

2030 Addison Street, Suite 500
Berkeley, California 94704
Telephone: (510) 540-6954 / Fax: (510) 540-7496

September 14, 1993

Alameda County Health Care Services Agency
Department of Environmental Health
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, CA 94621

687157.07
File: Report

Attention: Mr. Jeff Shapiro

Subject: Final Groundwater Monitoring Program Report and Request for Final Site Closure, Mill Springs Park Apartments (formerly Livermore Superblock) Railroad Avenue between South P and South L Streets Livermore, California

INTRODUCTION

This report presents results of the groundwater monitoring program conducted at the subject site from May 1989 to August 1993. Groundwater monitoring was performed fourteen times on an approximately quarterly basis during this four year period. This monitoring program was performed as part of the approved final closure plan for the subject site. The Earth Technology Corporation, (formerly Aqua Resources Inc. (ARI)), provided environmental consultation and engineering services during the previous Phase I, Phase II, and Final Site Remediation and Closure for the Mill Springs Park Apartment Site. The site is located at 1809 Railroad Avenue, between South L and South P Streets, in Livermore, California. The site was known formerly as the Livermore Superblock, and is shown in relation to the City of Livermore on the Vicinity Map, Figure 1.

The purpose of the monitoring program was to determine whether leakage of fuel oil from the previously removed concrete vault structure had migrated to groundwater underlying the site. The location of the monitoring well was determined based on the results of a March 14, 1989, Groundwater Study Report, and approved by the Alameda County Health Care Services Agency, Department of Environmental Health - Hazardous Materials Division. The location of the monitoring well is shown in relation to the approved development plan on the Monitoring Well Location Map, Figure 2 (in map pocket).

This letter report includes the following information obtained from the monitoring period between March 1991 and May 1993:

- Summary of the monitoring well sampling methodology and chemical analyses performed
- Discussion of results of chemical analyses

- Conclusions and Recommendations based on field observations and interpretation of chemical analytical data.

The water level data and chemical data for the 14 sampling events are summarized in Figures 3 and 4, respectively. Chain of Custody Forms and the Certified Chemical Analysis reports for the current monitoring period are presented in Appendix A. The previous groundwater monitoring report covering the period from May 1989 to May 1990, that was submitted for regulatory review on July 2, 1990 is included in Appendix B. Appendix C contains a copy of the Monitoring Well Installation report dated June 1, 1989 including a copy of the monitoring well log and the Alameda County Flood Control and Water Conservation District Well Permit Form.

GROUNDWATER LEVEL OBSERVATIONS

Prior to sampling the monitoring well, the depth to groundwater was measured from the top of the casing in the well and recorded to the nearest hundredth of a foot using an electronic interface probe or water level meter. The groundwater elevations observed at the time of each sampling interval are shown on Table 1. The plot of groundwater elevation over time is shown on Figure 3.

The groundwater level at the site was observed to vary significantly during the four year monitoring period. During the period from May 1989 to May 1991, the fluctuation in the groundwater elevation followed the typical decrease during the dry summer months and rise during the wet winter and spring months. The groundwater level in the monitoring well rose to an elevation of 438.13 (second highest recorded groundwater elevation during the monitoring program) feet above mean sea level (MSL) in May 1991. However, a rapid decrease in the groundwater elevation was observed beginning in August 1991. At that time, the groundwater level had dropped 13.74 feet to 424.39 feet.

During the subsequent two sampling events in November 1991, and February 1992, the water level had dropped an additional 5 ½ feet to an elevation below 418.6 feet. This elevation, which corresponds approximately to the bottom of the screened portion of the well casing, was utilized in plotting the graph presented on Figure 3, but does not represent the actual groundwater elevation at the time of the measurement.

Table 1
Observed Groundwater Elevations
(Mean Sea Level Datum)

Date of Observation	Groundwater Elevation (feet)
April 19, 1989	433.58
May 1, 1989	434.34
August 1, 1989	433.22
September 1, 1989	431.73
November 2, 1989	430.69
February 2, 1990	431.72
May 2, 1990	434.50
March 6, 1991	436.93
May 2, 1991	438.13
August 7, 1991	424.39
November 5, 1991	418.93*
February 21, 1992	418.91*
May 4, 1992	423.71
February 12, 1993	426.16
May 4, 1993	438.76

* Elevation at bottom of screened casing; groundwater elevation is at or below this point

The water levels recorded for the November and February 1992 intervals are apparently at the level of residual water remaining in the sump/sediment trap at the bottom of the well casing below the well screen. To measure the groundwater level during these two intervals, the dedicated bladder pump was removed since the water level probe could not be lowered below the top of the pump.

No groundwater samples were obtained during the November and February 1992 sampling intervals due to insufficient water volume in the monitoring well. At the time of the sampling interval in May 1992, the groundwater level was observed to have risen to an elevation of 423.71 feet above MSL.

Earth Technology contacted the Alameda County Flood Control and Water Conservation District, Zone 7 to determine the cause of the drawdown observed in August 1991. They explained that the supply of water into the Livermore area from the State Water Project aqueduct had been shutdown in March 1991, and that continued and/or increased pumping of the aquifer would result in the observed groundwater level drawdown. A contributing factor to the significant drawdown of the aquifer may be the pumping of three nearby wells operated by California Water Service Company (CWS) in Livermore.

One of the wells operated by CWS is located approximately 2000 feet west of the subject monitoring well. This well was out of service until July 1991, when it was brought back into service. With the resumed operation of this CWS well and the probable increased pumping rate of the two other local wells, it is expected that local as well as regional groundwater levels could be lowered significantly. However, groundwater recharge appears to have been sufficient during the following monitoring interval (May 1992) to raise the water level so that the monitoring well could be purged and sampled during the last sample interval.

From May 1992 to May 1993, the groundwater level had risen more than fifteen feet to an elevation of 438.76 feet. The groundwater elevation observed during the final monitoring interval was the highest groundwater elevation recorded during the four year monitoring program.

GROUNDWATER SAMPLING PROCEDURES AND FIELD OBSERVATIONS

The groundwater monitoring well was fully developed before sampling. Well development was accomplished by pumping 3 to 5 well volumes of water from the well utilizing the dedicated bladder pump previously installed in the monitoring well. The water removed from the well during development was placed in sealed containers and stored on-site pending results of chemical analyses. Based on the results of the initial analysis, the Livermore Public Works Department, Water Reclamation Plant approved disposal of the development water to the sanitary sewer. Stored purge water and water subsequently generated from purging at quarterly sampling intervals were discharged to the sanitary sewer.

After the groundwater elevation was determined, the monitoring well was purged and allowed to recover. When the groundwater level had recovered, a groundwater sample was collected from the discharge tube of the bladder pump. The samples were collected in 40 ml sample vials, provided by the laboratory. The sample vials were then placed in a chilled ice chest and transported to the laboratory under chain-of-custody control.

SUMMARY OF CHEMICAL ANALYSES AND DISCUSSION OF RESULTS

As discussed earlier, groundwater samples obtained at each quarterly sampling interval for chemical analysis were submitted to a State certified laboratory utilizing chain of custody protocols. Chemical analyses were performed by Curtis and Tompkins, Ltd., Analytical Laboratories in Berkeley. Travel blanks were also taken and analyzed where considered appropriate.

Chemical analyses included determination of Benzene, Toluene, Xylene, Ethylbenzene (BTXE) by EPA Method 8020 and for Total Petroleum Hydrocarbons by EPA Method 418.1 or EPA Method 8015, modified. The results of chemical analyses for the entire monitoring period are summarized in Table 2. Copies of the certified laboratory reports are presented in the attached appendices.

Benzene was the only EPA Method 8020 analyte detected above the method detection limit (0.5 ppb) in samples obtained during sampling intervals prior to August, 1991; the other analytes (Toluene, Xylene and Ethylbenzene) were not detected in any of the samples collected and analyzed.

Benzene was not detected at every sample interval, and its detected concentration was determined to range from less than 0.5 ppb (method detection limit) to a measured maximum of 5 ppb in August, 1989. The Benzene concentration over time is shown in Figure 4. Benzene was not detected in the baseline sample interval nor in the fourth quarter sample interval of the first year sampling; it was, however, detected in the first, second and third quarter sample intervals of the first year. At the first, second and third sample intervals, the monitoring well was resampled. Benzene was not detected in the resample analysis at the first and second quarter sample interval, but was detected in the third quarter sample interval.

In the second year sampling, Benzene concentrations were detected at 2.8 ppb during the initial March, 1991, sampling interval and at 2.0 ppb during the second sampling interval in May, 1991. Benzene was not detected (less than 0.5 ppb) in the August 1991, May 1992, February 1993, and May 1993 samples. Groundwater samples were not recovered from the monitoring well in November, 1991 and in February, 1992, due to insufficient water volume within the well casing resulting from local and regional lowering of the groundwater table.

Table 2
 Summary of Groundwater Analytical Results

Sample Date	TPH (mg/l)	Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Xylene (ug/l)	TPH Analytical Method
5/2/89	ND	ND	ND	ND	ND	EPA 8015
8/1/89	ND	5	ND	ND	ND	EPA 8015
9/1/89	ND	ND	ND	ND	ND	EPA 8015
11/3/89	ND	3.6	ND	ND	ND	EPA 8015
2/5/90	ND	4.5	ND	ND	ND	EPA 8015
5/2/90	ND	ND	ND	ND	ND	EPA 8015
3/6/91	NA	2.8	ND	ND	ND	---
5/2/91	NA	2.0	ND	ND	ND	---
8/7/91	NA	ND	ND	ND	ND	---
11/5/91	NS	NS	NS	NS	NS	---
2/21/92	NS	NS	NS	NS	NS	---
5/4/92	NA	ND	ND	ND	ND	---
2/12/93	ND	ND	ND	ND	ND	EPA 418.1
5/4/93	ND	ND	ND	ND	ND	EPA 418.1

Notes: ND = Not Detected above Method Detection Limit

NA = Not Analyzed

NS = Not Sampled (groundwater level below bottom of well casing)

CONCLUSIONS AND RECOMMENDATIONS

Based on the analyses of groundwater samples collected during the monitoring period from the monitoring well, there appears to be no remaining hydrocarbon contamination detectable in the groundwater associated with the concrete vault structure that was removed. Review of the chemical test results indicates that all the TPH analytes were below the method detection limits. Benzene was detected above the method detection level (.5 ppb), but not on a consistent, repeatable basis. In addition, the measured benzene concentration did not exceed the Maximum Contaminant Level (MCL) established by the EPA (5 ppm).

The results of the second year sampling intervals indicate that the concentration of benzene is apparently on the decline. In addition, benzene has not been detected at a concentration above the method detection limit (0.5 ug/l) for the last four consecutive sample intervals.

Based on the measured petroleum concentrations and field observation that no free petroleum product was observed in the groundwater samples collected as part of the groundwater monitoring program, Earth Technology concludes that continued monitoring is not warranted.

Therefore, Earth Technology recommends the following actions be taken at the site:

- The existing monitoring well be properly abandoned and sealed in conformance with Alameda County Flood Control and Water Conservation District, Zone 7, requirements
- The Alameda County Health Care Services Agency, Department of Environmental Health and the California Regional Water Quality Control Board, San Francisco Bay Region approve the site closure and issue a letter stating that no further action is required and that final closure has been achieved. The letter should be addressed to KH Realty 2 Inc., 22020 Clarendon Street, Suite 200, Woodland Hills, California 91367, Attention Mr. Jim Hardy.

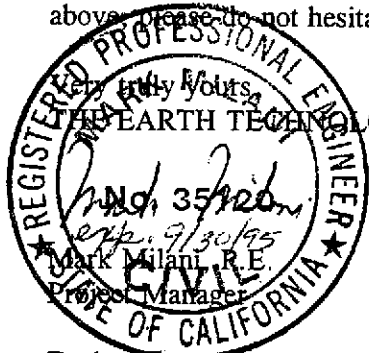
LIMITATIONS

Consistent with our discussions with the Client and the lead regulatory agency, namely the Alameda County Health Care Services Agency, our groundwater monitoring program was limited to the installation and development of one groundwater monitoring well and quarterly groundwater sample collection. Chemical analyses were performed by others, not under Earth Technology direct supervision. Test results are reported as received.

Final determination of additional site remediation, if required, will be determined by the Alameda County Health Care Services Agency. We cannot guarantee or warrant that soil or groundwater at this site are not contaminated above allowable limits for a given contaminant. This report is limited in its scope to the analyses and review of samples obtained from the one monitoring well as required by the regulatory agency.

The conclusions and recommendations contained herein represent professional opinions prepared consistent with the standards of care and diligence normally practiced by environmental consultants of a similar nature in the same locale. No warranty expressed or implied is made.

It has been a pleasure to provide you with this information. If you have any questions regarding the above, please do not hesitate to contact the undersigned.



THE EARTH TECHNOLOGY CORPORATION

Richard Makdisi, R.G.
Technical Director

- Enclosures:
- Appendix A - Certified Laboratory Reports and Chain of Custody Forms
 - Appendix B - Groundwater Monitoring Report: 1989 - 1990
 - Appendix C - Groundwater Monitoring Well Installation Report
 - Figure 1 - Vicinity Map
 - Figure 2 - Monitoring Well Location Plan
 - Figure 3 - Groundwater Elevation Over Time
 - Figure 4 - Benzene Concentration Over Time

cc: Addressee (two copies)
Mr. Jim Hardy, KH Realty 2, Inc. (two copies)
Regional Water Quality Control Board, San Francisco Bay Region



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

DATE RECEIVED: 05/05/93
DATE REPORTED: 05/17/93

EARTH TECHNOLOGY
RECEIVED

MAY 20 1993

LABORATORY NUMBER: 110802

Job# 687157.07

File Report Banking

CLIENT: THE EARTH TECHNOLOGY CORPORATION

PROJECT ID: 687157.07

LOCATION: MILL SPRING

RESULTS: SEE ATTACHED

Teresa Morrison
Reviewed by

[Signature]
Reviewed by

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LABORATORY NUMBER: 110802
CLIENT: THE EARTH TECHNOLOGY CORPORATION
PROJECT ID: 687157.07
LOCATION: MILL SPRING

DATE SAMPLED: 05/04/93
DATE RECEIVED: 05/05/93
DATE ANALYZED: 05/13/93
DATE REPORTED: 05/17/93

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)	REPORTING LIMIT (ug/L)
110802-1	MS-MW1-W1	ND	ND	ND	ND	0.5
110802-2	MS-MW1-TB	ND	ND	ND	ND	0.5

ND = Not detected at or above reporting limit.

Reporting Limit applies to all analytes.

QA/QC SUMMARY

RPD, %	1
RECOVERY, %	97

LABORATORY NUMBER: 110802
 CLIENT: THE EARTH TECHNOLOGY CORPORATION
 PROJECT ID: 687157.07
 LOCATION: MILL SPRING

DATE SAMPLED: 05/04/93
 DATE RECEIVED: 05/05/93
 DATE EXTRACTED: 05/11/93
 DATE ANALYZED: 05/11/93
 DATE REPORTED: 05/17/93

EPA 418.1: Total Recoverable Petroleum Hydrocarbons by IR

LAB ID	CLIENT ID	RESULT (mg/L)	REPORTING LIMIT (mg/L)
110802-1	MS-MW1-W1	ND	1

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	3
RECOVERY, %	96

Chain of Custody Record

Lab Job no.: 110802
 Date 5-4-93
 Page 1 of 1

Laboratory Curtis & Tompkins, Ltd
 Address 2323 5th St.
Berkeley, CA 94710

Method of Shipment: TETC

Client TETC
 Address 2030 Addison St. #500
Berkeley, CA 94704

Shipment No. 1
 Project Manager Mark Peterson
 Telephone No. (510) 540-6954

Project Name / Number Mill Spring / 687157.07

Fax No. (510) 540-2496

Contract / Purchase Order / Quote _____

Samplers: (Signature) Mark Peterson

Analysis Required	Remarks

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation		Temp.	Chemical	Filtered	No. of Containers	Analysis Required	Remarks
						Temp.	Chemical						
1 MS-MW1-W1	MW-1	5/4/93	1655	H ₂ O	40ml VOA	HC	HC1				3	X	
2 MS-MW1-TB	"	"	"	"	" "	"	"	"	"		1	X	
1 MS-MW1-W1	"	"	"	"	1-liter glass	"	B	"			1	X	

Relinquished by: Signature <u>Mark Peterson</u> Printed <u>Mark Peterson</u> Company <u>TETC</u> Reason <u>Analyses</u>	Date <u>5/4/93</u> Time <u>10:18</u>	Received by: Signature <u>Louise Brower</u> Printed <u>Louise Brower</u> Company <u>CIT Berkeley</u> Reason <u>Analyses</u>	Date <u>5/13</u> Time <u>10:18</u>	Relinquished by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____
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Comments: Std Turn around

Relinquished by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____
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687157.07
Mill Springs



Curtis & Tompkins, Ltd.
Analytical Laboratories, Since 1878

2323 5th Street
Berkeley, CA 94710
Phone: (510) 486-0900
FAX: (510) 486-0532

FAX TRANSMISSION

To:

NAME	Mark Peterson	
COMPANY	ETC	FAX NUMBER

From:

NAME	Louise Brewer
------	---------------

Reference:

--

Message:

If you do not receive all pages, Please Call (510) 486-0900 Page: _____ of _____

Date: _____



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

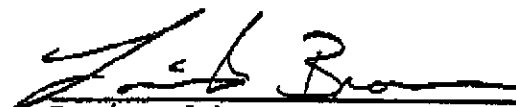
DATE RECEIVED: 02/12/93
DATE REPORTED: 02/24/93


LABORATORY NUMBER: 110084

CLIENT: THE EARTH TECHNOLOGY CORPORATION

PROJECT ID: MILL SPRINGS

RESULTS: SEE ATTACHED


Reviewed by


Reviewed by

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Berkeley

Los Angeles



LABORATORY NUMBER: 110084
CLIENT: THE EARTH TECHNOLOGY CORPORATION

DATE SAMPLED: 02/12/93
DATE RECEIVED: 02/12/93
DATE ANALYZED: 02/23/93
DATE REPORTED: 02/24/93

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)	REPORTING LIMIT (ug/L)
110084-1	MS-MW1-W1	ND	ND	ND	ND	0.5

ND = Not detected at or above reporting limit.

Reporting Limit applies to all analytes.

QA/QC SUMMARY

RPD, %	4
RECOVERY, %	99

The Earth Technology Corporation

Analytical Laboratories
5702 Bolin Ave.
Huntington Beach, Ca. 92649
(714) 892-2565

Curtis & Tompkins
2323 5th St
Berkeley, CA

FAX (714) 890-4032

Chain of Custody Record

Lab Job no. 116084
Date 2-12-93
Page 1 of 1

Client The Earth Technology Corp
Address 2080 Addison St. #500
Berkeley, CA 94704
Project Name / Number Mill Springs
Contract / Purchase Order / Quote _____

Project Manager Mark Milani
Telephone No. 510-540-6954
Fax No. 510-540-7496
Samplers: (Signature) [Signature]

Analysis Requested

Remarks

8020
TETC

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Description of Container	Preservation		Temp	Other	Remarks
							Temp	Chemical			
116084-1	MS-MW1-W1		2/12/93	1415	H ₂ O	40 ml VOA	Ice	HCl	1	X	
-2	MS-MW1-W2		2/12/93	1415	"	"	"	"	1	X	Hold*
-3	MS-MW1-W3		2/12/93	1415	"	"	"	"	1	X	Hold*
-4	MS-MW1-W4		2/12/93	1410	"	1 liter glass	"	"	1	X	Hold*
-5	MS-MW1-W5		2/12/93	1410	"	" " "	"	"	1	X	Hold*
✓ -6	MS-MW1-TB		2/12/93	-	"	40 ml VOA	"	"	1		Hold*

Relinquished by: Signature <u>[Signature]</u> Printed <u>MARK C. PETERSON</u> Company <u>TETC</u> Reason <u>Analysis</u>	Date <u>2/12/93</u> Time <u>1540</u>	Received by: Signature <u>[Signature]</u> Printed <u>Louise Browner</u> Company <u>C&T Berkeley</u> Reason _____	Relinquished by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____ Reason _____
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Method of Shipment: _____ Shipment No. _____ Special Instructions: _____	Comments: <u>* will call CtT's for start analyses other than one (1) 8020</u>	After analysis, samples are to be: <input type="checkbox"/> Disposed of (additional fee) <input type="checkbox"/> Stored (90 days max) <input type="checkbox"/> Stored over 90 days (additional fee) <input type="checkbox"/> Returned to customer
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FEB 24 '93 17:12 CURTIS & TOMPKINS BERKELEY

P.4



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2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 05/04/92

DATE REPORTED: 05/13/92

LABORATORY NUMBER: 107291

CLIENT: AQUA RESOURCES

PROJECT ID: 87157.7


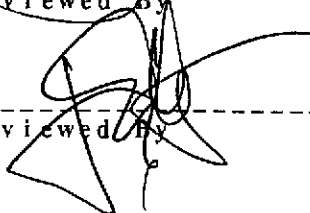
LOCATION: MILL SPRING

RESULTS: SEE ATTACHED

AQUA RESOURCES, INC
RECEIVED

MAY 19 1992

JOB NO. _____
FILE _____


Reviewed By _____

Reviewed By _____

Berkeley

Wilmington

Los Angeles

LABORATORY NUMBER: 107291
 CLIENT: AQUA RESOURCES
 PROJECT ID: 87157.7
 LOCATION: MILL SPRING

DATE SAMPLED: 05/04/92
 DATE RECEIVED: 05/04/92
 DATE ANALYZED: 05/06/92
 DATE REPORTED: 05/13/92

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
 Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)	REPORTING LIMIT * (ug/L)
107291-1	MS-MW1-W1A	ND	ND	ND	ND	0.5
107291-2	MS-MW1-TB1	ND	ND	ND	ND	0.5
107291-3	MS-MW1-W1B	ND	ND	ND	ND	0.5
107291-4	MS-MW1-W1C	ND	ND	ND	ND	0.5

ND = Not detected at or above reporting limit.

* Reporting Limit applies to all analytes.

QA/QC SUMMARY

RPD, % <1
 RECOVERY, % 91

Chain of Custody Record

Lab job no. 107291
 Date 5-4-92
 Page 1 of 1

Laboratory CURTIS & TOMPKINS
 Address 2323 5th St.
BERKELEY, CA

Method of Shipment: VEHICLE

Client AQUA RESOURCES
 Address 2030 ADDISON ST #500
BERKELEY, CA 94704

Shipment No. NA

Project Name / Number MILL SPRING / 971527

Project Manager MARK MILANI

Telephone No. (510) 540-6954

Fax No. (510) 540-7496

Contract / Purchase Order / Quote NA

Samplers: (Signature) Mark Peterson

Filter #	No. of Containers	Analysis Required								Remarks
<u>157</u>	<u>X</u>									
<u>1</u>	<u>X</u>									
<u>1</u>	<u>X</u>									
<u>1</u>	<u>X</u>									
<u>1</u>										<u>Hold</u>

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation		Filter #	No. of Containers	Remarks
						Temp.	Chemical			
<u>-1 MS-MWI-WIA</u>	<u>-</u>	<u>5/4/92</u>	<u>1505</u>	<u>H₂O</u>	<u>40 ml VOA</u>	<u>ICE</u>	<u>HCl</u>	<u>157</u>	<u>X</u>	
<u>-2 MS-MWI-TBI</u>	<u>NA</u>	<u>5/4/92</u>	<u>NA</u>	<u>H₂O</u>	<u>40 ml VOA</u>	<u>ICE</u>	<u>HCl</u>	<u>1</u>	<u>X</u>	
<u>-3 MS-MWI-WIB</u>	<u>-</u>	<u>5/4/92</u>	<u>1505</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>HCl</u>	<u>1</u>	<u>X</u>	
<u>-4 MS MWI WIC</u>	<u>-</u>	<u>5/4/92</u>	<u>1505</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>HCl</u>	<u>1</u>	<u>X</u>	
<u>-5 MS MWI-WID</u>	<u>-</u>	<u>5/4/92</u>	<u>1505</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>HCl</u>	<u>1</u>		<u>Hold</u>

Relinquished by: Signature <u>Mark Peterson</u> Printed <u>MARK C. PETERSON</u> Company <u>ARI</u> Reason <u>Analysis</u>	Date <u>5/4/92</u> Time <u>1720</u>	Received by: Signature <u>Nancy Wilson</u> Printed <u>Nancy Wilson</u> Company <u>C-TRAD</u> Reason <u>Analysis</u>	Date <u>5/4</u> Time <u>1720</u>	Relinquished by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____			
Comments: _____ _____ _____				Relinquished by: Signature _____ Printed _____ Company _____ Reason _____				Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____ Reason _____	Date _____ Time _____



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 08/07/91
DATE REPORTED: 08/15/91

AQUA RESOURCES, INC
RECEIVED

AUG 16 1991

JOB NO. 87157.7
FILE report

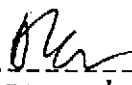
LABORATORY NUMBER: 104749

CLIENT: AQUA RESOURCES, INC.

PROJECT ID: 87157.7

LOCATION: MILLSPRING PARK APTS.

RESULTS: SEE ATTACHED



QA/QC Approval



Final Approval

LABORATORY NUMBER: 104749
 CLIENT: AQUA RESOURCES, INC.
 PROJECT ID: 87157.7
 LOCATION: MILLSPRING PARK APTS.

DATE RECEIVED: 08/07/91
 DATE ANALYZED: 08/09/91
 DATE REPORTED: 08/15/91

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
 Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)	REPORTING LIMIT * (ug/L)
104749-1	#1	ND	ND	ND	ND	0.5
104749-2	#2	ND	ND	ND	ND	0.5
104749-3	#3	ND	ND	ND	ND	0.5
104749-4	TBA	ND	ND	ND	ND	0.5

ND = Not detected at or above reporting limit.

* Reporting Limit applies to all analytes.

QA/QC SUMMARY

RPD, %	1
RECOVERY, %	103

704749

AQUA RESOURCES, INC.

SHIPMENT NO.: _____



CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

PROJECT NAME: Wingsfield Barnett Range
Hellspring Park Apts.

DATE 8/7/91

PROJECT NO.: 87157.7

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required
		Material	Method		Temp	Chemical	
1 2 3 4 A1		water	pump	VOAS	ice	HCL	BTK
#2			"				"
#3			"				"
TBA			"				

Total Number of Samples Shipped: 4 Sampler's Signature: Patricia Rodgers

Relinquished By:
Signature Patricia Rodgers
Printed Name PATRICIA RODGERS
Company AQUA RESOURCES
Reason analysis

Received By:
Signature Nancy Wilson
Printed Name Nancy Wilson
Company ERT

Date 8/7/91
Time 1:30

Relinquished By:
Signature _____
Printed Name _____
Company _____
Reason _____

Received By:
Signature _____
Printed Name _____
Company _____

Date 8/7
Time _____

REMARKS:
TBA - ambient

Special Shipment / Handling / Storage Requirements:

AQUA RESOURCES, INC.

SHIPMENT NO.: _____



CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

PROJECT NAME: Wingsfield Barnett Range

DATE 8/7/91

PROJECT NO.: 87157.7

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required
		Material	Method		Temp	Chemical	
<u>#1</u>		<u>water</u>	<u>pump</u>	<u>VOAS</u>	<u>ice</u>	<u>HCL</u>	<u>BTKE</u>
<u>#2</u>			"				"
<u>#3</u>			"				"
<u>TBA</u>							

Total Number of Samples Shipped: <u>4</u>	Sampler's Signature: <u>Patricia Rodgers</u>	
Relinquished By: Signature <u>Patricia Rodgers</u> Printed Name <u>PATRICIA RODGERS</u> Company <u>AQUA RESOURCES</u> Reason <u>analysis</u>	Received By: Signature <u>Nancy Wilson</u> Printed Name <u>Nancy Wilson</u> Company <u>CAF</u>	Date <u>8/7/91</u> Time <u>4:30</u>
Relinquished By: Signature _____ Printed Name _____ Company _____ Reason _____	Received By: Signature _____ Printed Name _____ Company _____	Date <u>1/1</u> Time

REMARKS:
TBA = ambient

Special Shipment / Handling / Storage Requirements:



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 05/02/91
DATE REPORTED: 05/10/91

LAB NUMBER: 103690

AQUA RESOURCES, INC
RECEIVED

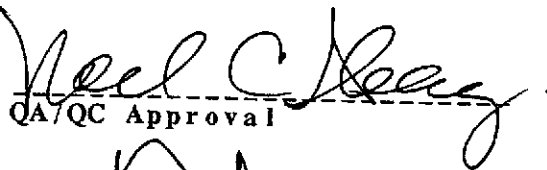
MAY 15 1991

JOB NO. 87157.7
FILE _____

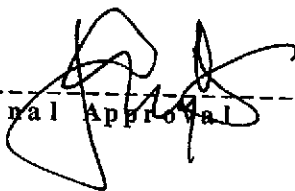
CLIENT: AQUA RESOURCES

PROJECT ID: 87157

RESULTS: SEE ATTACHED



QA/QC Approval



Final Approval

LABORATORY NUMBER: 103690
 CLIENT: AQUA RESOURCES
 PROJECT ID: 87157

 DATE RECEIVED: 05/02/91
 DATE ANALYZED: 05/07/91
 DATE REPORTED: 05/10/91

 Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
 Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)	REPORTING LIMIT * (ug/L)
103690-1	W-1-1	2.0	ND	ND	ND	0.5
103690-2	W-1-2	2.0	ND	ND	ND	0.5
103690-3	W-1-3	2.0	ND	ND	ND	0.5

ND = Not detected at or above reporting limit.

* Reporting Limit applies to all analytes.

QA/QC SUMMARY

RPD, %	1
RECOVERY, %	100

103690

AQUA RESOURCES, INC.

SHIPMENT NO.:



CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

DATE 5/2/91

PROJECT NAME:

PROJECT NO.: 87157

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required
		Material	Method		Temp	Chemical	
W-1-1		water		VOAS	ice		BTXE by
W-1-2		↓		↓	↓		EPA 8020
W-1-3		↓		↓	↓		↓
travel blank		↓		↓	↓		*

Total Number of Samples Shipped: 4 Sampler's Signature: Patricia Rodgers

Relinquished By:
 Signature: Patricia Rodgers
 Printed Name: PATRICIA RODGERS
 Company: AQUA RESOURCES INC
 Reason: analysis

Received By:
 Signature: Nancy Wilson
 Printed Name:
 Company:

Date: 5/2/91
 Time:

4.50

Relinquished By:
 Signature:
 Printed Name:
 Company:
 Reason:

Received By:
 Signature:
 Printed Name:
 Company:

Date: 1/1
 Time:

REMARKS: If there are any questions, refer back to your lab #103174

* Hold travel blanks to be run based on results of W-1-1, W-1-2, and W-1-3. Call with results prior to expiration of travel blank holding time.

Special Shipment / Handling / Storage Requirements:
 103690 has 2 W-1-4



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2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 03/07/91
DATE REPORTED: 03/21/91

AQUA RESOURCES, INC
RECEIVED

MAR 27 1991

JOB NO. 687157.07
FILE lab results

LAB NUMBER: 103174

CLIENT: AQUA RESOURCES

REPORT ON: TWO WATER SAMPLES

PROJECT ID: 87157
LOCATION: LIVERMORE

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

LABORATORY NUMBER: 103174
 CLIENT: AQUA RESOURCES
 PROJECT ID: 87157
 LOCATION: LIVERMORE

DATE RECEIVED: 03/07/91
 DATE ANALYZED: 03/14/91
 DATE REPORTED: 03/21/91

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
 Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)	REPORTING LIMIT * (ug/L)
103174-1	MW-1-1	2.8	ND	ND	ND	.5
103174-2	MW-1-2	2.1	ND	ND	ND	.5

ND = Not detected at or above reporting limit.

* Reporting Limit applies to all analytes.

QA/QC SUMMARY

RECOVERY, %

102



AQUA RESOURCES, INC.
 2030 ADDISON STREET, SUITE 500
 Berkeley, CA. 94704
 (415)540-6954

CHAIN OF CUSTODY RECORD

108174

Project Case		Project Name		BTX ₂		REMARKS	
87157		Livermore					
SAMPLERS (Signature)							
P. Rodger Wojciech Bajek							
██████████							
1	MW-1-1	(water)	✓				
2	MW-1-2	(water)	✓				
Relinquished by: (Signature)		Date/Time		Relinquished by: (Signature)		Date/Time	
Patricia Rodger		3/7/91 4:15					
Relinquished by: (Signature)		Date/Time		Relinquished by: (Signature)		Date/Time	
Relinquished by: (Signature)		Date/Time		Received for Laboratory by: (Signature)		Date/Time	
				Mary Hunter		3/7/91 4:45pm	
				Remarks			
				Normal TAT			



2030 Addison Street, Suite 500 • Berkeley, California 94704 • 415 540-6954

July 2, 1990

Alameda County Health Agency
Department of Environmental Health
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, CA 94621

87157.6
file: report

Attention: Mr. Lowell Miller

Subject: Groundwater Monitoring Report
Mill Springs Park Apartments (Formerly Livermore Superblock)
Railroad Avenue between South P and South L Streets
Livermore, California

Introduction

This report presents results of a groundwater monitoring program conducted at the subject site from May 1989 to May 1990. Groundwater monitoring was performed on a quarterly basis during this one year period. This monitoring program was performed as part of the approved final closure plan for the subject site. Aqua Resources Inc. (ARI) provided environmental consultation and engineering services during the previous Phase I, Phase II, and Final Site Remediation and Closure for the Mill Springs Park Apartment Site. The site is located on Railroad Avenue, between South L and South P Streets, in Livermore, California. The site was known formerly as the Livermore Superblock, and is shown in relation to the City of Livermore on the Vicinity Map, Figure 1.

The purpose of the monitoring program is to determine whether leakage of fuel oil from the previously removed concrete vault structure had migrated to groundwater underlying the site. Location of the monitoring well was determined based on the results of a March 14, 1989 Groundwater Study Report, and approved by the Alameda County Health Agency. The location of the monitoring well is shown in relation to the approved development plan on the Site Plan, Figure 2.

This letter report includes the following information:

- Summary of the monitoring well installation procedures, sampling methodology and chemical analyses performed,
- Discussion of results of chemical analyses, and
- Conclusions and Recommendations based on field observations and interpretation of chemical analytical data.

Copies of the monitoring well log and the Alameda County Flood Control and Water Conservation District Well Permit Form were presented in the Monitoring Well Installation report dated June 1, 1989. Chain of Custody Forms and the Certified Chemical Analysis reports for the year long monitoring program are presented as attachments to this report.

Monitoring Well Installation Procedure

Prior to installation of the monitoring well, a site reconnaissance was performed to field locate the approved monitoring well. At the time the site reconnaissance was performed, the concrete vault structure excavation had been backfilled and site development was in progress.

On April 20, 1989, one groundwater monitoring well was installed at the site by HEW Drilling Company of Palo Alto, using a CME-75 drill rig equipped with an eight-inch diameter hollow stem auger. Augers were steam cleaned prior to drilling. A standard split barrel sampler, with a 2-5/8 inch outer diameter and 2 inch inner diameter, was used for soil sampling. Prior to obtaining each sample, the disassembled sampler and the brass sample liners were washed in a solution of TSP in water. Each piece was triple rinsed, with the final rinse being distilled water.

A boring log was prepared for the well in the field. Soil samples were collected at five-foot intervals during the drilling of the well. The soil exposed in the ends of the tube was quickly noted, and the ends were then sealed with teflon tape and new snug-fitting plastic caps. The edges of the caps were sealed with plastic tape. The cap was labeled with the sample number, depth, date, and project name. A second sample was taken from each five-foot interval to be reserved for inspection if needed at a later date. The third sample, if recovered, was used for the sample description. The soil samples were placed in a chilled ice chest as they were collected. Selected soil samples were submitted for chemical analyses; remaining samples were held pending results of the chemical analyses. Results of chemical analyses performed on the soil samples were presented in the June 1, 1989 Monitoring Well Installation report.

The monitoring well was installed at the conclusion of soil sampling. The monitoring well casing consisted of two-inch diameter Schedule 40 PVC pipe. The well casing was slotted (slot opening 0.020 inches) between depths of 30 feet and 60 feet. The annulus between the casing and bore wall was backfilled with #3 RMC Lonestar sand to a depth of 28 feet below existing grade (about two feet above the top of slotted casing). A three foot seal of 3/8-inch diameter bentonite pellets was constructed immediately above the sand pack, and the remainder of the annulus was filled with cement grout.

The top of the well casing was fitted with a locking cap. Because the monitoring well is located in a landscaped area, the well head was constructed within a christy box. The christy box was completed in a manner to reduce the potential for surface water runoff from ponding around the well head. After the monitoring well installation was completed, the elevation of the top of the casing was determined by survey methods. The elevation of the top of the casing is +477.08 feet, Mean Sea Level Datum.

Groundwater Sampling Procedures and Field Observations

After the monitoring well installation was completed, the monitoring well was developed by surging and bailing. The water removed from the well during development was placed in sealed containers and stored on-site pending results of chemical analyses. Based on the results of the initial analysis, the Livermore Public Works Department, Water Reclamation Plant approved disposal of the development water and water subsequently generated from purging at quarterly sample intervals, to the sanitary sewer.

Prior to sampling the monitoring well, the groundwater depth was measured to the top of the casing in the well and recorded to the nearest hundredth of a foot using an electronic interface probe. The groundwater elevations observed at the time of each sampling interval are shown of Table 1. The plot of groundwater elevation over time is shown on Figure 3.

Table 1
Observed Groundwater Elevations
(Mean Sea Level Datum)

Date of Observation	Groundwater Elevation (feet)
April 20, 1989	433.58
May 1, 1989	434.34
August 1, 1989	433.22
September 1, 1989	431.73
November 2, 1989	430.69
February 2, 1990	431.72
May 2, 1990	434.50

After the water elevation was determined, the monitoring well was purged and allowed to recover. When the groundwater level had recovered, a groundwater sample was collected using a teflon bailer. Prior to purging the well, and again before collection of the groundwater sample, the bailer was cleaned in a solution of TSP in water, rinsed with tap water, and given a final rinse with distilled water. A new length of nylon rope was used for lowering and raising the bailer.

The first sample from the well was retrieved from the surface of the water, and the contents of the bailer were observed to assess whether there was any visible floating product present. At every quarterly sample interval, no visible free product was observed in the groundwater samples taken. The sample vials and jars, provided by the laboratory, were filled from the bailer. The sample vials were placed in a chilled ice chest and transported to the laboratory under chain-of-custody control.

Summary of Chemical Analyses and Discussion of Results

As discussed earlier, groundwater samples obtained at each quarterly sampling interval for chemical analysis were submitted to a State certified laboratory utilizing chain of custody protocols. Chemical analyses were performed by Curtis and Tompkins, Ltd., Analytical Laboratories in Berkeley. For quality assurance purposes, a split sample taken during the third sample interval was also submitted to Brown & Caldwell in Emeryville, California. Travel blanks were also taken and analyzed where considered appropriate.

Chemical analyses included determination of Total Petroleum Hydrocarbons (TPH) by EPA Method 8015, and Benzene, Toluene, Xylene, Ethyl Benzene (BTXE) by EPA Method 8020. Results of the chemical analyses are presented on the attached certified laboratory reports. No analytes were detected above the method detection levels (1 part per million, 1 ppm) for the TPH analyses (EPA Method 8015). Benzene was the only EPA Method 8020 analyte detected above the method detection limit (.5 to 1.0 ppb); the other analytes (Toluene, Xylene and Ethyl Benzene) were not detected.

Benzene was not detected at every sample interval, and its detected concentration was determined to range from less than .5 ppb (method detection limit) to a measured maximum of 5 ppb. The Benzene concentration over time is shown in Figure 4. Benzene was not detected in the baseline sample interval nor in the fourth quarter sample interval; but was detected in the first, second and third quarter sample intervals. At the first, second and third sample intervals, the monitoring well was resampled. Benzene was not detected in the resample analysis at the first and second quarter sample interval, but was detected in the third quarter sample interval.

Conclusions and Recommendations

Based on the analyses of groundwater samples collected during the monitoring period from the monitoring well, there does not appear to be significant hydrocarbon contamination in the groundwater associated with the concrete vault structure that was removed. Review of the chemical test results indicates that all the TPH analytes were below the method detection limits. Benzene was detected above the method detection level (.5 ppb), but not on a consistent, repeatable basis. In addition, the measured Benzene concentration did not exceed the Maximum Contaminant Level (MCL) established by the EPA.

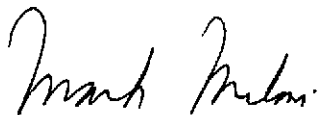
Based on the measured petroleum concentrations and field observation that no free petroleum product was observed in the groundwater sample collected as part of the groundwater monitoring program, ARI concludes that continued monitoring is not beneficial. Therefore, ARI recommends that the monitoring well be abandoned and sealed in conformance with Alameda County Flood Control and Water Conservation District, Zone 7, requirements.

Limitations

Consistent with our discussions with the Client and the lead regulatory agency, namely the Alameda County Health Agency, our groundwater monitoring program was limited to the installation and development of one groundwater monitoring well and quarterly groundwater sample collection. Chemical analyses were performed by others, not under ARI direct supervision. Test results are reported as received. Final determination of additional site remediation, if required, will be determined by the Alameda County Public Health Agency. We cannot guarantee or warrant that soil or groundwater at this site are not contaminated above allowable limits for a given contaminant. This report is limited in its scope to the analyses and review of samples obtained from the one monitoring well as required by the regulatory agency. All services were performed in substantial conformance with current standards of environmental engineering practice. No other warranty, express or implied, is made.

It has been a pleasure to provide you with this information. If you have any questions regarding the above, please do not hesitate to contact the undersigned.

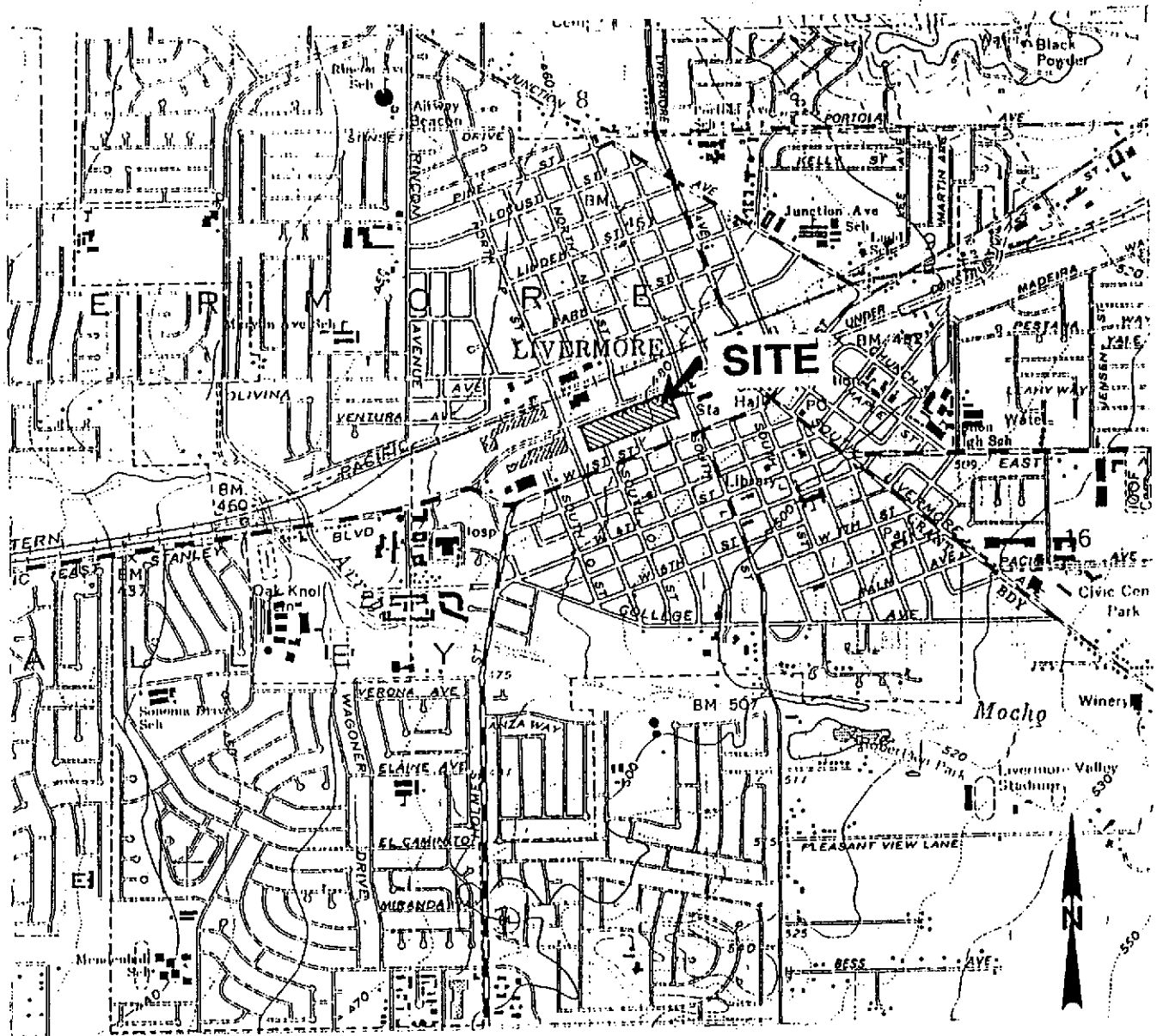
Very truly yours,
AQUA RESOURCES INC.



Mark Milani, P.E.
Project Manager

Attachments: Certified Laboratory Reports
 Chain of Custody Form
 Figure 1 - Vicinity Map
 Figure 2 - Monitoring Well Location Plan
 Figure 3 - Groundwater Elevation Over Time
 Figure 4 - Benzene Concentration Over Time

cc: Addressee (2)
 Barnett-Range Corporation, Attn: Mr. Larry Malcolm (2)
 Regional Water Quality Control Board, San Francisco Bay Region



VICINITY MAP

MILL SPRINGS PARK APARTMENTS

Railroad Avenue

Livermore, California

REFERENCE:

Portion of U.S.G.S. 7.5 Minute Topographic Quadrangle Map, Livermore, California, dated 1961, photorevised 1980, at a scale of 1:24,000.

Figure 3
Groundwater Elevation Over Time

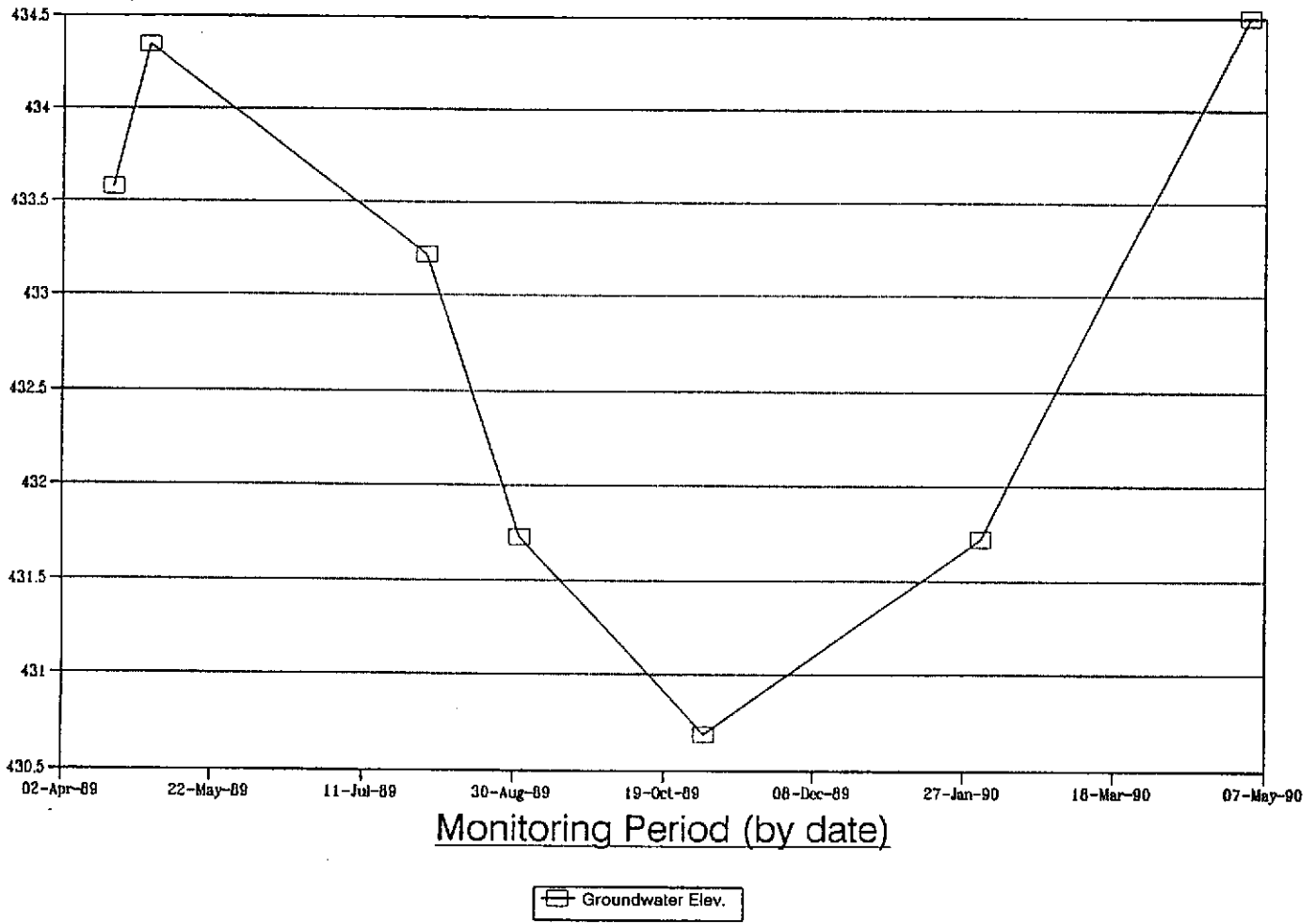
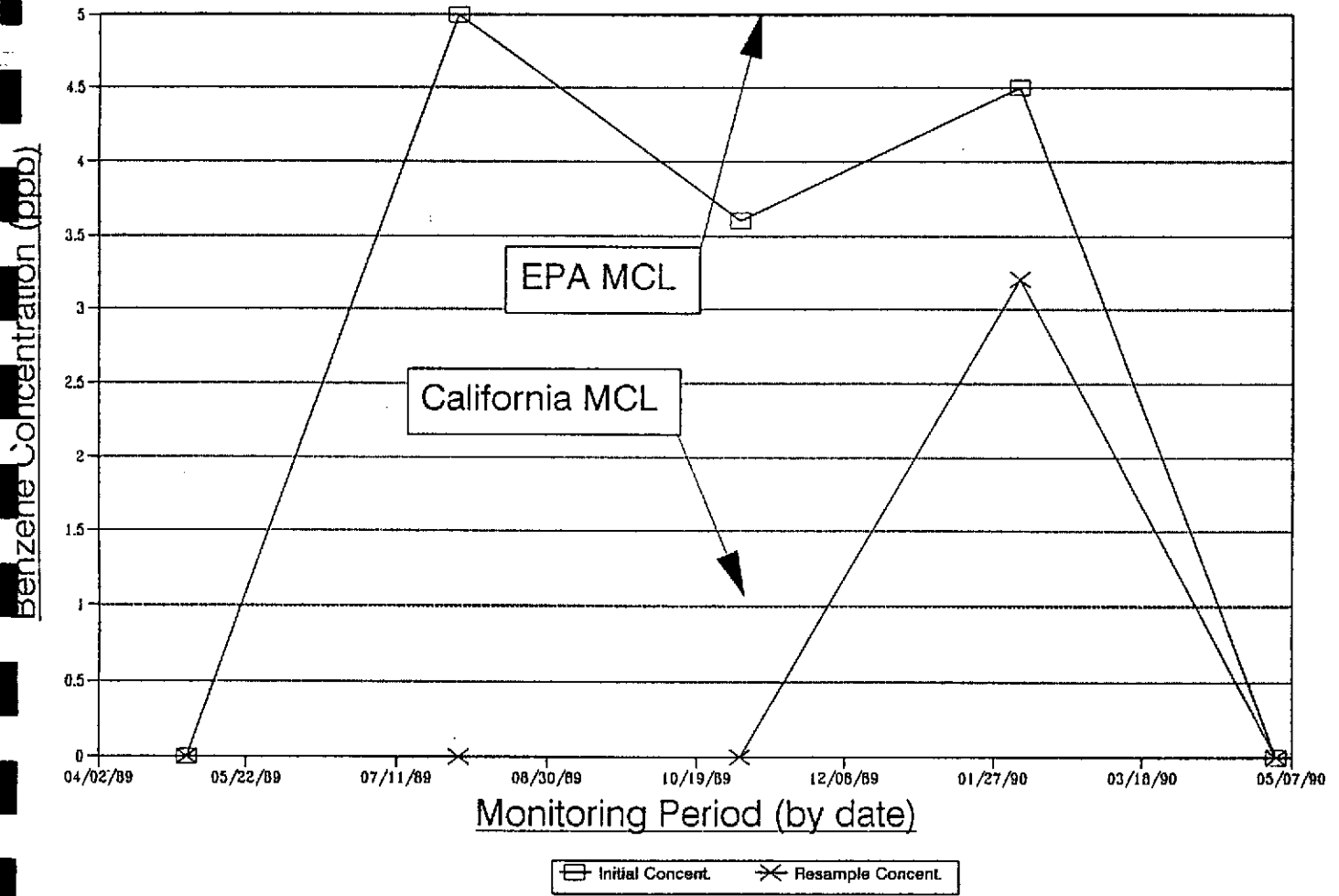


Figure 4
Benzene Concentration over Time





Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710. Phone (415) 486-0900

DATE RECEIVED: 05/02/89
DATE REPORTED: 05/10/89
PAGE 1 OF 3

LAB NUMB

CLIENT: AQUA RESOURCES, INC.

REPORT ON: 1 WATER SAMPLE

JOB #: 87157.6
LOCATION: MILL SPRINGS PARK

RESULTS: SEE ATTACHED


Laboratory Director



LABORATORY NUMBER: 17307
CLIENT: AQUA RESOURCES, INC.
PROJECT #: 87157.6
LOCATION: MILL SPRINGS PARK

DATE RECEIVED: 05/02/89
DATE ANALYZED: 05/08/89
DATE REPORTED: 05/10/89
PAGE 2 OF 3

Extractable Petroleum Hydrocarbons in Aqueous Solutions
EPA 8015 (Modified)
Extraction Method: EPA 3510

LAB ID	CLIENT ID	GASOLINE (mg/L)	KEROSINE (mg/L)	DIESEL (mg/L)	OTHER (mg/L)
17307-1A	MW-1	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)

ND = Not Detected; Limit of detection in parentheses.

QA/QC SUMMARY

RPD, %	5
Spike: % Recovery	89

LABORATORY NUMBER: 17307
 CLIENT: AQUA RESOURCES, INC.
 JOB NUMBER: 87157.6
 JOB LOCATION: MILL SPRINGS PARK

DATE RECEIVED: 05/02/89
 DATE ANALYZED: 05/03/89
 DATE REPORTED: 05/10/89
 PAGE 3 OF 3

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
 Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/kg)	TOLUENE (ug/kg)	TOTAL XYLENES (ug/kg)	ETHYL BENZENE (ug/kg)
17307-1B	MW-1	ND(1)	ND(1)	ND(1)	ND(1)

QA/QC SUMMARY

%RPD	5
%RECOVERY	96



AQUA RESOURCES, INC.
 2030 ADDISON STREET, SUITE 500
 Berkeley, CA. 94704
 (415)540-6954

CHAIN OF CUSTODY RECORD

17307

Project Code 87157.6		Project Name Barnett Range Mill Springs Park		REMARKS TPH BTX+E		
SAMPLERS (Signature) J. Shakofsky						
MW-1						
Relinquished by (Signature) S. Shakofsky		Date/Time	Received by (Signature)	Relinquished by (Signature)	Date/Time 05/02/89 1 P. 11	Received by (Signature) J. Anderson
Relinquished by (Signature)		Date/Time	Received by (Signature)	Relinquished by (Signature)	Date/Time	Received by (Signature)
Relinquished by (Signature)	Date/Time	Received for Laboratory by (Signature) J. Anderson	Date/Time	Remarks		



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 08/01/89

DATE REPORTED: 08/09/89

PAGE 1 OF 3

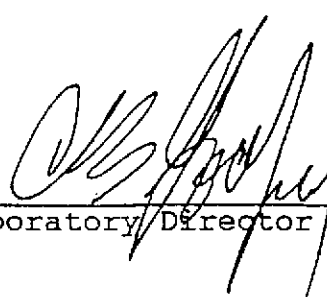
LAB NUMBER: 17928

CLIENT: AQUA RESOURCES

REPORT ON: 1 WATER SAMPLE

JOB #: 87157.6
PROJECT NAME: BARNETT RANGE

RESULTS: SEE ATTACHED



Laboratory Director



LABORATORY NUMBER: 17928
CLIENT: AQUA RESOURCES
PROJECT #: 87157.6
PROFECT NAME: BARNETT RANGE

DATE RECEIVED: 08/01/89
DATE ANALYZED: 08/03/89
DATE REPORTED: 08/09/89
PAGE 2 OF 3

Extractable Petroleum Hydrocarbons in Aqueous Solutions
EPA 8015 (Modified)
Extraction Method: EPA 3510

LAB ID	CLIENT ID	GASOLINE (mg/L)	KEROSINE (mg/L)	DIESEL (mg/L)	OTHER (mg/L)
17928	MW-1	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not Detected; Limit of detection in parentheses.

QA/QC SUMMARY

RPD, %	7
Spike: % Recovery	95

LABORATORY NUMBER: 17928
 CLIENT: AQUA RESOURCES
 JOB NUMBER: 87157.6
 PROJECT NAME: BARNETT RANGE

DATE RECEIVED: 08/01/89
 DATE ANALYZED: 08/08/89
 DATE REPORTED: 08/09/89
 PAGE 3 OF 3

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
 Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/L)	TOLUENE (ug/L)	TOTAL XYLENES (ug/L)	ETHYL BENZENE (ug/L)
17928	MW-1	5	ND(1)	ND(1)	ND(1)

ND = Not Detected; Limit of detection in parentheses.

QA/QC SUMMARY

%RPD	5
%RECOVERY	95

AQUA RESOURCES, INC.



CHAIN OF CUSTODY RECORD

SHIPMENT NO.: _____

PAGE _____ OF _____

DATE 8/1/89

PROJECT NAME: Barnett Range

PROJECT NO.: 87157.6

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required
		Material	Method		Temp	Chemical	
<u>MW-1</u>		<u>water</u>	<u>bailey</u>	<u>glass jar + vial</u>	<u>ice</u>		<u>TPH, BTEX + E</u>

Total Number of Samples Shipped: 2 Sampler's Signature: Patricia Rodgers

Relinquished By: Signature: <u>Patricia Rodgers</u> Printed Name: <u>PATRICIA RODGERS</u> Company: <u>AQUA RESOURCES INC</u> Reason: <u>analysis</u>	Received By: Signature: <u>Nancy Patton</u> Printed Name: _____ Company: <u>CTI</u>	Date: <u>8/1/89</u>
Relinquished By: Signature: _____ Printed Name: _____ Company: _____ Reason: _____	Received By: Signature: _____ Printed Name: _____ Company: _____	Date: <u>1/1</u>
		Time: <u>125 PM</u>
		Time: _____

REMARKS:

Special Shipment / Handling / Storage Requirements:



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 09/01/89
DATE REPORTED: 09/13/89
PAGE 1 OF 3

LAB NUMBER: 18172

CLIENT: AQUA RESOURCES, INC.

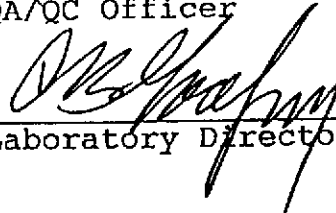
REPORT ON: 2 WATER SAMPLES

JOB #: 87157.6
LOCATION: LIVERMORE

RESULTS: SEE ATTACHED



QA/QC Officer



Laboratory Director



LABORATORY NUMBER: 18172
CLIENT: AQUA RESOURCES
PROJECT #: 87157.6
LOCATION: LIVERMORE

DATE RECEIVED: 09/01/89
DATE ANALYZED: 09/07/89
DATE REPORTED: 09/13/89
PAGE 2 OF 3

Extractable Petroleum Hydrocarbons in Aqueous Solutions
EPA 8015 (Modified)
Extraction Method: EPA 3510

LAB ID	CLIENT ID	GASOLINE (mg/L)	KEROSENE (mg/L)	DIESEL (mg/L)	OTHER (mg/L)
18172-1	1T	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
18172-2	2T	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not Detected; Limit of detection in parentheses.

QA/QC SUMMARY

RPD, %	8
Spike: % Recovery	100



LABORATORY NUMBER: 18172
CLIENT: AQUA RESOURCES
JOB NUMBER: 87157.6
JOB LOCATION: LIVERMORE

DATE RECEIVED: 09/01/89
DATE ANALYZED: 09/13/89
DATE REPORTED: 09/13/89
PAGE 3 OF 3

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/L)	TOLUENE (ug/L)	TOTAL XYLENES (ug/L)	ETHYL BENZENE (ug/L)
18172-1	1T	ND(1)	ND(1)	ND(1)	ND(1)
18172-2	2T	ND(1)	ND(1)	ND(1)	ND(1)

QA/QC SUMMARY

%RPD
%RECOVERY

<1
92

AQUA RESOURCES, INC.



CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 1

PAGE 1 OF 1

DATE 9/1/89

PROJECT NAME: LIVERMORE

PROJECT NO.: B7157.6

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required
		Material	Method		Temp	Chemical	
#1T	WELL	WATER		BOTTLE	4°C		TEH
#2T	WELL	WATER		VIAL	4°C		BTX & E

Total Number of Samples Shipped: 4 Sampler's Signature: Douglas Doytek

Relinquished By: Signature: <u>Douglas Doytek</u> Printed Name: <u>DOYTEK, DOUGLAS</u> Company: <u>AQUA RESOURCES</u> Reason: _____	Received By: Signature: <u>Nancy Wilson</u> Printed Name: <u>Nancy Wilson</u> Company: <u>ARLIS Technology</u>	Date: <u>9/01/89</u> Time: <u>2:55</u>
Relinquished By: Signature: _____ Printed Name: _____ Company: _____ Reason: _____	Received By: Signature: _____ Printed Name: _____ Company: _____	Date: <u> / / </u> Time: _____

REMARKS:

2 BOTTLES AND 2 VIALS SUBMITTED:
 1 BOTTLE AND 1 VIAL IS TRAVEL BLANK
 1 BOTTLE AND 1 VIAL IS SAMPLE FROM WELL

IDENTITY OF TRAVEL BLANK RETAINED BY ARI NW 9/01/89

Special Shipment / Handling / Storage Requirements:



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 11/03/89
DATE REPORTED: 11/13/89
PAGE 1 OF 3

LAB NUMBER: 18621

CLIENT: AQUA RESOURCES

REPORT ON: 1 WATER SAMPLE

JOB #: 87157.6

RESULTS: SEE ATTACHED

M. E. Printea
QA/QC Officer

[Signature]
Laboratory Director



LABORATORY NUMBER: 18621-1
CLIENT: AQUA RESOURCES
JOB #: 87157.6
SAMPLE ID: W - 1

DATE RECEIVED: 11/03/89
DATE ANALYZED: 11/03/89
DATE REPORTED: 11/13/89
PAGE 2 OF 3

EPA 602: Volatile Aromatic Hydrocarbons in Water

COMPOUND	RESULT ug/L	DETECTION LIMIT ug/L
Benzene.....	3.6	1
Toluene.....	ND	1
Ethyl Benzene.....	ND	1
Total Xylenes.....	ND	1
Chlorobenzene.....	ND	1
1,4-Dichlorobenzene.....	ND	1
1,3-Dichlorobenzene.....	ND	1
1,2-Dichlorobenzene.....	ND	1

ND = None Detected

QA/QC SUMMARY

RPD %	27
SPIKE RECOVERY %	81

LABORATORY NUMBER: 18621
 CLIENT: AQUA RESOURCES
 PROJECT #: 87157.6

 DATE RECEIVED: 11/03/89
 DATE ANALYZED: 11/08/89
 DATE REPORTED: 11/13/89
 PAGE 3 OF 3

 Extractable Petroleum Hydrocarbons in Aqueous Solutions
 EPA 8015 (Modified)
 Extraction Method: EPA 3510

LAB ID	CLIENT ID	GASOLINE (mg/L)	KEROSENE (mg/L)	DIESEL (mg/L)	OTHER (mg/L)
18621-1	W - 1	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not Detected; Limit of detection in parentheses.

QA/QC SUMMARY

RPD, %	31
Spike: % Recovery	97

AQUA RESOURCES, INC.



CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 1

PAGE 1 OF 1

DATE 11/2/89

PROJECT NAME: 87157.6

PROJECT NO.: _____

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required
		Material	Method		Temp	Chemical	
<u>W-1</u>		<u>Water</u>		<u>Vials</u>	<u>ice</u>		<u>Total petroleum hydrocarbons BTX+E</u>

Total Number of Samples Shipped: <u>2</u>	Sampler's Signature: <u>Patricia Rodgas</u>	Date: <u>11/2/89</u>
Relinquished By: Signature: <u>Patricia Rodgas</u> Printed Name: <u>PATRICIA RODGAS</u> Company: <u>AQUA RESOURCES</u> Reason: <u>for analysis</u>	Received By: Signature: <u>Scott Rittman</u> Printed Name: <u>Scott Rittman</u> Company: <u>CT</u>	Time: <u>2:50</u>
Relinquished By: Signature: _____ Printed Name: _____ Company: _____ Reason: _____	Received By: Signature: _____ Printed Name: _____ Company: _____	Date: <u>1/1</u> Time: _____

REMARKS:

Please have Steve Jordan contact Mark Milani prior to analysis. Phone: 540-6954

Special Shipment / Handling / Storage Requirements:

AQUA RESOURCES, INC.

SHIPMENT NO.: _____



CHAIN OF CUSTODY RECORD

 PAGE 1 OF 1

 PROJECT NAME: 87157.6

 DATE 11/13/89

PROJECT NO.: _____

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required
		Material	Method		Temp	Chemical	
<u>W-1</u>		<u>water</u>	<u>bailed</u>	<u>liter bottle</u>	<u>ice</u>		<u>TSS</u>

Total Number of Samples Shipped: <u>1</u>		Sampler's Signature: <u>Patricia Rodgers</u>		Date
Relinquished By: Signature: <u>Patricia Rodgers</u> Printed Name: <u>PATRICIA RODGERS</u> Company: <u>AQUA RESOURCES</u> Reason: <u>analysis</u>		Received By: Signature: <u>[Signature]</u> Printed Name: _____ Company: _____		Date <u>11/13/89</u>
Relinquished By: Signature: _____ Printed Name: _____ Company: _____ Reason: _____		Received By: Signature: _____ Printed Name: _____ Company: _____		Date <u>1 / 1</u>
Time		Time		Time

REMARKS:

Special Shipment / Handling / Storage Requirements:



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 02/05/90
DATE REPORTED: 02/12/90
PAGE 1 OF 3

LAB NUMBER: 19482

CLIENT: AQUA RESOURCES

REPORT ON: 1 WATER SAMPLE

PROJECT #: 87157.6

RESULTS: SEE ATTACHED

M. Z. Spuniera

QA/QC Officer

[Signature]

Laboratory Director



LABORATORY NUMBER: 19482
CLIENT: AQUA RESOURCES
PROJECT #: 87157.6

DATE RECEIVED: 02/05/90
DATE ANALYZED: 02/10/90
DATE REPORTED: 02/12/90
PAGE 2 OF 3

Extractable Petroleum Hydrocarbons in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	KEROSENE (mg/L)	DIESEL (mg/L)	OTHER (mg/L)
19482-1	W - 1	ND(0.5)	ND(0.5)	ND(0.5)

ND = NOT DETECTED; LIMIT OF DETECTION IN PARENTHESES

QA/QC SUMMARY

RPD, %	4
Spike: % Recovery	96



FEB 20 1990

LABORATORY NUMBER: 19482-1
 CLIENT: AQUA RESOURCES
 JOB #: 87157.6
 SAMPLE ID: W - 1

JOB NO.
 FILE NO.

DATE RECEIVED: 02/05/90
 DATE ANALYZED: 02/15/90
 DATE REPORTED: 02/16/90
 PAGE 3 OF 3

EPA 602: Volatile Aromatic Hydrocarbons in Water

COMPOUND	RESULT ug/L	DETECTION LIMIT ug/L
Benzene.....	4.5	0.5
Toluene.....	ND	0.5
Ethyl Benzene.....	ND	0.5
Total Xylenes.....	ND	0.5
Chlorobenzene.....	ND	0.5
1,4-Dichlorobenzene.....	ND	0.5
1,3-Dichlorobenzene.....	ND	0.5
1,2-Dichlorobenzene.....	ND	0.5

ND = None Detected

QA/QC SUMMARY

RPD %	<1
SPIKE RECOVERY %	93

1948Z

AQUA RESOURCES, INC.



CHAIN OF CUSTODY RECORD

SHIPMENT NO.: _____

PAGE 2 OF 1

DATE 2/2/90

PROJECT NAME: _____

PROJECT NO.: 87157.6

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required
		Material	Method		Temp	Chemical	
<u>W-1</u>		<u>water</u>		<u>lateral</u>	<u>ice</u>		<u>TEH</u>
<u>W-1</u>		<u>water</u>		<u>vials</u>	<u>ice</u>		<u>602</u>

Total Number of Samples Shipped: _____

Sampler's Signature: Patricia Rodgers

Relinquished By:
 Signature: Patricia Rodgers
 Printed Name: PATRICIA RODGERS
 Company: AQUA RESOURCES
 Reason: analysis

Received By:
 Signature: [Signature]
 Printed Name: M. Patch
 Company: CFI

Date: 2-15-90

Time: 5:15

Relinquished By:
 Signature: _____
 Printed Name: _____
 Company: _____
 Reason: _____

Received By:
 Signature: _____
 Printed Name: _____
 Company: _____

Date: 1/1

Time: _____

REMARKS:
Hold travel blanks for possible analysis

Special Shipment / Handling / Storage Requirements: _____

Analytical Report

LOG NO: E90-02-104

Received: 02 FEB 90
Reported: 14 FEB 90

Mr. Mark Milani
Aqua Resources Inc.
2030 Addison Street, Suite 500
Berkeley, California 94704

Purchase Order: 87157.6

REPORT OF ANALYTICAL RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION, AQUEOUS SAMPLES	DATE SAMPLED
02-104-1	W-1	02 FEB 90
PARAMETER	02-104-1	
EPA Method 602		
Date Extracted	02.12.90	
1,2-Dichlorobenzene, ug/L	<0.5	
1,3-Dichlorobenzene, ug/L	<0.5	
1,4-Dichlorobenzene, ug/L	<0.5	
Benzene, ug/L	3.2	
Chlorobenzene, ug/L	<0.5	
Ethylbenzene, ug/L	<0.5	
Toluene, ug/L	<0.5	
Total Xylene Isomers, ug/L	<0.5	



Analytical Report

LOG NO: E90-02-104

Received: 02 FEB 90
Reported: 14 FEB 90

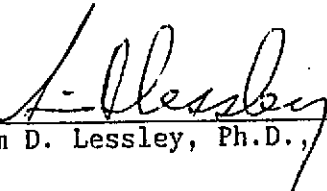
Mr. Mark Milani
Aqua Resources Inc.
2030 Addison Street, Suite 500
Berkeley, California 94704

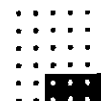
Purchase Order: 87157.6

REPORT OF ANALYTICAL RESULTS

Page 2

LOG NO	SAMPLE DESCRIPTION, BLANK WATER SAMPLES	DATE SAMPLED
02-104-2	Trip Blank	
PARAMETER		02-104-2
EPA Method 602		
Date Extracted		02.09.90
1,2-Dichlorobenzene, ug/L		<0.5
1,3-Dichlorobenzene, ug/L		<0.5
1,4-Dichlorobenzene, ug/L		<0.5
Benzene, ug/L		<0.5
Chlorobenzene, ug/L		<0.5
Ethylbenzene, ug/L		<0.5
Toluene, ug/L		<0.5
Total Xylene Isomers, ug/L		<0.5


Sim D. Lessley, Ph.D., Laboratory Director



LOG # 9002104

AQUA RESOURCES, INC.

SHIPMENT NO.:



CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

DATE 2/2/90

PROJECT NAME:

PROJECT NO.: 87157.6

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required
		Material	Method		Temp	Chemical	
A1-1	TRIP Blank	water		vial	ice		As Required 602

Total Number of Samples Shipped: 5 Sampler's Signature: Patricia Rodgers

Relinquished By: Signature: Patricia Rodgers Printed Name: PATRICIA RODGERS Company: AQUA RESOURCES Reason: analysis	Received By: Signature: Monika Sobott Printed Name: Monika Sobott Company: BCR	Date: 2/2/90 Time: 9:22pm
Relinquished By: Signature: Printed Name: Company: Reason:	Received By: Signature: Printed Name: Company:	Date: 1/1 Time:

REMARKS:

Hold travel blank for possible analysis

Requires O/S w/ 11. RDL Contact client if problems are encountered. KC 2/2/90



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710. Phone (415) 486-0900

DATE RECEIVED: 05/02/90

DATE REPORTED: 05/07/90

PAGE 1 OF 3

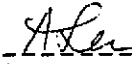
LAB NUMBER: 100358

CLIENT: AQUA RESOURCES

REPORT ON: 1 WATER SAMPLES

PROJECT #: 87157.6

RESULTS: SEE ATTACHED



QA/QC Approval



Final Approval



LABORATORY NUMBER: 100358
CLIENT: AQUA RESOURCES
JOB #: 87157.6

DATE RECEIVED: 05/02/90
DATE EXTRACTED: 05/03/90
DATE ANALYZED: 05/04/90
DATE REPORTED: 05/07/90
PAGE 2 OF 3

Extractable Petroleum Hydrocarbons in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	KEROSENE RANGE (mg/L)	DIESEL RANGE (mg/L)	REPORTING LIMIT (mg/L)
100358-1	W-1	ND	ND	0.50

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	3
RECOVERY, %	96



LABORATORY NUMBER: 100358-1
CLIENT: AQUA RESOURCES
JOB #: 87157.6
SAMPLE ID: W-1

DATE RECEIVED: 05/02/90
DATE ANALYZED: 05/03/90
DATE REPORTED: 05/07/90
PAGE 3 OF 3

EPA 8020: Volatile Aromatic Hydrocarbons in Water

COMPOUND	RESULT ug/L	REPORTING LIMIT ug/L
Benzene.....	ND	0.50
Toluene.....	ND	0.50
Ethyl Benzene.....	ND	0.50
Total Xylenes.....	ND	0.50
Chlorobenzene.....	ND	0.50
1,4-Dichlorobenzene.....	ND	0.50
1,3-Dichlorobenzene.....	ND	0.50
1,2-Dichlorobenzene.....	ND	0.50

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	2
RECOVERY, %	90

100358

AQUA RESOURCES, INC.



CHAIN OF CUSTODY RECORD

SHIPMENT NO.: _____

PAGE 1 OF 1

DATE 5/2/90

PROJECT NAME: _____

PROJECT NO.: 87157.6

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required
		Material	Method		Temp	Chemical	
W-1		water		Liter	ice		TEH
W-1		water		vials	ice		602

Total Number of Samples Shipped: _____	Sampler's Signature: <u>Patricia Rodgers</u>	Date <u>5/2/90</u>
Relinquished By: Signature: <u>Patricia Rodgers</u> Printed Name: <u>PATRICIA RODGERS</u> Company: <u>AQUA RESOURCES</u> Reason: <u>analysis</u>		
Received By: Signature: <u>Nancy J. Wilson</u> Printed Name: <u>Nancy J. Wilson</u> Company: <u>CEST LAB</u>		Time <u>4:15</u>
Relinquished By: Signature: _____ Printed Name: _____ Company: _____ Reason: _____		Date <u> / / </u> Time <u> : </u>

REMARKS:

Detection Limit should be 0.5 ug/L

Hold travel blanks for possible analysis.

Special Shipment / Handling / Storage Requirements:



aqua
resources
inc.

ORIGINAL

2030 Addison Street, Suite 500 • Berkeley, California 94704 • 415 540-6954

June 1, 1989

87157.6

Alameda County Health Agency
Department of Environmental Health
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, CA 94621

Attn: Lowell Miller

Subject: Monitoring Well Installation and Groundwater
Monitoring Program
Mill Springs Park Apartments
(Formerly Livermore Superblock)
Railroad Avenue between South P and South L Streets
Livermore, California

INTRODUCTION

As part of the groundwater investigation and monitoring program at the Mill Springs Park Apartment Site, Aqua Resources Incorporated (ARI) installed a groundwater monitoring well at the subject site. Installation of the monitoring well was required by the Alameda County Health Agency, Environmental Health Department - Hazardous Materials Division as part of the Approved Final Closure Plan dated October 23, 1988. The purpose of the monitoring well is to determine whether leakage of fuel oil from the previously removed concrete vault structure had contaminated groundwater underlying the site. Location of the monitoring well was determined based on the results of a March 14, 1989 Groundwater Study Report, and approved by the Alameda County Health Agency.

This letter report includes the following information:

- o Description of the monitoring well installation procedures, sampling methodology and chemical analyses performed,
- o discussion of results of chemical analyses, and
- o conclusions based on field observations and interpretation of chemical analytical data.

Copies of the drafted well log, Alameda County Flood Control and Water Conservation District Well Permit Form, Chain of Custody Forms and the Certified Chemical Analysis reports are presented as attachments to this report.

As part of the required monitoring program, quarterly groundwater sampling of monitoring well will be performed by ARI for one year. Results of quarterly sampling will be presented as addenda to this report. The addenda will consist of a brief cover letter giving the date of sampling and copies of the Chain of Custody form and certified laboratory reports. A final report summarizing the quarterly data will be prepared including interpretation of the data, conclusions and recommendations.

Monitoring Well Installation Procedure

Prior to installation of the monitoring well, a site reconnaissance was performed to field locate the approved monitoring well location. At the time the site reconnaissance was performed, the tank excavation had been backfilled and site development was in progress.

On April 20, 1989, one groundwater monitoring well was installed at the site by HEW Drilling Company of Palo Alto, using a CME-75 drill rig equipped with an eight-inch diameter hollow stem auger. The monitoring well location is shown on the attached Monitoring Well Location Plan. Augers were steam cleaned prior to drilling. A standard split barrel sampler, with a 2-5/8 inch outer diameter and 2 inch inner diameter, was used for soil sampling. The sampler has the capacity for obtaining an 18-inch sample using three six-inch long brass liners. Prior to obtaining each sample, the disassembled sampler and the brass liners were washed in a solution of TSP in water. Each piece was triple rinsed, with the final rinse being distilled water.

A boring log was prepared for the well in the field. Blow counts were recorded for each six inches of penetration of the sampler, and the time at which each sample was taken was noted on the log. Soil samples were collected at five-foot intervals during the drilling of the well. The soil exposed in the ends of the tube was quickly noted, and the ends were then sealed with teflon tape and new snug-fitting plastic caps. The edges of the caps were sealed with plastic tape. The cap was labeled with the sample number, depth, date, and project name. A second sample was taken from each five-foot interval to be reserved for inspection if needed at a later date. The third sample, if recovered, was used for the sample description.

The soil samples were placed in a chilled ice chest as they were collected. Selected soil samples were submitted for chemical analyses, remaining samples were held pending results of the chemical analyses:

The monitoring well was installed at the conclusion of soil sampling. The monitoring well casing consisted of two-inch diameter Schedule 40 PVC pipe. The bottom of the well casing was closed with a screw-on cap. The well casing was slotted (slot opening 0.020 inches) between depths of 30 feet and 60 feet. The annulus space between the casing and bore wall was filled with #3 RMC Lonestar sand to a depth of 28 feet below existing grade (about two feet above the top of slotted casing). A three foot seal of 3/8-inch diameter bentonite pellets was constructed immediately above the sand pack, and the remainder of the annulus was filled with cement grout. The top of the well casing was fitted with a locking cap. Because the monitoring well is located in a landscape area, the well head was constructed within a christy box. The christy box was completed in a manner to reduce the potential for surface water runoff from ponding around the well head.

On May 1, 1989, the groundwater depth was measured to the top of the casing in the well, to the nearest hundredth of a foot, using an electronic interface probe. The well was developed by evacuating approximately 20 gallons of water from the well, using a three-foot teflon bailer. The water removed from the well was placed in sealed containers and stored onsite pending results of chemical analyses and determination of appropriate disposal.

After the well was developed and allowed to recover, a groundwater sample was collected using the bailer. Prior to developing the well, and again before collection of the groundwater sample, the bailer was cleaned in a solution of TSP in water, rinsed with tap water, and given a final rinse with distilled water. A new length of nylon rope was used for lowering and raising the bailer. The first sample from the well was retrieved from the surface of the water, and the contents of the bailer were observed to assess whether there was substantial floating product present. The sample vials and jars, provided by the laboratory, were filled from the bailer. The sample vials were placed in a chilled ice chest and transported to the laboratory under chain-of-custody control.

Site Condition Summary

The site is currently being developed for residential apartments. The immediate area that surrounds the monitoring well will consist of landscape improvements. Building Two is immediately east of the monitoring well. Except where directed to existing catch basins, surface drainage is generally to the west and southwest in the vicinity of the monitoring well.

During the boring for the monitoring well, sandy clay gravel fill was encountered from the ground surface to a depth of about five feet. The fill is underlain to the depth explored (about 62 feet) with native soils consisting of interbedded clayey sand, gravelly sand, silty sand, sandy gravel, and silty clay. A slight hydrocarbon odor was noted in the soil samples obtained between

depths of about 50 and 55 feet. Detailed subsurface conditions encountered in the boring are presented on the attached boring log.

Free groundwater was first observed during drilling at a depth of about 43 1/2 feet. Prior to bailing (12 days after well completion) the free groundwater level was observed at a depth of 42.74 feet. The water level at the time of groundwater sample collection was 43.87 feet. Floating product was not observed in the bailer when the first water sample was retrieved.

Summary of Chemical Analyses and Discussion of Results

As discussed earlier, soil and groundwater samples selected for chemical analysis were submitted to a State certified laboratory utilizing chain of custody protocols. Chemical analyses were performed by Curtis and Tompkins, Ltd, Analytical Laboratories in Berkeley. Chemical analyses, on soils included determination of Total Petroleum Hydrocarbons (TPH); Chemical Analyses of the groundwater included TPH, Benzene, Toluene, Xylene, Ethyl-benzene (BTX & E). Results of the chemical analyses are presented on the attached certified laboratory reports.

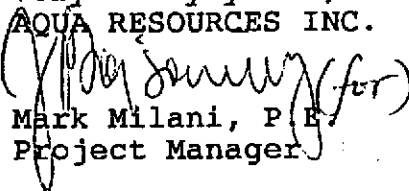
Conclusions and limitations

Based on the analyses of the soil and groundwater samples collected from the monitoring well, there does not appear to be significant hydrocarbon contamination associated with the concrete vault structure that was removed. Review of the chemical test results indicates that all the TPH analytes were below the method detection limits for the soil sample except for the diesel component in three samples. The reason for this is unclear since diesel was not detected in any previous soil samples analyzed at the site during final site remediation. Similarly, all analytes were also below the method detection limits for the water sample.

Our groundwater investigation, was limited to the installation and development of one groundwater monitoring well, soil and groundwater sample collection. Chemical analyses were performed by others, not under ARI direct supervision. Test results are reported as received. Final determination of additional site remediation, if required, will be determined by the Alameda County Public Health Agency. We cannot guarantee or warrant that soil or groundwater at this site are not contaminated above allowable limits for a given contaminant. This report is limited in its scope to the analyses and review of samples obtained from the one monitoring well as required by the regulatory agency. All services were performed in substantial conformance with current standards of environmental engineering practice. No other warranty express or implied is made.

It has been a pleasure to provide you with this information. If you have any questions regarding the above, please do not hesitate to contact the undersigned.

Very truly yours,
AQUA RESOURCES INC.


Mark Milani, P.E.
Project Manager

cc: Addressee (2)

Barnett-Range Corporation (2)

Mill Springs Park Apartment Field Office
Attn: Mr. Larry Malcolm

Attachments: Approved Well Permit
Log of Boring/Monitoring Well
Certified Laboratory Reports
Chain of Custody Form
Monitoring Well Location Plan

17245

AQUA RESOURCES, INC.

SHIPMENT NO.: 1



CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

PROJECT NAME: Mill Springs Poll Act

DATE 4/21/89

PROJECT NO.: 87157.6

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required
		Material	Method		Temp	Chemical	
MW1-1-1	6-6 1/2	Soil	Direct	Black Liner	ice		TPH 1
MW1-2-1	11-11 1/2				chill		Hold 2
MW1-3-1	16-16 1/2						TPH 3
MW1-4-1	21-21 1/2						Hold 4
MW1-5-1	26-26 1/2						TPH 5
MW1-6-1	31-31 1/2						Hold 6
MW1-7-1	36-36 1/2						Hold 7
MW1-8-1	41-41 1/2						TPH 8
MW1-9-1	46-46 1/2						Hold 9
MW1-10-1	51-51 1/2						TPH 10
MW1-11-1	56-56 1/2						Hold 11
MW1-12-1	61-61 1/2						TPH 12

Total Number of Samples Shipped: 12

Sampler's Signature: M. Malone

Relinquished By:
 Signature: Mark Malone
 Printed Name: Mark Malone
 Company: Aqua Resources
 Reason: to Lab for analysis

Received By:
 Signature: Scott R. Titman
 Printed Name: SCOTT R. TITMAN
 Company: ERT

Date 4/21/89

Time 9:40

Relinquished By:
 Signature: _____
 Printed Name: _____
 Company: _____
 Reason: _____

Received By:
 Signature: _____
 Printed Name: _____
 Company: _____

Date 1/1

Time _____

REMARKS: - Do not run analysis until verbal authorization / confirmation given by Mark Malone or Dewey Overback.
 - Analysis are to be performed on standard 2-week laboratory basis.
 - Sample indicated "hold": additional analysis may be performed on these samples pending results of above analyses.

Special Shipment / Handling / Storage Requirements:



AQUA RESOURCES, INC.
 2030 ADDISON STREET, SUITE 500
 Berkeley, CA. 94704
 (415)540-6954

17307

CHAIN OF CUSTODY RECORD

Project Code 87157.6		Project Name Barnett Range Mill Springs Park				REMARKS	
SAMPLERS (Signature) J. Shakofsky							
MW-1							
Relinquished by: (Signature) S. Shakofsky		Date/Time		Received by (Signature)		Date/Time 05/02/89 8:11	
Relinquished by: (Signature)		Date/Time		Received by (Signature)		Date/Time	
Relinquished by: (Signature)		Date/Time		Received for Laboratory by: (Signature) Anderson		Date/Time	
						Remarks	

ORIGINAL



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94566 (415) 484-2600

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT 1799 Railroad Avenue
Livermore, Calif. 94550

PERMIT NUMBER 89156
LOCATION NUMBER _____

CLIENT
Name Barnett Range Corporation
Address P.O. Box 8189 Phone 309-951-5140
City Stockton, CA Zip 95208-1489

PERMIT CONDITIONS

Circled Permit Requirements Apply

(3) APPLICANT
Name Aqua Resources
2030 Addison Street
Address Suite 500 Phone 540-6954
City Berkeley, CA Zip 94704

(A) GENERAL

1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

(4) DESCRIPTION OF PROJECT
Water Well Construction _____ Geotechnical Investigation _____
Cathodic Protection _____ General _____
Well Destruction _____ Contamination

(B) WATER WELLS, INCLUDING PIEZOMETERS

1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic, irrigation, and monitoring wells unless a lesser depth is specially approved.

PROPOSED WATER WELL USE
Domestic _____ Industrial _____ Irrigation _____
Municipal _____ Monitoring Other _____

PROPOSED CONSTRUCTION
Drilling Method:
Mud Rotary _____ Air Rotary _____ Auger
Cable _____ Other _____
DRILLER'S LICENSE NO. HEW Drilling, East Palo Alto
384167

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum _____
Casing Diameter 3 in. Depth 70 ft.
Surface Seal Depth 20 ft. Number 1
*minimum**

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

GEOTECHNICAL PROJECTS
Number of Borings _____ Maximum _____
Hole Diameter _____ in. Depth _____ ft.

E. WELL DESTRUCTION. See attached.

ESTIMATED STARTING DATE 3/30/89
ESTIMATED COMPLETION DATE 3/30/89

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

Approved Wyman Hong Date 20 Mar 89
Wyman Hong

APPLICANT'S SIGNATURE Mark Melon Date 3-17-89



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

LABORATORY NUMBER: 17245
 CLIENT: Aqua Resources, Inc.
 JOB #: 87157.6
 LOCATION: MILL SPRINGS PARK APT.

DATE RECEIVED: 04/21/89
 DATE ANALYZED: 04/25/89
 DATE REPORTED: 04/27/89

Extractable Petroleum Hydrocarbons in Soils & Wastes
 EPA 8015 (Modified)
 Extraction Method: EPA 3550

LAB ID	CLIENT ID	GASOLINE (mg/Kg)	KEROSINE (mg/Kg)	DIESEL (mg/Kg)	OTHER (mg/Kg)
17245-1	MW1-1-1	ND(10)	ND(10)	ND(10)	ND(10)
17245-3	MW1-1-1	ND(10)	ND(10)	ND(10)	ND(10)
17245-5	MW1-5-1	ND(10)	ND(10)	220 *	ND(10)
17245-8	MW1-8-1	ND(10)	ND(10)	140 *	ND(10)
17245-10	MW1-10-1	ND(10)	ND(10)	11 *	ND(10)
17245-12	MW1-12-1	ND(10)	ND(10)	ND(10)	ND(10)

* Fingerprint pattern does not match Hydrocarbon Standards. Quantitation based on largest peaks within diesel range.

ND = Not Detected; Limit of detection in parentheses.

QA/QC SUMMARY

Duplicate: Relative % Difference 6
 Spike: % Recovery 110

Stephen L. Jones
 LABORATORY DIRECTOR



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 05/02/89
DATE REPORTED: 05/10/89
PAGE 1 OF 3


LAB NUMBER: 17307

CLIENT: AQUA RESOURCES, INC.

REPORT ON: 1 WATER SAMPLE

JOB #: 87157.6
LOCATION: MILL SPRINGS PARK

RESULTS: SEE ATTACHED


Laboratory Director

LABORATORY NUMBER: 17307
 CLIENT: AQUA RESOURCES, INC.
 PROJECT #: 87157.6
 LOCATION: MILL SPRINGS PARK

DATE RECEIVED: 05/02/89
 DATE ANALYZED: 05/08/89
 DATE REPORTED: 05/10/89
 PAGE 2 OF 3

Extractable Petroleum Hydrocarbons in Aqueous Solutions
 EPA 8015 (Modified)
 Extraction Method: EPA 3510

LAB ID	CLIENT ID	GASOLINE (mg/L)	KEROSINE (mg/L)	DIESEL (mg/L)	OTHER (mg/L)
17307-1A	MW-1	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)

ND = Not Detected; Limit of detection in parentheses.

QA/QC SUMMARY

RPD, % 5
 Spike: % Recovery 89



LABORATORY NUMBER: 17307
CLIENT: AQUA RESOURCES, INC.
JOB NUMBER: 87157.6
JOB LOCATION: MILL SPRINGS PARK

DATE RECEIVED: 05/02/8
DATE ANALYZED: 05/03/8
DATE REPORTED: 05/10/8
PAGE 3 OF 3

Benzene, Toluene, Ethyl Benzene, Xylenes by EPA 8020
Extraction by EPA 5030 Purge and Trap

LAB ID	CLIENT ID	BENZENE (ug/kg)	TOLUENE (ug/kg)	TOTAL XYLENES (ug/kg)	ETHYL BENZENE (ug/kg)
17307-1B	MW-1	ND(1)	ND(1)	ND(1)	ND(1)

QA/QC SUMMARY

%RPD	5
%RECOVERY	96



OBSERVATION WELL INSTALLATION REPORT

Well # MW-1

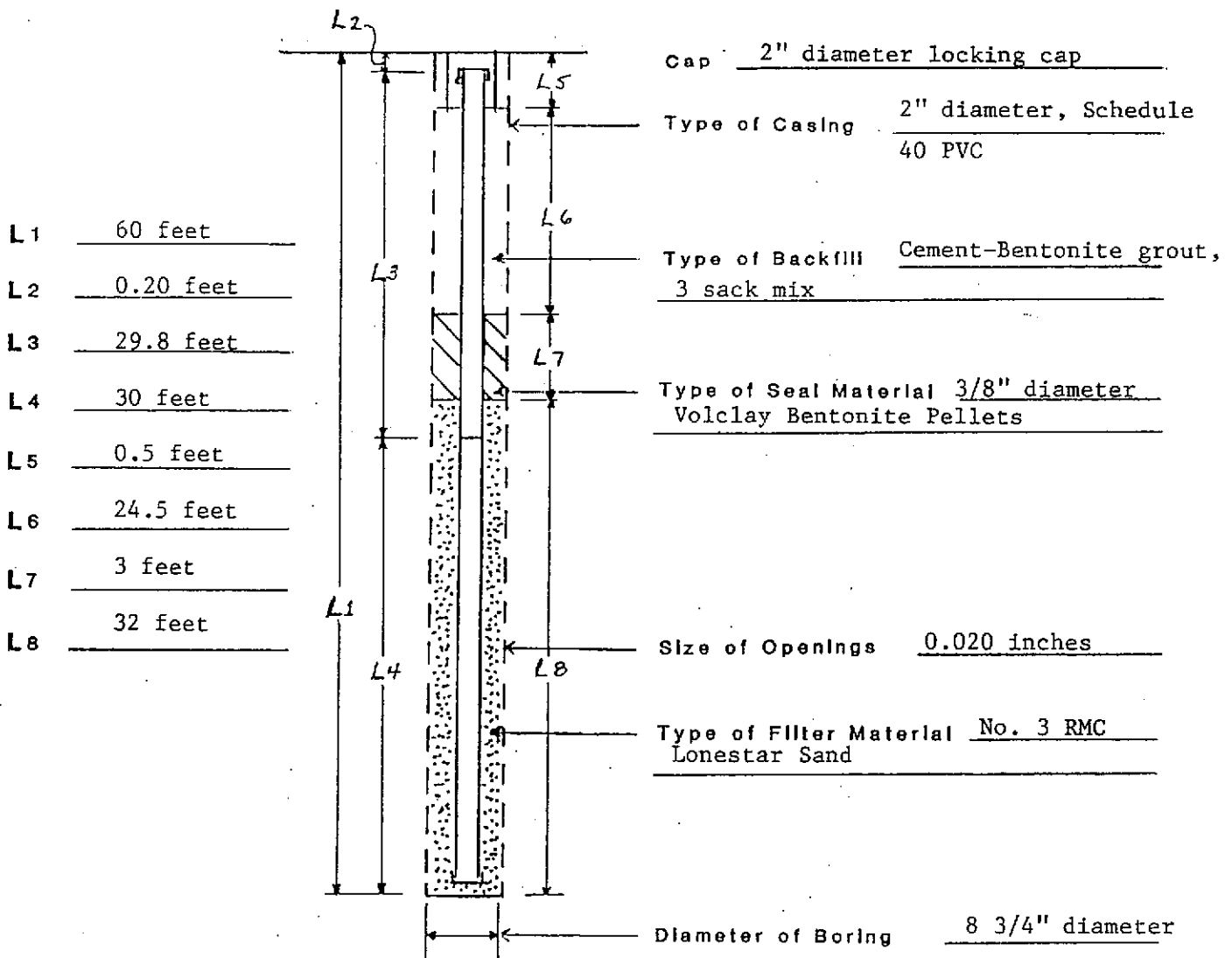
Project Mill Springs Park Apartments (87157.6)

Location Livermore, CA

Type of Rig CME-75 Installed by HEW Drilling Company

Date Started April 20, 1989 Date Finished April 20, 1989

Type of Observation Well Monitoring Well Ground Elev. 477.28 Casing Top, Elev. 477.08



Remarks Well developed on May 1, 1989

Inspected By M. Milani

BORING LOCATION	MW-1	ELEVATION AND DATUM	477.28 feet, Mean Sea Level
DRILLING CONTRACTOR	HEW Drilling Co.	DATE STARTED	Apr 20, 1989
DRILLER		DATE FINISHED	Apr 20, 1989
DRILLING EQUIPMENT	CME-75	COMPLETION DEPTH (FEET)	61½
DIAMETER OF BORING	8 3/4 inches	NO. OF DIST. SAMPLES	-
PURPOSE OF BORING	Monitoring Well Installation	WATER FIRST DEPTH (FEET)	43½
SAMPLING EQUIPMENT	2 ½-inch O.D. Split Barrel	LOGGED BY:	M. Milani
COMMENTS	140-lb. hammer, 30-inch fall	CHECKED BY:	P. Rodgers

DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG	SAMPLES				REMARKS
			NO.	TYPE	BLOW COUNT	DRILLING RATE/ MIN.	
	Fill: CLAYEY, SANDY GRAVEL, gray-brown, moist, medium dense, fine to coarse grained sand, fine to medium size gravel (GC)						BL=Brass Liner Blow counts per 6-inch drive interval given in ()
6	CLAYEY SAND, red-brown, moist, medium dense, fine to coarse grained, trace gravel (SC)		1	BL	27		(7/12/15) 8:50 2 liners recovered no odor
10	GRAVELLY SAND, gray-brown, moist, medium dense, fine to coarse grained sand, medium size gravel, large gravel in shoe, trace clay (SW)		2	BL	35		(12/17/18) 9:00 2 liners recovered no odor
15	SANDY GRAVEL, gray-brown, moist to wet, medium dense, trace clay (GW)						
	SILTY CLAY, mottled red-brown and yellow-brown, moist to wet, soft, trace fine grained sand, moderate plasticity (CL)		3	BL	9		(1/3/6) 9:10 lost lower two samples, resampled, recovered 2 additional liners no odor
20	GRAVELLY SAND, red-brown, moist to wet, very dense, fine to coarse grained sand, fine to medium size gravel, iron oxide staining (SW)		4	BL	65		(10/30/35) 9:22 3 liners recovered no odor
	Trace clay below 23 feet						
25	GRAVELLY SAND, blue-gray, moist-wet, dense, fine to coarse grained sand, fine to medium size gravel. (SW)		5	BL	49		(11/22/27) 9:33 2 liners recovered
30							

Project Mill Springs Park Apartments
Project No. 87157.6

LOG OF BORING

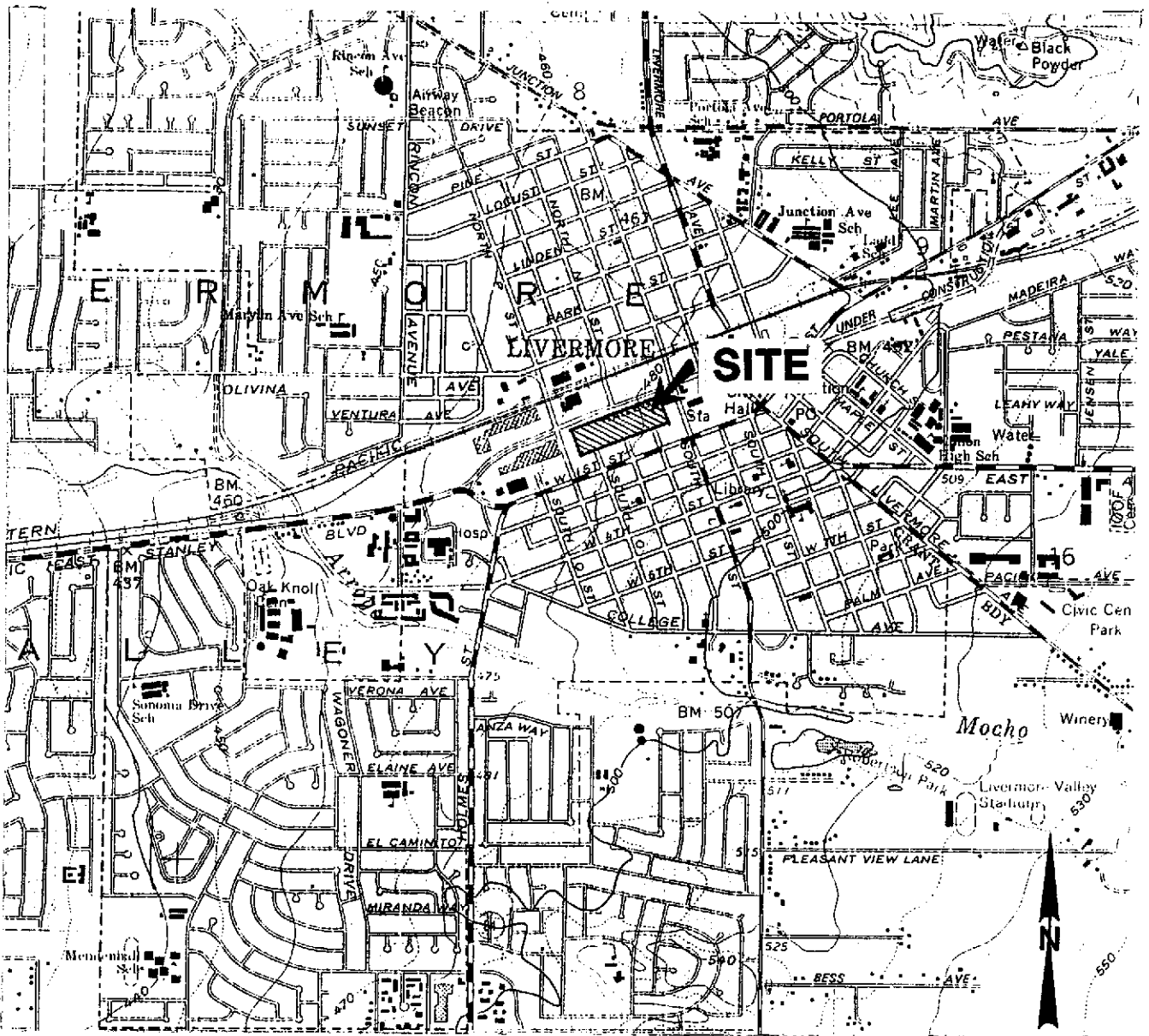
Fig.

DEPTH (FEET)	DESCRIPTION	GRAPHIC LOG LITHOLOGY	SAMPLES				REMARKS
			NO.	TYPE	BLOW COUNT	DRILLING RATE/ TIME	
30	GRAVELLEY SAND, continued SILTY SAND, green-gray, wet, medium dense, fine grained (SM)		6	BL	47		(16/31/16) 9:45 2 liners recovered no odor
35	GRAVELLY SAND, green-gray, moist to wet, medium dense, fine grained sand, fine to medium size gravel, with stringers of silty clay (SP)		7	BL	31		(14/19/12) 10:05 3 liners recovered no odor
40			8	BL	95/10"		(30/45/50 [4"]) 10:25 2 liners recovered no odor
45	SANDY GRAVEL, brown, wet to saturated, dense, fine to coarse grained sand, medium to coarse size gravel (GW) Saturated below 43½ feet		9	BL	47		Free water encoun- tered during drill- ing at 43½ feet (14/23/24) 10:45 no odor, 1 liner recovered
50	blue-gray and very dense below 50 feet		10	BL	83		(11/33/50) 11:05 strong odor, 2 liners recovered
55	Mottled gray-brown and blue-gray, fine to coarse grained sand, fine to coarse grained gravel, thin sand interbed between 55 and 55½ feet		11	BL	52		(10/22/30) 11:25 slight odor, 2 liners recovered
60	CLAYEY SAND, brown, saturated, very dense, fine to medium grained sand, trace medium size gravel (SC)		12	BL	83		(14/43/40) 11:50 no odor, 2 liners recovered
65	Boring terminated at 61½ feet 2-inch diameter PVC monitoring well installed						
70							

Project
Project No.

CONT. LOG OF BORING

Fig.



VICINITY MAP

MILL SPRINGS PARK APARTMENTS

Railroad Avenue

Livermore, California

REFERENCE:

Portion of U.S.G.S. 7.5 Minute Topographic Quadrangle Map, Livermore, California, dated 1961, photorevised 1980, at a scale of 1:24,000.

Figure 3
Groundwater Elevation Over Time

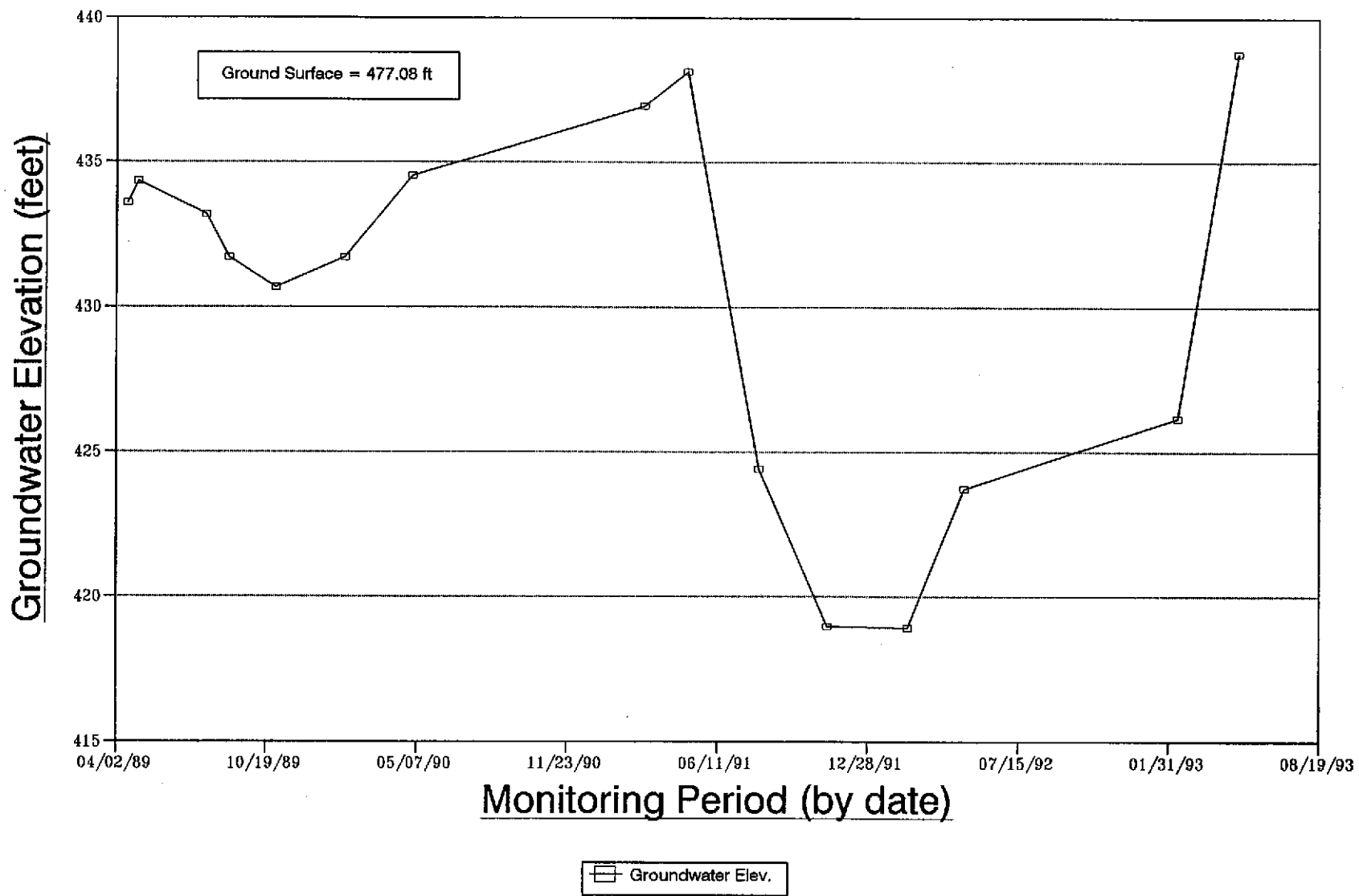


Figure 4
Benzene Concentration over Time

