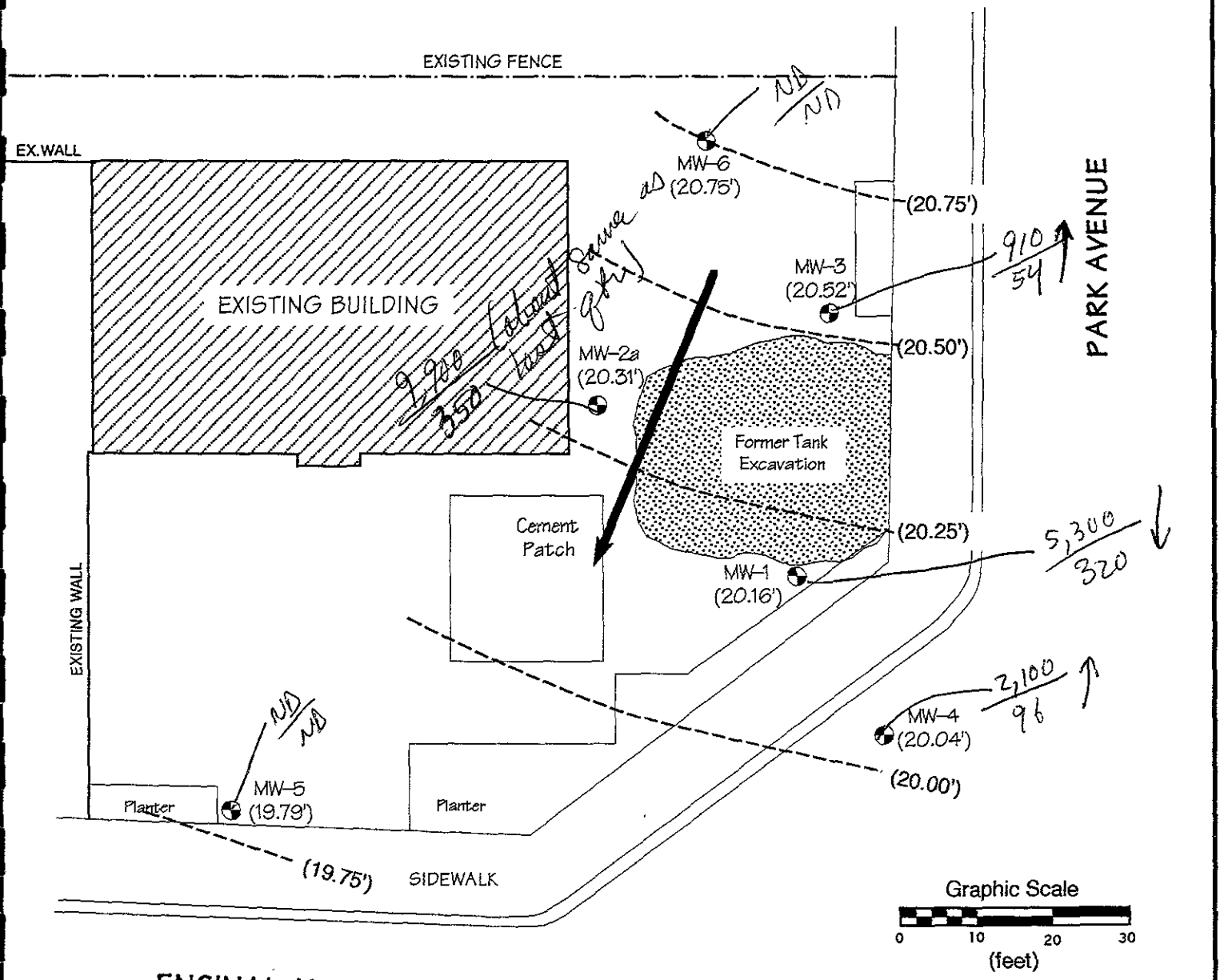
Legend

MW-5 - Groundwater Monitoring Well Location

Title:	Site Plan 2425 Encinal Ave Alameda, California
Figure Number: 2.0	Scale: 1" = 20"
Drawn By: JVC	Date: 7/24/96
Project Number: 6039-5	

ACC Environmental Consultants
7977 Capwell Drive, Suite 100
Oakland, CA 94621
(510) 638-8400 Fax: (510) 638-8404

N E W S



Legend

MW-5 - Groundwater Monitoring Well Location

- Groundwater Elevation Contour (Contour Interval = 0.25 foot)

- Approximate Groundwater Flow Direction 6/27/96

TPHg (ppb)
B

↑ conc. gone up this qtr.

↓ conc. gone down this qtr

Title:	Groundwater Gradient 2425 Encinal Avenue Alameda, California		
Figure Number:	3	Scale:	1" = 20"
Drawn By:	JVC	Date:	7/24/96
Project Number:	6039-5		

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N E W S

WELL MONITORING WORKSHEET

ACC WELL MONITORING WORKSHEET

Job Name: 2425 Encinal		Purge Method: Bailing	
Site Address: 2425 Encinal		Sampled By: MK	
Job #: 6089-2.5		Laboratory: Chromalab	
Date: 6/27/96.		Analysis: Various	
	Sampling	Developing	
Drum Inventory	Developing		

	Volume	Measurements					Observations
Well: MW-1	(Gal)	pH	Temp	Cond	DO	Redox	
Depth of Boring: 17.25	0	6.8	21.0	4.20	1.4		Odor. Petroleum hydrocarbon odor
Depth to Water: 7.45	2	6.9	21.0	4.51	1.6		
Water Column: 9.8	4	6.9	21.2	4.20	1.4		
Well Diameter: 2	6	7.0	21.0	4.20	0.8		
Well Volume: 1.5			(C°)				
Comments:							
Well: MW-2	0	6.7	22.0	4.38	0.2		Odor Petroleum Hydrocarbon
Depth of Boring: 14.16	2	6.8	22.0	4.26	0.6		
Depth to Water: 7.67	3	6.9	21.8	4.29	0.9		
Water Column: 6.49	4	6.9	21.8	4.24	~~1.8~~ 1.4		
Well Diameter: ~~2~~			(C°)				
Well Volume: 1.0							
Comments:							
Well: MW-3	0	6.6	20.8	5.50	1.4		Odor Petroleum hydrocarbon
Depth of Boring: 14.31	2	6.8	21.0	5.60	1.3		
Depth to Water: 7.37	3	6.8	21.5	5.39	1.0		
Water Column: 6.29	4	6.8	21.0	5.30	1.6		
Well Diameter: 2			(C°)				
Well Volume: 1.1							
Comments:							
Well: MW-4	0	6.8	22.0	3.19	0.5		
Depth of Boring: 17.50	2	6.9	22.0	4.45	0.5		
Depth to Water: 6.93	4	7.0	22.0	4.42	0.5		
Water Column: 10.57	6	7.0	22.0	4.45	0.4		
Well Diameter: 2			(C°)				
Well Volume: 1.6							
Comments:							
Well: MW-5	0	6.6	68.4	4.2	1.3	105	
Depth of Boring: 17.5	2	6.9	68.0	4.01	2.6		
Depth to Water: 7.55	4	6.8	68.0	4.09	2.0		
Water Column: 9.95	6	6.8	68.2	4.14	2.6		
Well Diameter: 2			(F°)				
Well Volume: 1.5							
Comments:							

ACC WELL MONITORING WORKSHEET

Job Name: 2425 Encinal.	Purge Method: Bailing
Site Address: 2425 Encinal	Sampled By: MCK
Job #: 6039-2.5	Laboratory: Chromalab
Date: 6/27/96	Analysis: Various.
	Sampling / Developing / Developing
Drum Inventory	

	Volume (Gal)	Measurements pH	Temp	Cond	DO	Redox	Observations
Well: MW-6							
Depth of Boring: 17.5	0	6.6	65.5	2.11	*1.2	210	
Depth to Water: 7.28	2	6.7	65.1	2.14	1.0		
Water Column: 10.22	4	6.9	64.8	2.08	0.8		
Well Diameter: 2	6	6.9	64.9	2.10	0.8		
Well Volume: 1.5			(F°)				
Comments:							

	Volume (Gal)	pH	Temp	Cond	DO	Redox	Observations
Well:							
Depth of Boring:							
Depth to Water:							
Water Column:							
Well Diameter:							
Well Volume:							
Comments:							

	Volume (Gal)	pH	Temp	Cond	DO	Redox	Observations
Well:							
Depth of Boring:							
Depth to Water:							
Water Column:							
Well Diameter:							
Well Volume:							
Comments:							

	Volume (Gal)	pH	Temp	Cond	DO	Redox	Observations
Well:							
Depth of Boring:							
Depth to Water:							
Water Column:							
Well Diameter:							
Well Volume:							
Comments:							

	Volume (Gal)	pH	Temp	Cond	DO	Redox	Observations
Well:							
Depth of Boring:							
Depth to Water:							
Water Column:							
Well Diameter:							
Well Volume:							
Comments:							

ANALYTICAL RESULTS AND CHAIN OF CUSTODY RECORD

CHROMALAB, INC.

Environmental Services (SDB)

July 3, 1996 *Submission #:* 9606917

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: 2425 ENCINAL *Project#:* 6039-2.5
Received: June 27, 1996

re: One sample for Miscellaneous Metals analysis.
Method: *EPA 3010A/6010A*

Client Sample ID: **MW-1**
Spl#: 90096 *Matrix:* WATER *Extracted:* July 3, 1996
Sampled: June 27, 1996 *Run#:* 2020 *Analyzed:* July 3, 1996

ANALYTE	RESULT (mg/L)	REPORTING LIMIT (mg/L)	BLANK RESULT (mg/L)	BLANK SPIKE (%)	DILUTION FACTOR
IRON	4.6	0.10	N.D.	104	1

Charles Woolley
Chemist

John S. Labash
Inorganic Supervisor

CHROMALAB, INC.

Environmental Services (SDB)

July 3, 1996 *Submission #:* 9606917

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: 2425 ENCINAL *Project#:* 6039-2.5
Received: June 27, 1996

re: One sample for Miscellaneous Metals analysis.
Method: *EPA 3010A/6010A*

Client Sample ID: **MW-2A**
Spl#: 90097 *Matrix:* WATER *Extracted:* July 3, 1996
Sampled: June 27, 1996 *Run#:* 2020 *Analyzed:* July 3, 1996

ANALYTE	RESULT (mg/L)	REPORTING LIMIT (mg/L)	BLANK RESULT (mg/L)	BLANK SPIKE (%)	DILUTION FACTOR
IRON	8.4	0.10	N.D.	104	1

Charles Woolley
Chemist

John S. Labash
Inorganic Supervisor

CHROMALAB, INC.

Environmental Services (SDB)

July 3, 1996 *Submission #:* 9606917

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: 2425 ENCINAL *Project#:* 6039-2.5
Received: June 27, 1996

re: One sample for Miscellaneous Metals analysis.
Method: *EPA 3010A/6010A*

Client Sample ID: **MW-3**
Spl#: 90098 *Matrix:* WATER *Extracted:* July 3, 1996
Sampled: June 27, 1996 *Run#:* 2020 *Analyzed:* July 3, 1996

ANALYTE	RESULT (mg/L)	REPORTING LIMIT (mg/L)	BLANK RESULT (mg/L)	BLANK SPIKE (%)	DILUTION FACTOR
IRON	5.3	0.10	N.D.	104	1

Charles Woolley
Chemist

John S. Labash
Inorganic Supervisor

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Federal ID #68-0140157

CHROMALAB, INC.

Environmental Services (SDB)

July 3, 1996 *Submission #:* 9606917

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: 2425 ENCINAL *Project#:* 6039-2.5
Received: June 27, 1996

re: One sample for Miscellaneous Metals analysis.
Method: *EPA 3010A/6010A*

Client Sample ID: **MW-4**
Spl#: 90099 *Matrix:* WATER *Extracted:* July 3, 1996
Sampled: June 27, 1996 *Run#:* 2020 *Analyzed:* July 3, 1996

ANALYTE	RESULT (mg/L)	REPORTING LIMIT (mg/L)	BLANK RESULT (mg/L)	BLANK SPIKE (%)	DILUTION FACTOR
IRON	8.9	0.10	N.D.	104	1

Charles Woolley
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John S. Labash
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Environmental Services (SDB)

July 3, 1996 *Submission #:* 9606917

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: 2425 ENCINAL *Project#:* 6039-2.5
Received: June 27, 1996

re: One sample for Miscellaneous Metals analysis.
Method: *EPA 3010A/6010A*

Client Sample ID: **MW-5**
Spl#: 90100 *Matrix:* WATER *Extracted:* July 3, 1996
Sampled: June 27, 1996 *Run#:* 2020 *Analyzed:* July 3, 1996

ANALYTE	RESULT (mg/L)	REPORTING LIMIT (mg/L)	BLANK RESULT (mg/L)	BLANK SPIKE (%)	DILUTION FACTOR
IRON	1.1	0.10	N.D.	104	1

Charles Woolley
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Environmental Services (SDB)

July 5, 1996 *Submission #:* 9606917

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: 2425 ENCINAL *Project#:* 6039-2.5
Received: June 27, 1996

re: One sample for Soluble Miscellaneous Metals analysis.
Method: *EPA 3005/6010*

Client Sample ID: **MW-6**
Spl#: 90107 *Matrix:* WATER *Extracted:* July 3, 1996
Sampled: June 27, 1996 *Run#:* 2039 *Analyzed:* July 5, 1996

ANALYTE	RESULT (mg/L)	REPORTING LIMIT (mg/L)	BLANK RESULT (mg/L)	BLANK SPIKE (%)	DILUTION FACTOR
IRON	N.D.	0.10	N.D.	110	1

Charles Woolley
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CHROMALAB, INC.

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July 5, 1996 *Submission #:* 9606917

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: 2425 ENCINAL *Project#:* 6039-2.5
Received: June 27, 1996

re: One sample for Soluble Miscellaneous Metals analysis.
Method: *EPA 3005/6010*

Client Sample ID: **MW-1**
Spl#: 90102 *Matrix:* WATER *Extracted:* July 3, 1996
Sampled: June 27, 1996 *Run#:* 2039 *Analyzed:* July 5, 1996

ANALYTE	RESULT (mg/L)	REPORTING LIMIT (mg/L)	BLANK RESULT (mg/L)	BLANK SPIKE (%)	DILUTION FACTOR
IRON	2.2	0.10	N.D.	110	1

Charles Woolley
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Federal ID #68-0140157

CHROMALAB, INC.

Environmental Services (SDB)

July 5, 1996 *Submission #:* 9606917

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: 2425 ENCINAL *Project#:* 6039-2.5
Received: June 27, 1996

re: One sample for Soluble Miscellaneous Metals analysis.
Method: *EPA 3005/6010*

Client Sample ID: **MW-2A**
Spl#: 90103 *Matrix:* WATER *Extracted:* July 3, 1996
Sampled: June 27, 1996 *Run#:* 2039 *Analyzed:* July 5, 1996

ANALYTE	RESULT (mg/L)	REPORTING LIMIT (mg/L)	BLANK RESULT (mg/L)	BLANK SPIKE (%)	DILUTION FACTOR
IRON	4.4	0.10	N.D.	110	1

Charles Woolley
Chemist

John S. Labash
Inorganic Supervisor

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CHROMALAB, INC.

Environmental Services (SDB)

July 5, 1996 *Submission #:* 9606917

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: 2425 ENCINAL *Project#:* 6039-2.5
Received: June 27, 1996

re: One sample for Soluble Miscellaneous Metals analysis.
Method: *EPA 3005/6010*

Client Sample ID: **MW-3**
Spl#: 90104 *Matrix:* WATER *Extracted:* July 3, 1996
Sampled: June 27, 1996 *Run#:* 2039 *Analyzed:* July 5, 1996

ANALYTE	RESULT (mg/L)	REPORTING LIMIT (mg/L)	BLANK RESULT (mg/L)	BLANK SPIKE (%)	DILUTION FACTOR
IRON	2.6	0.10	N.D.	110	1

Charles Woolley
Chemist

John S. Labash
Inorganic Supervisor

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CHROMALAB, INC.

Environmental Services (SDB)

July 5, 1996 *Submission #:* 9606917

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: 2425 ENCINAL *Project#:* 6039-2.5
Received: June 27, 1996

re: One sample for Soluble Miscellaneous Metals analysis.
Method: *EPA 3005/6010*

Client Sample ID: **MW-4**
Spl#: 90105 *Matrix:* WATER *Extracted:* July 3, 1996
Sampled: June 27, 1996 *Run#:* 2039 *Analyzed:* July 5, 1996

ANALYTE	RESULT (mg/L)	REPORTING LIMIT (mg/L)	BLANK RESULT (mg/L)	BLANK SPIKE (%)	DILUTION FACTOR
IRON	3.3	0.10	N.D.	110	1

Charles Woolley
Chemist

John S. Labash
Inorganic Supervisor

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Federal ID #68-0140157

CHROMALAB, INC.

Environmental Services (SDB)

July 5, 1996 *Submission #:* 9606917

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: 2425 ENCINAL *Project#:* 6039-2.5
Received: June 27, 1996

re: One sample for Soluble Miscellaneous Metals analysis.
Method: *EPA 3005/6010*

Client Sample ID: **MW-5**
Spl#: 90106 *Matrix:* WATER *Extracted:* July 3, 1996
Sampled: June 27, 1996 *Run#:* 2039 *Analyzed:* July 5, 1996

ANALYTE	RESULT (mg/L)	REPORTING LIMIT (mg/L)	BLANK RESULT (mg/L)	BLANK SPIKE (%)	DILUTION FACTOR
IRON	N.D.	0.10	N.D.	110	1

Charles Woolley
Chemist

John S. Labash
Inorganic Supervisor

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Federal ID #68-0140157

CHROMALAB, INC.

Environmental Services (SDB)

July 3, 1996 *Submission #:* 9606917

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: 2425 ENCINAL *Project#:* 6039-2.5
Received: June 27, 1996

re: One sample for Miscellaneous Metals analysis.
Method: *EPA 3010A/6010A*

Client Sample ID: **MW-6**
Spl#: 90101 *Matrix:* WATER *Extracted:* July 3, 1996
Sampled: June 27, 1996 *Run#:* 2020 *Analyzed:* July 3, 1996

ANALYTE	RESULT (mg/L)	REPORTING LIMIT (mg/L)	BLANK RESULT (mg/L)	BLANK SPIKE (%)	DILUTION FACTOR
IRON	5.5	0.10			1

Charles Woolley
Chemist

John S. Labash
Inorganic Supervisor

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Federal ID #68-0140157

CHROMALAB, INC.

Environmental Services (SDB)

July 5, 1996 *Submission #:* 9606917

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: 2425 ENCINAL *Project#:* 6039-2.5
Received: June 27, 1996

re: 6 samples for Gasoline and BTEX compounds analysis.
Method: *EPA 5030/8015M/8020*

Matrix: WATER
Sampled: June 27, 1996 *Run#:* 1969 *Analyzed:* June 29, 1996

Spl#	CLIENT SPL ID	Gasoline (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl Benzene (ug/L)	Total Xylenes (ug/L)
90096	MW-1	5300	320	81	280	710
90097	MW-2A	9900	350	33	230	580
90098	MW-3	910	54	4.9	53	79

Matrix: WATER
Sampled: June 27, 1996 *Run#:* 2047 *Analyzed:* July 4, 1996

Spl#	CLIENT SPL ID	Gasoline (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl Benzene (ug/L)	Total Xylenes (ug/L)
90099	MW-4	2100	96	11	18	20
90100	MW-5	N.D.	N.D.	N.D.	N.D.	N.D.
90101	MW-6	N.D.	N.D.	N.D.	N.D.	N.D.
Reporting Limits		50	0.50	0.50	0.50	0.50
Blank Result		N.D.	N.D.	N.D.	N.D.	N.D.
Blank Spike Result (%)		110	96.6	102	99.4	107

June Zhao
Chemist

Marianne Alexander
Gas/BTEX Supervisor

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(510) 484-1919 • Facsimile (510) 484-1096
Federal ID #68-0140157

QUALITY CONTROL NARRATIVE
for
Chromalab, Inc.
Client Reference: 9606917
Clayton Project No. 96064.12

Sample Information/Problems:

There were no problems with sample receipt.

Analytical Problems:

No problems were encountered with the sample analyses.

Quality Control:

The quality control data is summarized in the Quality Assurance Data Package, which follows the analytical report.

- MS/MSD: A matrix spike and matrix spike duplicate were analyzed where applicable. Spikes for EPA Method 300.0 (07/03/96) showed low recoveries for Phosphate. The LCSs for this method showed acceptable results. (Phosphate is not a target compound for this project).
- LCS/LCSD: A laboratory control spike and duplicate were analyzed where applicable, and all results were acceptable.
- ICV/CCV: Response for all analytes met Clayton acceptance criteria.
- Surrogate Recoveries: Not applicable.

Analytical Results
for
Chromalab, Inc.
Client Reference: 9606917
Clayton Project No. 96064.12

Sample Identification: See Below
Lab Number: 9606412
Sample Matrix/Media: WATER
Method Reference: EPA 300.0

Date Received: 06/28/96
Date Analyzed: 06/28/96

Lab Number	Sample Identification	Date Sampled	Nitrate-N (mg/L)	Method Detection Limit (mg/L)
-01	MW-1	06/27/96	0.56	0.05
-02	MW-2A	06/27/96	<0.05	0.05
-03	MW-3	06/27/96	<0.05	0.05
-04	MW-4	06/27/96	0.50	0.05
-05	MW-5	06/27/96	2.9	0.05
-06	MW-6	06/27/96	2.9	0.05
-07	METHOD BLANK	--	<0.05	0.05

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Clayton
ENVIRONMENTAL
CONSULTANTS

Analytical Results
for
Chromalab, Inc.
Client Reference: 9606917
Clayton Project No. 96064.12

Sample Identification: See Below
Lab Number: 9606412
Sample Matrix/Media: WATER
Method Reference: EPA 300.0

Date Received: 06/28/96
Date Analyzed: 06/28/96

Lab Number	Sample Identification	Date Sampled	Sulfate (mg/L)	Method Detection Limit (mg/L)
-01	MW-1	06/27/96	30	2
-02	MW-2A	06/27/96	11	2
-03	MW-3	06/27/96	31	2
-04	MW-4	06/27/96	19	2
-05	MW-5	06/27/96	61 [a]	2
-06	MW-6	06/27/96	59	2
-07	METHOD BLANK	--	<2	2

ND: Not detected at or above limit of detection
--: Information not available or not applicable

[a] Sample analyzed on 07/03/96.

why different? Chromalab, 7/30/96
Mimi, stated that all samples were run on 6/28/96, but MW-5 had higher results so they had to rerun by diluting.

Analytical Results
for
Chromalab, Inc.
Client Reference: 9606917
Clayton Project No. 96064.12

Sample Identification: See Below
Lab Number: 9606412
Sample Matrix/Media: WATER
Method Reference: EPA 160.1

Date Received: 06/28/96
Date Analyzed: 06/28/96

Lab Number	Sample Identification	Date Sampled	Total Dissolved Solids (mg/L)	Method Detection Limit (mg/L)
-01	MW-1	06/27/96	660	10
-02	MW-2A	06/27/96	290	10
-03	MW-3	06/27/96	330	10
-04	MW-4	06/27/96	330	10
-05	MW-5	06/27/96	320	10
-06	MW-6	06/27/96	180	10
-07	METHOD BLANK	--	<10	10

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Clayton
ENVIRONMENTAL
CONSULTANTS

Quality Assurance Results Summary

Matrix Spike/Matrix Spike Duplicate Results

for

Clayton Project No. 96064.12

Quality Assurance Results Summary - Matrix Spike/Matrix Spike Duplicate
for
Clayton Project No. 96064.12

Clayton Lab Number: 9606412-01A
Ext./Prep. Method: --
Date: / /
Analyst: --
Std. Source: 960422A
Sample Matrix/Media: WATER

Analytical Method: EPA 300.0
Instrument ID: 02739
Date: 06/28/96
Time: 15:24
Analyst: HYW
Units: MG/L
QC Batch No: 9606285H

Analyte	Sample Result	Spike Level	Matrix Spike Result	MS Recovery (%)	Matrix Spike Duplicate Result	MSD Recovery (%)	Average Recovery (% R)	LCL (% R)	UCL (% R)	RPD (%)	UCL (%RPD)
CHLORIDE	50.7	200	241	95	239	94	95	83	106	0.8	20
NITRATE AS NITROGEN	0.559	50.0	48.0	95	47.4	94	94	74	114	1.3	20
SULFATE	29.8	400	390	90	387	89	90	80	103	0.8	20

ND = Not detected at or above limit of detection
SOR = Spike out of range due to high sample concentration.
LCL = Lower Control Limit
UCL = Upper Control Limit

Quality Assurance Results Summary - Matrix Spike/Matrix Spike Duplicate
for
Clayton Project No. 96064.12

Clayton Lab Number: 9607048-05A
Ext./Prep. Method:
Date: / /
Analyst:
Std. Source: A960703IC
Sample Matrix/Media: WATER

Analytical Method: EPA 300.0
Instrument ID: 02739
Date: 07/03/96
Time: 13:14
Analyst: RAH
Units: MG/L
QC Batch No: 9607031R

Analyte	Sample Result	Spike Level	Matrix Spike Result	MS Recovery (%)	Matrix Spike Duplicate Result	MSD Recovery (%)	Average Recovery (% R)	LCL (% R)	UCL (% R)	RPD (%)	UCL (%RPD)
NITRATE AS NO3	ND	5.00	4.38	88	4.36	87	87	75	125	0.5	20
PHOSPHATE	ND	10.0	6.40	64*	6.60	66*	65*	75	125	3.1	20
SULFATE	16.1	20.0	33.1	85	33.1	85	85	80	103	0.0	20

* Result is outside of control limits. SEE LCS

ND = Not detected at or above limit of detection
SOR = Spike out of range due to high sample concentration.
LCL = Lower Control Limit
UCL = Upper Control Limit

Quality Assurance Results Summary - Matrix Spike/Matrix Spike Duplicate
for
Clayton Project No. 96064.12

Clayton Lab Number:	LCS	Analytical Method:	EPA 300.0
Ext./Prep. Method:		Instrument ID:	02739
Date:	/ /	Date:	07/03/96
Analyst:		Time:	14:05
Std. Source:	A9607031C	Analyst:	RAH
Sample Matrix/Media:	WATER	Units:	MG/L
		QC Batch No:	9607031R

Analyte	Sample Result	Spike Level	Matrix Spike Result	MS Recovery (%)	Matrix Spike Duplicate Result	MSD Recovery (%)	Average Recovery (% R)	LCL (% R)	UCL (% R)	RPD (%)	UCL (%RPD)
NITRATE AS NO3	ND	10.0	9.50	95	9.60	96	96	75	125	1.0	20
PHOSPHATE	ND	20.0	18.3	92	18.2	91	91	75	125	0.5	20
SULFATE	ND	40.0	36.7	92	36.6	92	92	80	103	0.3	20

ND = Not detected at or above limit of detection
SOR = Spike out of range due to high sample concentration.
LCL = Lower Control Limit
UCL = Upper Control Limit

CHROMALAB, INC.
SAMPLE RECEIPT CHECKLIST

Client Name ACC

Project 2425 Encinal

Reference/Subm # 28543/9606917

Checklist completed by: Mimi Yalk / 6/28/96 (Signature / Date)

Date/Time Received 6/27/96 / 1651 (Date / Time)

Received by P. Solis

Carrier name

Logged in by CR / 6/27/96 (Initials / Date)

Matrix Water

Shipping container in good condition?	NA ✓		Yes	No
Custody seals present on shipping container?	Intact	Broken	Yes	No
Custody seals on sample bottles?	Intact	Broken	Yes	No
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
Samples intact?			Yes ✓	No
Sufficient sample volume for indicated test?			Yes ✓	No
VOA vials have zero headspace?	NA		Yes	No ✓
Trip Blank received?	NA		Yes	No ✓
All samples received within holding time?			Yes ✓	No

Container temperature? 11.2°C

pH upon receipt 2, 7 pH adjusted for metals Check performed by: MP NA

Any NO response must be detailed in the comments section below. If items are not applicable, they should be marked NA.

Client contacted? Date contacted?

Person contacted? Contacted by?

Regarding?

Comments: One VOA vial for each of the following samples were received with headspace: MW-4 and MW-5. VOA pH will be checked by the chemist. Unpreserved samples were received at pH 7, preserved samples at pH 2.

Corrective Action:

SMPLRECD.CK

CHROMALAB, INC.

Environmental Services (SDB) (DOHS 1094)

SUBM #: 9606917 REP: PM
CLIENT: ACC
DUE: 07/05/96
REF #: 28543

28543

Chain of Custody

DATE 6/27/96 PAGE ____ OF ____

PROJ. MGR Misty Kvitreider
COMPANY ACC Environmental Consultants
ADDRESS 7977 Capwell Drive, Suite 100
Oakland, California 94621

SAMPLERS (SIGNATURE) Misty Kvitreider
(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)	Nitrate	LUFT METALS: Cd, Cr, Pb, Zn, Ni	CAM METALS (17)	PRIORITY POLLUTANT METALS (13)	TOTAL ~~Iron~~ Iron	EXTRACTION (TCLP, STLC)	Sulfate	TDS	(Filtered) Ferric Iron	NUMBER OF CONTAINERS
MW-1	6/27/96		W			X										X				X		X	X	X	9
MW-2			W			X										X				X		X	X	X	9
MW-3			W			X										X				X		X	X	X	9
MW-4			W			X										X				X		X	X	X	9
MW-5			W			X										X				X		X	X	X	9
MW-6			W			X										X				X		X	X	X	9

PROJECT INFORMATION

PROJECT NAME: 2425 Fencinal
PROJECT NUMBER: ~~6039~~ 6039-2.5
P.O. #: 6039-2.5

SAMPLE RECEIPT

TOTAL NO. OF CONTAINERS	52
HEAD SPACE	
REC'D GOOD CONDITION/COLD	
CONFORMS TO RECORD	

TAT: (STANDARD 5-DAY) | | | 24 | 48 | 72 | OTHER

SPECIAL INSTRUCTIONS/COMMENTS:
For Ferric Iron - used filtered Sample in Amber Liter

RELINQUISHED BY 1.
Misty Kvitreider 1437 (TIME)
(SIGNATURE)
Misty Kvitreider 6/27/96 (DATE)
(PRINTED NAME)
ACC Environmental (COMPANY)

RECEIVED BY 1.
(SIGNATURE) (TIME)
(PRINTED NAME) (DATE)
(COMPANY)

RELINQUISHED BY 2.
(SIGNATURE) (TIME)
(PRINTED NAME) (DATE)
(COMPANY)

RECEIVED BY 2.
(SIGNATURE) (TIME)
(PRINTED NAME) (DATE)
(COMPANY)

RELINQUISHED BY 3.
(SIGNATURE) 1750 (TIME)
Peter Sakis 6/27/96 (DATE)
(PRINTED NAME)
Chromalab Inc (COMPANY)

RECEIVED BY (LABORATORY) 3.
(SIGNATURE) (TIME)
Chris Rowley 6/27/96 (DATE)
(PRINTED NAME)
Chromalab (LAB)