



April 6, 1998

GROUNDWATER MONITORING REPORT  
MARCH 23, 1998 GROUNDWATER SAMPLING  
ASE JOB NO. 3011

at  
Zima Center Corporation  
2951 High Street  
Oakland, California 94619



Prepared by:  
AQUA SCIENCE ENGINEERS, INC.  
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No. 38738  
Exp. 4-99

## 1.0 INTRODUCTION

### Site Location (Site), See Figure 1

Zima Center Corporation  
2951 High Street  
Oakland, CA 94619

### Property Owner

Zima Center Corporation  
2951 High Street  
Oakland, CA 94619  
Attn.: Mr. Mohammad Mashhoon  
(510) 436-4700

### Environmental Consulting Firm

Aqua Science Engineers, Inc. (ASE)  
2411 Old Crow Canyon Road, #4  
San Ramon, CA 94583  
Contact: Robert Kitay, Senior Geologist  
(510) 820-9391

### Agency Review

Alameda County Health Care Services Agency (ACHCSA)  
1131 Harbor Bay Parkway, 2nd Floor  
Alameda, CA 94502  
Attn.: Ms. Madhulla Logan  
(510) 293-8695

California Regional Water Quality Control Board (RWQCB),  
San Francisco Bay Region  
2101 Webster Street, Suite 500  
Oakland, CA 94612  
(510) 286-4359

The following is a report detailing the results of the March 23, 1998, groundwater sampling at the above referenced site (Figure 2).

## 2.0 GROUNDWATER FLOW DIRECTION AND GRADIENT

On March 23, 1998, ASE staff geologist Charlie Rous measured the depth to water in each site groundwater monitoring well using an electric water level sounder. The surface of the groundwater was also checked for the presence of free-floating hydrocarbons or sheen using a product thickness bailer. No free-floating hydrocarbons or sheen were present in any site monitoring well. Groundwater elevations are presented in Table One.

A groundwater potentiometric surface map is presented as Figure 2. The groundwater flow direction is generally to the southeast at a gradient of approximately 0.066. This gradient is consistent with previous calculated gradients and flow directions, but is not consistent with petroleum hydrocarbon distribution in groundwater which suggests a northward groundwater flow direction.

## 3.0 GROUNDWATER SAMPLE COLLECTION AND ANALYSES

Prior to sampling, monitoring wells MW-2, MW-5 and MW-6 were purged of four well casing volumes of groundwater using dedicated polyethylene bailers. The pH, temperature and conductivity parameters were monitored during purging. Samples were not collected until these parameters stabilized. Groundwater samples were then collected from each well using dedicated polyethylene bailers. The samples were decanted from the bailers into 40-ml volatile organic analysis (VOA) vials containing hydrochloric acid as a preservative, capped, labeled and placed in coolers with wet ice for transport to a California state certified analytical laboratory, Chromalab, Inc. of Pleasanton, California (ELAP #1094), under appropriate chain-of-custody documentation.

The well purge water was placed in 55-gallon steel drums, labeled, and left on-site for temporary storage. Copies of the well sampling field logs are included as Appendix A.

The groundwater samples collected from monitoring wells MW-2, MW-5 and MW-6 were analyzed for total petroleum hydrocarbons as gasoline (TPH-G) by EPA Method 5030/8015M, benzene, toluene, ethylbenzene, and total xylenes (collectively known as BTEX) and methyl tertiary butyl ether (MTBE) by EPA Method 8020.

The analytical results for this and previous sampling events are presented in Table Two, and the certified laboratory report and chain-of-custody documentation are included as Appendix B.

#### **4.0 GROUNDWATER REMEDIATION**

Between May 28, 1997 and June 24, 1997, 2,550 lbs. of Oxygen Releasing Compound (ORC) was injected into the borings along the northern and eastern sides of the existing underground storage tanks (USTs). This drilling and ORC injection was performed by Fast-Tek Engineering Support Services of San Rafael, California on May 28 and 29 1997, Soils Exploration Services of Benicia, California on May 30, 1997 and En Prob Environmental Probing of Oroville, California on June 24, 1997.

On August 22, September 22, December 6, 1997, and March 3, 1998, ASE measured the dissolved oxygen (DO) in groundwater from each monitoring well. DO substantially increased in all site monitoring wells since the ORC injection was performed. A DO increase in groundwater will stimulate aerobic biodegradation of petroleum hydrocarbons. DO concentration data is presented in Table Three.

#### **5.0 CONCLUSIONS**

Hydrocarbon concentrations in groundwater samples collected from monitoring well MW-2 are currently at a historic low. No hydrocarbons were detected in the groundwater samples collected from monitoring well MW-6. Hydrocarbon concentrations detected in groundwater samples collected from monitoring well MW-5 were slightly higher than concentrations in the previous sampling period, but still remain much lower than the pre-remediation concentrations. A slight rise in the groundwater table and the effects of 'rebound' following remediation may be responsible for the slight rise in hydrocarbon concentrations detected in groundwater samples collected from this monitoring well. Even with the slight rise in hydrocarbon concentrations in the groundwater samples collected from monitoring well MW-5, the concentrations are still well below a 1 in 100,000 cancer risk for groundwater volatilization to indoor air in a potential commercial building built directly over monitoring well MW-5 scenario as shown in the August 22, 1997 addendum to the Risk-Based Corrective Action (RBCA) assessment. The DO concentrations in site monitoring wells indicate that substantial oxygen remains available for bioremediation to continue.

#### **6.0 RECOMMENDATIONS**

Since the hydrocarbon concentrations in the site wells do not appear to be a risk to human health at a 1 in 100,000 cancer risk in any of the scenarios outlined in the RBCA previously performed for the site, and since the

hydrocarbons detected at the site remain low compared to the pre-remediation concentrations, ASE considers the remediation project successful, and recommends case closure for this site.

## 7.0 REPORT LIMITATIONS

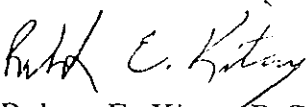
The results of this report represent the conditions at the time of the groundwater sampling at the specific locations where the groundwater samples were collected, and for the specific parameters analyzed by the laboratory. It does not fully characterize the site for contamination resulting from sources other than the underground storage tanks and associated plumbing at the site, or for parameters not analyzed by the laboratory. All of the laboratory work cited in this report was prepared under the direction of independent CAL-EPA certified laboratory. The independent laboratory is solely responsible for the contents and conclusions of the chemical analysis data.

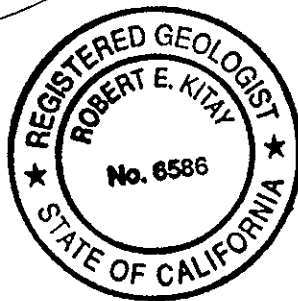
Aqua Science Engineers appreciates the opportunity to provide environmental consulting services for this project and trust that this report meets your needs. Please feel free to call us at (510) 820-9391 if you have any questions or comments.

Respectfully submitted,

AQUA SCIENCE ENGINEERS, INC.

  
Charlie Rous  
Staff Geologist

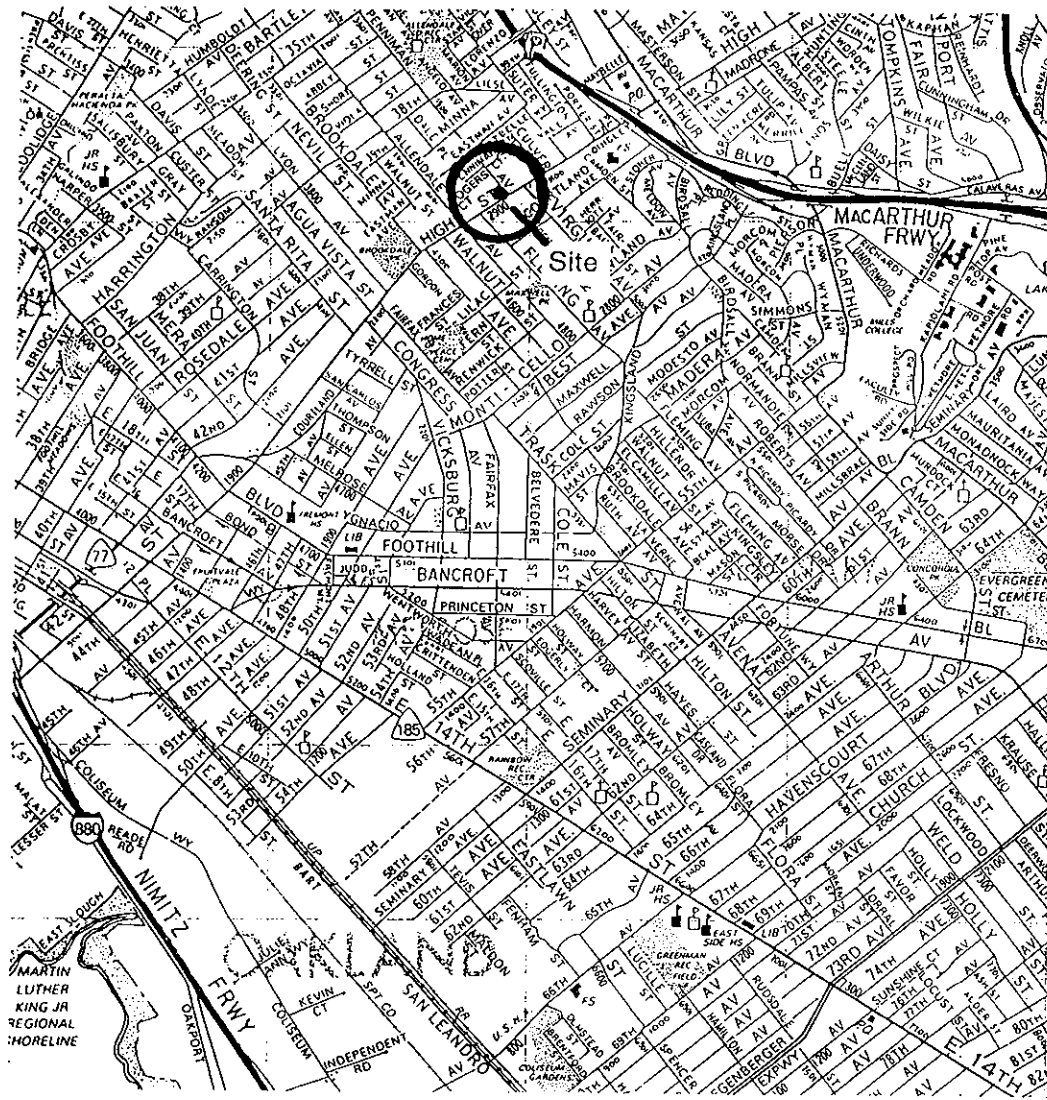
  
Robert E. Kitay, R.G.  
Senior Geologist



Attachments: Figures 1 and 2  
Tables One, Two and Three  
Appendices A and B

cc: Ms. Madhulla Logan, Alameda County Health Care Services Agency  
RWQCB, San Francisco Bay Region

## FIGURES



### SITE LOCATION MAP

ZIMA CENTER CORPORATION  
2951 HIGH STREET  
OAKLAND, CALIFORNIA

AQUA SCIENCE ENGINEERS, INC.

FIGURE 1



NORTH

SCALE  
1" = 30'

MW-6  
(92.76')



PENNIMAN AVENUE

SIDEWALK

EXISTING  
USTS

MW-5  
(91.72')

93'

91'

MW-4  
(90.70')

FORMER  
UST

94'

91'

RESIDENTIAL

MW-2  
(95.02')

BUILDING

PUMP ISLANDS

94'

MW-1  
(93.60')

92'

MW-3  
(91.61')

93'

PUMP ISLANDS

SIDEWALK

HIGH STREET

PROPERTY LIMITS

**LEGEND**

MW-6  
(92.75')

Monitoring well with  
groundwater elevation



Groundwater elevation  
contour

92' ———

Approximate groundwater  
flow direction



GROUNDWATER ELEVATION  
CONTOUR MAP - 03/23/98

ZIMA CENTER CORPORATION  
2951 HIGH STREET  
OAKLAND, CALIFORNIA

AQUA SCIENCE ENGINEERS, INC.

FIGURE 2



## TABLES

**TABLE ONE**  
**Summary of Groundwater Well Survey Data**

Well I.D.	Date of Measurement	Top of Casing Elevation (relative to project datum)	Depth to Water (feet)	Groundwater Elevation (project data)
MW-1	02-23-95	97.62	5.89	91.73
	05-26-95		5.20	92.42
	08-23-95		8.67	88.95
	12-13-96		4.61	93.01
	01-16-97		3.79	93.83
	03-27-97		5.87	91.75
	06-27-97		8.33	89.29
	09-22-97		9.62	87.90
	12-06-97		5.35	92.27
	<b>03-23-98</b>		<b>4.02</b>	<b>93.60</b>
MW-2	02-23-95	97.87	6.81	91.06
	05-26-95		4.90	92.97
	08-23-95		8.33	89.54
	12-13-96		6.85	91.02
	01-16-97		1.54	96.33
	03-27-97		5.51	92.36
	06-27-97		8.43	89.44
	09-22-97		9.50	88.37
	12-06-97		6.81	91.06
	<b>03-23-98</b>		<b>2.85</b>	<b>95.02</b>
MW-3	02-23-95	97.03	4.21	92.82
	05-26-95		6.44	90.59
	08-23-95		8.69	88.34
	12-13-96		5.60	91.43
	01-16-97		5.28	91.75
	03-27-97		6.64	90.39
	06-27-97		8.35	88.68
	09-22-97		9.42	87.61
	12-06-97		6.38	90.65
	<b>03-23-98</b>		<b>5.42</b>	<b>91.61</b>

**TABLE ONE (Continued)**  
 Summary of Groundwater Well Survey Data

Well I.D.	Date of Measurement	Top of Casing Elevation (relative to project datum)	Depth to Water (feet)	Groundwater Elevation (project data)
MW-4	02-23-95	96.77	6.25	92.07
	05-26-95		6.18	90.59
	08-23-95		8.55	88.22
	12-13-96		5.86	90.91
	01-16-97		5.79	90.98
	03-27-97		7.37	89.40
	06-27-97		8.75	88.02
	09-22-97		9.31	87.46
	12-06-97		6.25	90.52
	<b>03-23-98</b>		<b>6.07</b>	<b>90.70</b>
MW-5	12-13-96	98.32	6.25	92.07
	01-16-97		6.32	92.00
	03-27-97		7.51	90.81
	06-27-97		8.96	89.36
	09-22-97		9.38	88.94
	12-06-97		6.01	92.31
	<b>03-23-98</b>		<b>6.60</b>	<b>91.72</b>
MW-6	01-16-97	98.16	5.12	93.04
	03-27-97		6.55	91.61
	06-27-97		8.39	89.77
	09-22-97		9.14	88.99
	12-06-97		5.41	92.75
	<b>03-23-98</b>		<b>5.40</b>	<b>92.76</b>

**TABLE TWO**  
**Certified Analytical Results of GROUNDWATER Samples**  
**All Results are in Parts Per Billion (ppb)**

Sample I.D.	TPH Gasoline	Benzene	Toluene	Ethyl Benzene	Total Xylenes	MTBE
<u>MW-1</u>						
02-23-95	<50	<0.5	<0.5	<0.5	<0.5	---
05-26-95	<50	<0.5	<0.5	<0.5	<0.5	---
08-23-95	<50	<0.5	<0.5	<0.5	<0.5	---
<u>MW-2</u>						
02-23-95	3,300	9.6	13	8	28	---
05-26-95	4,600	39	18	21	39	---
08-23-95	<50	15	6	10	15	---
12-13-96	1,900	110	110	120	330	65
03-27-97	3,900	34	20	86	140	200
06-27-97	2,400	18	<5	6	8.8	2,000
09-22-97	<5,000	8.4	20	33	100	3,900
12-06-97	3,000	33	40	40	140	2,300
03-23-98	220	3.0	2.8	5.8	13	18
<u>MW-3</u>						
02-23-95	<50	<0.5	<0.5	<0.5	<0.5	---
05-26-95	<50	<0.5	<0.5	<0.5	<0.5	---
08-23-95	<50	<0.5	<0.5	<0.5	<0.5	---
<u>MW-4</u>						
06-26-96	2,500	230	64	99	110	5,700
03-27-97	6,200	300	150	160	310	7,100
<u>MW-5</u>						
12-13-96	3,600	180	350	81	510	430
03-27-97	120,000	28,000	16,000	2,600	10,000	64,000
06-27-97	6,300	10,000	2,400	290	4,500	43,000
09-22-97	<50,000	7.9	3.3	0.63	3.3	30,000
12-06-97	<5,000**	33	12	<5.0	7.3	33,000
03-23-98	29,000	150	160	130	320	34,000

**TABLE TWO**  
(continued)  
Certified Analytical Results of **GROUNDWATER** Samples  
All Results are in **Parts Per Billion (ppb)**

Sample I.D.	TPH Gasoline	Benzene	Toluene	Ethyl Benzene	Total Xylenes	MTBE
<u>MW-6</u>						
01-13-97	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5
03-27-97	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5
06-27-97	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5
09-22-97	< 50	< 0.5	< 0.5	< 0.5	< 0.5	24
12-06-97	94	< 0.5	< 0.5	< 0.5	< 0.5	< 5
03-23-98	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 5
EPA METHOD	5030/ 8015M	8020	8020	8020	8020	8020
DTSC MCL	NE	1	100*	680	1,750	NE

Notes:

DTSC MCL = Department of Toxic Substances Control maximum level for drinking water

\* = DTSC recommended action level; MCL not established

NE = DTSC MCLs and RALs not established

\*\* = Hydrocarbon found in Gasoline Range is uncharacteristic of Gasoline Profile. If quantified using Gasoline's response factor, concentration would equal 24,000 ppb.

--- = Not Analyzed

**TABLE THREE**  
**Summary of Dissolved Oxygen Results in Groundwater**  
**All Results in Parts Per Million (ppm)**

Sample I.D.	Before Purging	After Purging
-----	-----	-----
<u>MW-1</u>		
06-27-97	0.99	---
08-20-97	0.64	0.96
09-22-97	1.60	---
12-06-97	1.30	---
<b>03-03-98</b>	<b>0.86</b>	---
<u>MW-2</u>		
06-27-97	0.86	0.94
08-20-97	0.43	0.81
09-22-97	1.15	3.40
12-06-97	1.52	4.88
<b>03-03-98</b>	<b>5.12</b>	<b>4.64</b>
<u>MW-3</u>		
06-27-97	1.26	---
08-20-97	1.13	1.29
09-22-97	2.75	---
12-06-97	3.15	---
<b>03-03-98</b>	<b>0.70</b>	---
<u>MW-4</u>		
06-27-97	0.97	---
08-20-97	5.50	6.18
09-22-97	11.80	---
12-06-97	5.15	---
<b>03-03-98</b>	<b>1.08</b>	---
<u>MW-5</u>		
06-27-97	0.71	8.70
08-20-97	>20.00	>20.00
09-22-97	>20.00	>20.00
12-06-97	19.20	19.17
<b>03-03-98</b>	<b>18.19</b>	<b>17.14</b>
<u>MW-6</u>		
06-27-97	0.61	0.89
08-20-97	0.69	1.02
09-22-97	1.10	2.90
12-06-97	2.11	2.50
<b>03-03-98</b>	<b>1.03</b>	<b>1.42</b>

Notes:

--- = Well not purged

# APPENDIX A

Well Sampling Field Logs



## WELL SAMPLING FIELD LOG

Project Name and Address: ZIMA, 2951 High St, Oakland  
 Job #: 3011 Date of sampling: 3/23/98  
 Well Name: mw-1 Sampled by: CR  
 Total depth of well (feet): \_\_\_\_\_ Well diameter (inches): 2  
 Depth to water before sampling (feet): 4.02  
 Thickness of floating product if any: \_\_\_\_\_  
 Depth of well casing in water (feet): \_\_\_\_\_  
 Number of gallons per well casing volume (gallons): \_\_\_\_\_  
 Number of well casing volumes to be removed: \_\_\_\_\_  
 Req'd volume of groundwater to be purged before sampling (gallons): \_\_\_\_\_  
 Equipment used to purge the well: \_\_\_\_\_  
 Time Evacuation Began: \_\_\_\_\_ Time Evacuation Finished: \_\_\_\_\_  
 Approximate volume of groundwater purged: \_\_\_\_\_  
 Did the well go dry?: \_\_\_\_\_ After how many gallons: \_\_\_\_\_  
 Time samples were collected: \_\_\_\_\_  
 Depth to water at time of sampling: \_\_\_\_\_  
 Percent recovery at time of sampling: \_\_\_\_\_  
 Samples collected with: \_\_\_\_\_  
 Sample color: \_\_\_\_\_ Odor: \_\_\_\_\_  
 Description of sediment in sample: \_\_\_\_\_

### SAMPLES COLLECTED

Sample	# of containers	Volume & type container	Pres	Iced?	Analysis





# WELL SAMPLING FIELD LOG

Project Name and Address: Zima 2951 High St, Oakland  
 Job #: 3011 Date of sampling: 3/23/98  
 Well Name: mw-2 Sampled by: CR  
 Total depth of well (feet): 19.93 Well diameter (inches): 2  
 Depth to water before sampling (feet): 2.85  
 Thickness of floating product if any: N/A  
 Depth of well casing in water (feet): 17.08  
 Number of gallons per well casing volume (gallons): 2.9  
 Number of well casing volumes to be removed: 4  
 Req'd volume of groundwater to be purged before sampling (gallons): 11  
 Equipment used to purge the well: Dedicated Bailer  
 Time Evacuation Began: 10:45 Time Evacuation Finished: 10:55  
 Approximate volume of groundwater purged: 11  
 Did the well go dry?: NO After how many gallons: \_\_\_\_\_  
 Time samples were collected: 10:00  
 Depth to water at time of sampling: 3.01  
 Percent recovery at time of sampling: \_\_\_\_\_  
 Samples collected with: Dedicated Bailer  
 Sample color: Clear Odor: None  
 Description of sediment in sample: none

## CHEMICAL DATA

Volume Purged	Temp	pH	Conductivity
<u>2.5</u>	<u>76.4</u>	<u>8.7</u>	<u>890</u>
<u>5</u>	<u>73.1</u>	<u>8.6</u>	<u>813</u>
<u>7.5</u>	<u>73.2</u>	<u>8.5</u>	<u>821</u>
<u>10</u>	<u>73.0</u>	<u>8.8</u>	<u>752</u>

## SAMPLES COLLECTED

Sample	# of containers	Volume & type container	Pres	iced?	Analysis
<u>mw-2</u>	<u>3</u>	<u>40mL UDA</u>	<u>14-11</u>	<u>Y</u>	<u>TPH, (OTEX) / m TSS</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____



## WELL SAMPLING FIELD LOG

Project Name and Address: Zima, 2951 High St., Oakland  
Job #: 3011 Date of sampling: 3/23/18  
Well Name: mw-3 Sampled by: CR  
Total depth of well (feet): \_\_\_\_\_ Well diameter (inches): 2  
Depth to water before sampling (feet): 5.42  
Thickness of floating product if any: \_\_\_\_\_  
Depth of well casing in water (feet): \_\_\_\_\_  
Number of gallons per well casing volume (gallons): \_\_\_\_\_  
Number of well casing volumes to be removed: \_\_\_\_\_  
Req'd volume of groundwater to be purged before sampling (gallons): \_\_\_\_\_  
Equipment used to purge the well: \_\_\_\_\_  
Time Evacuation Began: \_\_\_\_\_ Time Evacuation Finished: \_\_\_\_\_  
Approximate volume of groundwater purged: \_\_\_\_\_  
Did the well go dry?: \_\_\_\_\_ After how many gallons: \_\_\_\_\_  
Time samples were collected: \_\_\_\_\_  
Depth to water at time of sampling: \_\_\_\_\_  
Percent recovery at time of sampling: \_\_\_\_\_  
Samples collected with: \_\_\_\_\_  
Sample color: \_\_\_\_\_ Odor: \_\_\_\_\_  
Description of sediment in sample: \_\_\_\_\_

### SAMPLES COLLECTED

Sample	# of containers	Volume & type container	Pres	Iced?	Analysis
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____



## WELL SAMPLING FIELD LOG

Project Name and Address: Zima, 2951 H<sub>2</sub>L St, Oakland  
Job #: 3011 Date of sampling: 3/23/96  
Well Name: mw-4 Sampled by: CR  
Total depth of well (feet): \_\_\_\_\_ Well diameter (inches): 4  
Depth to water before sampling (feet): 6.07  
Thickness of floating product if any: \_\_\_\_\_  
Depth of well casing in water (feet): \_\_\_\_\_  
Number of gallons per well casing volume (gallons): \_\_\_\_\_  
Number of well casing volumes to be removed: \_\_\_\_\_  
Req'd volume of groundwater to be purged before sampling (gallons): \_\_\_\_\_  
Equipment used to purge the well: \_\_\_\_\_  
Time Evacuation Began: \_\_\_\_\_ Time Evacuation Finished: \_\_\_\_\_  
Approximate volume of groundwater purged: \_\_\_\_\_  
Did the well go dry?: \_\_\_\_\_ After how many gallons: \_\_\_\_\_  
Time samples were collected: \_\_\_\_\_  
Depth to water at time of sampling: \_\_\_\_\_  
Percent recovery at time of sampling: \_\_\_\_\_  
Samples collected with: \_\_\_\_\_  
Sample color: \_\_\_\_\_ Odor: \_\_\_\_\_  
Description of sediment in sample: \_\_\_\_\_

### SAMPLES COLLECTED

Sample	# of containers	Volume & type container	Pres	Iced?	Analysis
-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----
-----	-----	-----	-----	-----	-----



# WELL SAMPLING FIELD LOG

Project Name and Address: Zuma, 2951 High St, Oakland  
 Job #: 3011 Date of sampling: 3/27/98  
 Well Name: mw-5 Sampled by: CR  
 Total depth of well (feet): 27.20 Well diameter (inches): 2  
 Depth to water before sampling (feet): 6.60  
 Thickness of floating product if any: N/A  
 Depth of well casing in water (feet): 20.6  
 Number of gallons per well casing volume (gallons): 3.5  
 Number of well casing volumes to be removed: 4  
 Req'd volume of groundwater to be purged before sampling (gallons): 14  
 Equipment used to purge the well: Dedicated Bailer  
 Time Evacuation Began: 11:00 Time Evacuation Finished: 11:11  
 Approximate volume of groundwater purged: 9  
 Did the well go dry?: YES After how many gallons: 9  
 Time samples were collected: 13:30  
 Depth to water at time of sampling: 16.67  
 Percent recovery at time of sampling: \_\_\_\_\_  
 Samples collected with: Dedicated Bailer  
 Sample color: Clear Odor: None  
 Description of sediment in sample: Faint odor

## CHEMICAL DATA

Volume Purged	Temp	pH	Conductivity
<u>3</u>	<u>75.1</u>	<u>8.0</u>	<u>1070</u>
<u>6</u>	<u>74.9</u>	<u>8.3</u>	<u>1100</u>
<u>9</u>	<u>73.1</u>	<u>8.5</u>	<u>990</u>
<u>12</u>	_____	_____	_____
_____	_____	_____	_____

## SAMPLES COLLECTED

Sample	# of containers	Volume & type container	Pics	iced?	Analysis
<u>mw-5</u>	<u>3</u>	<u>40 ml VOA</u>	<u>Att</u>	<u>Y</u>	<u>TPH-S/BTEX/MTBE</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____



# WELL SAMPLING FIELD LOG

Project Name and Address: Zuma, 2951 High St. Oakland  
 Job #: 3011 Date of sampling: 3/23/98  
 Well Name: mw-6 Sampled by: CR  
 Total depth of well (feet): 28.21 Well diameter (inches): 2  
 Depth to water before sampling (feet): 5.40  
 Thickness of floating product if any: N/A  
 Depth of well casing in water (feet): 22.81  
 Number of gallons per well casing volume (gallons): 3.8  
 Number of well casing volumes to be removed: 4  
 Req'd volume of groundwater to be purged before sampling (gallons): 15  
 Equipment used to purge the well: Dedicated Bailer  
 Time Evacuation Began: 11:20/14:05 Time Evacuation Finished: 11:30/14:25  
 Approximate volume of groundwater purged: 15  
 Did the well go dry?: NO After how many gallons: \_\_\_\_\_  
 Time samples were collected: 14:30  
 Depth to water at time of sampling: \_\_\_\_\_  
 Percent recovery at time of sampling: \_\_\_\_\_  
 Samples collected with: Dedicated Bailer  
 Sample color: lt brown Odor: None  
 Description of sediment in sample: Minor Silt

## CHEMICAL DATA

Volume Purged	Temp	pH	Conductivity
<u>4</u>	<u>75.0</u>	<u>8.0</u>	<u>600</u>
<u>8</u>	<u>75.3</u>	<u>8.2</u>	<u>530</u>
<u>12</u>	<u>76.0</u>	<u>7.7</u>	<u>510</u>
<u>16</u>	<u>76.1</u>	<u>7.7</u>	<u>570</u>

## SAMPLES COLLECTED

Sample	# of containers	Volume & type container	Pres	iced?	Analysis
<u>mw-6</u>	<u>3</u>	<u>40ml VOA</u>	<u>HY</u>	<u>X</u>	<u>TPH-5/BTEX/m+35</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

## **APPENDIX B**

Certified Analytical Report  
and  
Chain of Custody Documentation

**CHROMALAB, INC.**

Environmental Services (SDB)

April 2, 1998

Submission #: 9803359

AQUA SCIENCE ENGINEERS INC

Atten: Charlie Rous

Project: ZIMA  
Received: March 24, 1998

Project#: 3011

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

Client Sample ID: MW-2

Spl#: 177093

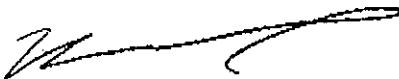
Sampled: March 23, 1998

Matrix: WATER

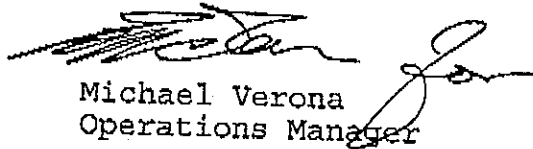
Run#: 11958

Analyzed: April 2, 1998

ANALYTE	RESULT (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE (%)	DILUTION FACTOR
GASOLINE	220	50	N.D.	113	1
MTBE	18	5.0	N.D.	89	1
BENZENE	3.0	0.50	N.D.	87	1
TOLUENE	2.8	0.50	N.D.	89	1
ETHYL BENZENE	5.8	0.50	N.D.	102	1
XYLENES	13	0.50	N.D.	95	1



Vincent Vancil  
Chemist



Michael Verona  
Operations Manager

510-837-4853

1220 Quarry Lane • Pleasanton, California 94566-4756  
(510) 484-1919 • Facsimile (510) 484-1096  
Federal ID #68-0140157

PM V132 O: BTEXQC0226

VINCE 17:25

# CHROMALAB, INC.

Environmental Services (SDB)

April 2, 1998

Submission #: 9803359

AQUA SCIENCE ENGINEERS INC

Atten: Charlie Rous

Project: ZIMA

Project#: 3011

Received: March 24, 1998

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

Client Sample ID: MW-5

Spl#: 177094

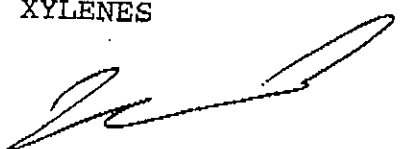
Sampled: March 23, 1998

Matrix: WATER


Run#: 11958

Analyzed: April 2, 1998

ANALYTE	RESULT (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE (%)	DILUTION FACTOR
GASOLINE	29000	10000	N.D.	113	200
MTBE	34000	1000	N.D.	89	200
BENZENE	150	100	N.D.	87	200
TOLUENE	160	100	N.D.	89	200
ETHYL BENZENE	130	100	N.D.	102	200
XYLENES	320	100	N.D.	95	200



Vincent Vancil  
Chemist



Michael Verona  
Operations Manager



# CHROMALAB, INC.

Environmental Services (SDB)

April 2, 1998

Submission #: 9803359

AQUA SCIENCE ENGINEERS INC

Atten: Charlie Rous

Project: ZIMA

Project#: 3011

Received: March 24, 1998

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

Client Sample ID: MW-6

Spl#: 177095

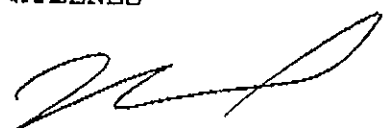
Matrix: WATER


Sampled: March 23, 1998

Run#: 11958

Analyzed: April 2, 1998

ANALYTE	RESULT (ug/L)	REPORTING LIMIT (ug/L)	BLANK RESULT (ug/L)	BLANK SPIKE (%)	DILUTION FACTOR
GASOLINE	N.D.	50	N.D.	113	1
MTBE	N.D.	5.0	N.D.	89	1
BENZENE	N.D.	0.50	N.D.	87	1
TOLUENE	N.D.	0.50	N.D.	89	1
ETHYL BENZENE	N.D.	0.50	N.D.	102	1
XYLENES	N.D.	0.50	N.D.	95	1

  
Vincent Vancil  
Chemist

  
Michael Verona  
Operations Manager

510-837-4853


1220 Quarry Lane • Pleasanton, California 94566-4756  
(510) 484-1919 • Facsimile (510) 484-1096  
Federal ID #68-0140157

PM V132 O: BTEXQC022C  
VINCE 17:28

Agua Science Engineers, Inc.  
 2411 Old Crow Canyon Road, #4,  
 San Ramon, CA 94583  
 (510) 820-9391 - FAX (510) 837-4853

# Chain of Custody

DATE 3-24-98 PAGE 1 OF 1

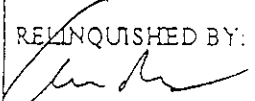
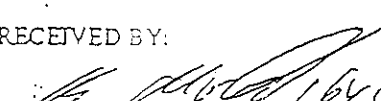
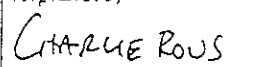

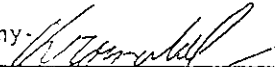
SAMPLERS (SIGNATURE)  (PHONE NO.) 820-9391 PROJECT NAME ZIMA NO. 3011  
 ADDRESS 2951 HIGH ST., OAKLAND

## ANALYSIS REQUEST

SPECIAL INSTRUCTIONS:

5-DAY TAT

SAMPLE ID.	DATE	TIME	MATRIX	NO. OF SAMPLES	TPH-GASOLINE (EPA 5030/8015)	TPH-GASOLINE/BTEX/MTBE (EPA 5030/8015-8020)	TPH-DIESEL (EPA 3510/8015)	PURGABLE AROMATICS (EPA 602/6020)	PURGABLE HALOCARBONS (EPA 601/8010)	VOLATILE ORGANICS (EPA 624/8240)	BASE/NEUTRALS, ACIDS (EPA 625/8270)	OIL & GREASE (EPA 5520 E&F or B&F)	LOFT METALS (5) (EPA 6010+7000)	TITLE 22 (CRM 17) (EPA 6010+7000)	TCLP (EPA 1311/1310)	STLC-CRM MET. (EPA 1311/1310)	REACTIVITY CORROSIVITY IGNITABILITY										
					MW-2	3-23-98	13:15	H <sub>2</sub> O	3 VOA		X																
MW-5	↓	13:30	↓	↓		X																					
MW-6	↓	14:30	↓	↓		X																					

RELINQUISHED BY:  (signature)	RECEIVED BY:  (signature)	RELINQUISHED BY:  (signature)	RECEIVED BY LABORATORY:  (signature)	COMMENTS:  <u>5-DAY TAT</u>
16:45 (time)	3:24 98 (time)	3-24-98 (time)		
CHARLES ROUS (printed name)	BOB MOULIN (printed name)			
Company- ASE	Company- 	Company-	Company-	