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**DECEMBER 1993  
QUARTERLY SHALLOW GROUNDWATER  
MONITORING**

**LIVERMORE ARCADE SHOPPING CENTER  
FIRST STREET AND SOUTH P STREET  
LIVERMORE, CALIFORNIA**

*Prepared for:*

**Grubb & Ellis Realty Income Trust, Liquidating Trust  
351 California Street, Suite 1120  
San Francisco, CA 94104**

*Prepared by:*

**H+GCL, Inc.  
2200 Powell Street, Suite 880  
Emeryville, California 94608**

**December 10, 1993**

48016/17/DEC-93.QTR

**DECEMBER 1993  
QUARTERLY SHALLOW GROUNDWATER  
MONITORING**

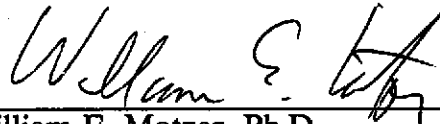
**LIVERMORE ARCADE SHOPPING CENTER  
FIRST STREET AND SOUTH P STREET  
LIVERMORE, CALIFORNIA**

*Submitted By:*



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Scott Nelson  
Project Geologist



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William E. Motzer, Ph.D.  
Director Hydrogeology/Environmental  
Engineering Services  
California Registered Geologist No. 4202  
(Expires 6/30/94)

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## **1.0 INTRODUCTION**

### **1.1 Purpose and Scope**

In December 1993, H<sup>+</sup>GCL, Inc. (H<sup>+</sup>GCL) conducted additional groundwater sampling from monitoring wells installed on the Livermore Arcade Shopping Center (LASC) (herein referred to as the subject site or subject property), in the City of Livermore, California. This investigation was conducted on behalf of Grubb & Ellis Realty Income Trust, Liquidating Trust (herein referred to as Grubb & Ellis) in cooperation with the San Francisco Bay Region of the Regional Water Quality Control Board (RWQCB) staff in order to monitor concentrations of tetrachloroethane (PCE) in groundwater on the LASC.

This investigation monitored groundwater concentrations of volatile organic compounds (VOCs), particularly tetrachloroethane (also known as perchloroethylene, "perk" or PCE) that was discovered in the soil and groundwater at the subject site and associated degradation products such as trichloroethylene (TCE), cis-1,2 dichloroethene (cis 1,2-DCE) or trans 1,2-dichloroethene (trans 1,2-DCE).

### **1.2 Site Location**

The subject property is approximately 25 miles east of San Francisco Bay along Interstate 580 (Figure 1, Appendix A). The LASC is located at the northwest corner of First Street and South P Street in downtown Livermore, California. Railroad Avenue borders the subject site to the north and South S Street borders the Livermore Arcade Shopping Center on the west (Figure 2, Appendix A).

### **1.3 Site Description**

The subject property is listed at the Alameda County Assessor's Office on Map 98, Page 403, Parcel 8-4. The LASC was built in 1973; it contains 11 businesses, of which eight are retail stores and two are restaurants. The subject site occupies approximately 11.75 acres, including the asphalt-paved parking areas. The topography is relatively flat with surface runoff to the north and west. Ornamental vegetation consists of grass, ivy, bushes, and small trees.

## 2.0 GROUNDWATER INVESTIGATION

### 2.1 Previous Investigations

In 1990, H<sup>+</sup>GCL conducted a subsurface investigation that found dissolved-phase PCE contamination, approximately 40 feet (ft) below surface grade (bsg), in the shallow groundwater and downgradient from Mike's Cleaners. Following this discovery, Grubb & Ellis installed additional groundwater monitoring wells. These wells were used to determine hydrogeological conditions beneath the site and the vertical and horizontal extent of PCE contamination. The presence of clay layers (aquitards) at depths of approximately 75 to 110 ft bsg, has prevented vertical migration of PCE to date. In September and October, 1993, H<sup>+</sup>GCL installed two deep groundwater monitoring wells north of the subject site to confirm that the aquitards are present in the subsurface north of the subject site and that the PCE plume had not penetrated into a lower aquifer. This deep aquifer was identified in the deep monitoring wells and in earlier California Water Service (CWS) well logs as being 125- to 145-ft bsg.

Quarterly groundwater monitoring began in March 1991. Groundwater monitoring was continued on a limited basis because of a continued drop in the shallow, unconfined groundwater table due to the extensive drought from 1986 through 1992. Although through 1990, H<sup>+</sup>GCL documented the shallow groundwater at approximately 42 ft bsg, a significant decrease in the groundwater table was noted in the latter half of 1991. In November 1991, quarterly groundwater monitoring noted a decrease in the shallow groundwater table to approximately 56.5 ft bsg; this was below the total depth for the deepest groundwater monitoring well. Also, for many of the on- and off-site monitoring wells, the groundwater table was below the screened interval. As a result, and with the concurrence of the RWQCB, H<sup>+</sup>GCL installed two additional, deeper shallow groundwater monitoring wells (MW-17 and MW-18). This data was included in H<sup>+</sup>GCL's April 1992 report: *Remedial Investigation Report, Livermore Arcade Shopping Center, Livermore, California* (H<sup>+</sup>GCL, 1992). The deep groundwater monitoring wells north of the subject site are described in H<sup>+</sup>GCL's December 1993 report: *Deep Groundwater Monitoring Wells Report for the Livermore Arcade Shopping Center, Livermore, California* (H<sup>+</sup>GCL, 1993a). The most recent sampling data for monitoring wells on the subject site is contained in H<sup>+</sup>GCL's June 1993 report: *Quarterly Shallow Groundwater, Livermore Arcade Shopping Center, First Street and South P Street, Livermore, California* (H<sup>+</sup>GCL, 1993b).

### 2.2 Current Investigation

Because access issues are currently unresolved between the LASC and the adjacent Millers Outpost Shopping Center where a number of wells are located, this most recent set of groundwater monitoring well data are only from groundwater measurements and sampling conducted on November 30, 1993 on the LASC. H<sup>+</sup>GCL was able to collect groundwater samples from 5 monitoring wells; the wells sampled are: MW-2, MW-4, MW-5, MW-6, and MW-7 (Figures 3 and 4, Appendix A).

from 5 monitoring wells; the wells sampled are: MW-2, MW-4, MW-5, MW-6, and MW-7 (Figures 3 and 4, Appendix A).

### **2.3 Groundwater Table Measurements and Groundwater Sampling**

Groundwater table elevations were measured using an electronic sounder ("water level probe"); the depth to water (DTW) was measured and recorded to establish the groundwater table elevations. Groundwater monitoring well measurements, indicate a rise in the shallow, unconfined groundwater table of over one half foot since the June, 1993 quarterly monitoring data (Figure 4, Appendix A). Groundwater monitoring well measurements and elevations are shown on Table 1 (Appendix B). Local groundwater flow direction is essentially the same as that shown on the June, 1993 quarterly report (north-northwest).

One groundwater sample was collected from each of the five monitoring wells and analyzed for VOCs; samples were collected on November 30, 1993. New, disposable polyethylene bailers were used on each well to bail three casings of water prior to sampling. Initial sampling parameters included temperature, pH, conductivity, and dissolved oxygen content (DOC) were also performed on each sampled monitoring well. The associated equipment was cleaned between each well with soap and rinsed with de-ionized water to minimize the potential for cross-contamination. Samples were transferred into prepared glassware supplied by the DHS certified analytical laboratory specifically for the individual sample. Samples were then immediately placed on ice and transported under Chain-of-Custody protocol to K-Prime Laboratory in Richmond, California. Chain-of-Custody records are included in Appendix C. Water sampling forms are included in Appendix D.

### **2.4 Groundwater Sample Analyses**

The collected groundwater samples were analyzed for VOCs by U.S. Environmental Protection Agency (EPA) Method 8240/624. PCE and TCE detected for each groundwater monitoring well sample is listed in Table 2 (Appendix B). The certified laboratory data sheets are included in Appendix C.

### **2.5 Groundwater Sample Analytical Results**

The VES at monitoring well MW-17 had made significant progress in removing PCE contained in soil and groundwater. The groundwater concentration for PCE in the sample collected from monitoring well MW-17 decreased from 1,300 parts per billion (ppb) on June 6, 1992 to 27.4 ppb on June 24, 1993. However, results from MW-7, several feet away from MW-17, indicate an increase in PCE concentrations to 123 ppb from 27.4 ppb PCE in June, 1993. The PCE groundwater concentration in monitoring well MW-6 has increased from 89.2 ppb in June, 1993 to 121 ppb. The groundwater

sample from MW-5 showed 9.4 ppb PCE, whereas the June data did not detect VOCs in this well.

The groundwater sample analyses also show that an associated degradation product trichloroethylene (TCE) was detected above method detection limits in MW-7 (20 ppb). In general, biodegradation has not yet begun and the PCE remains undegraded as sample results suggest in most of the monitoring wells.



### 3.0 CONCLUSIONS AND RECOMMENDATIONS

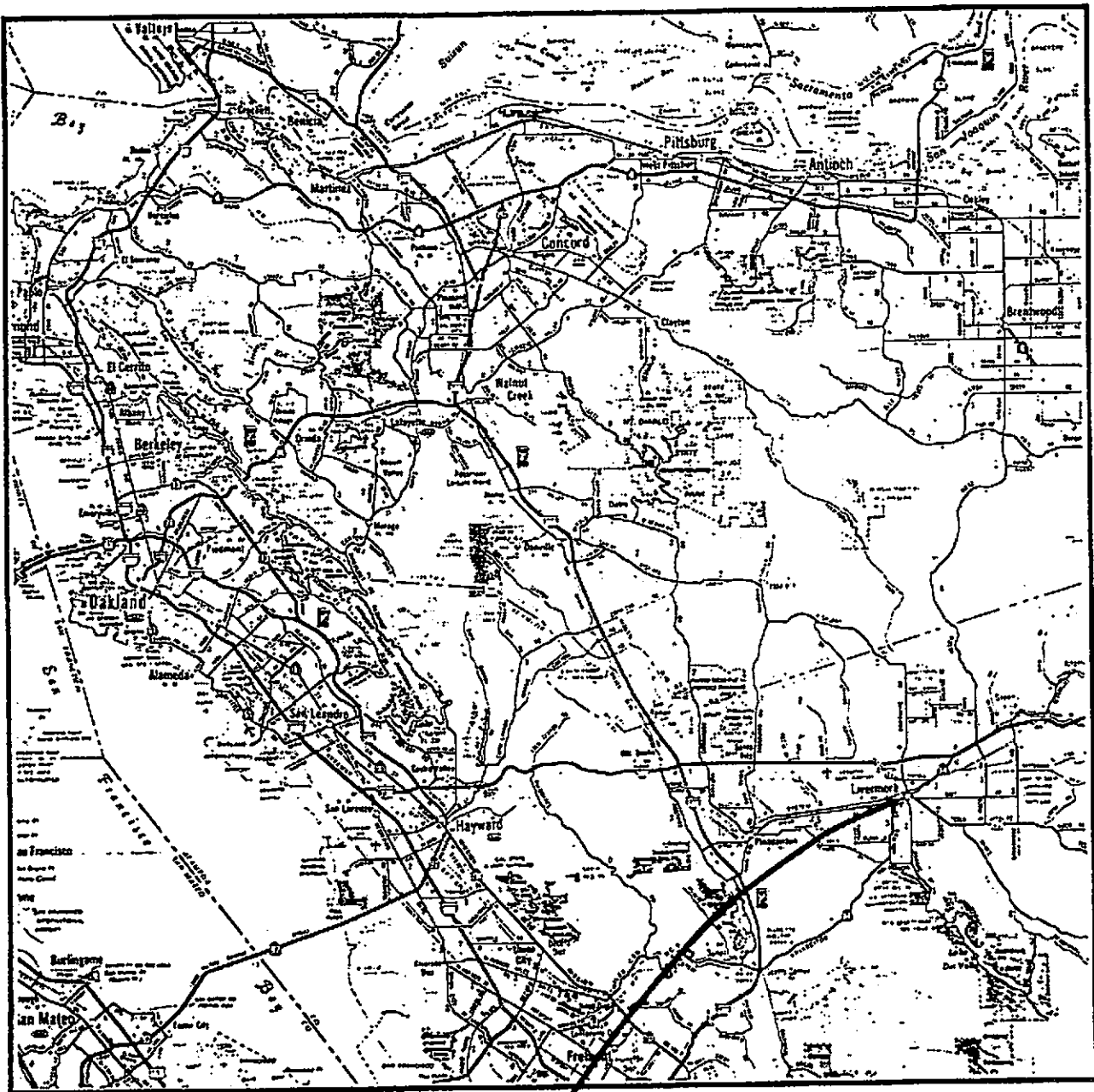
A comparison of the southern half of the PCE groundwater plume shown in the June 1993 report (H<sup>+</sup>GCL, 1993b) with a plot of the current PCE plume indicates that there has been an overall increase in PCE concentrations, particularly around monitoring well MW-7. Much of this increase, on the Livermore Arcade Shopping Center property, can be attributed to delays in restarting the Vapor Extraction System (VES) program, which removed as much as 0.4 pounds of PCE each day (H<sup>+</sup>GCL, 1992). Those delays have resulted from additional equipment requirements imposed in connection with H<sup>+</sup>GCL's discharge permit renewal, which are in the process of being addressed. H<sup>+</sup>GCL's earlier groundwater investigation (1993b) shows that on the subject property, a 10 ppb PCE isoconcentration contour extended downgradient (northwest) from monitoring well MW-17 across the property boundary and north beyond the Union Pacific Railroad Tracks (H<sup>+</sup>GCL, 1993b).

#### 4.0 REFERENCES CITED

H<sup>+</sup>GCL, Inc., 1992, *Remedial Investigation Report, Livermore Arcade Shopping Center, Livermore, California*: Report to Grubb & Ellis Reality Income Trust, April 1992, 56 p.

H<sup>+</sup>GCL, Inc., 1993a, *Deep Groundwater Monitoring Wells Report for the Livermore Arcade Shopping Center, Livermore, California*: Report to Grubb & Ellis Reality Income Trust, Liquidating Trust, November, 1993.

H<sup>+</sup>GCL, Inc., 1993b, *June 1993 Quarterly Shallow Groundwater Monitoring, Livermore Arcade Shopping Center, First Street and South P Street, Livermore, California*: Report to Grubb & Ellis Reality Income Trust, Liquidating Trust, June 1993.



Arcade Site



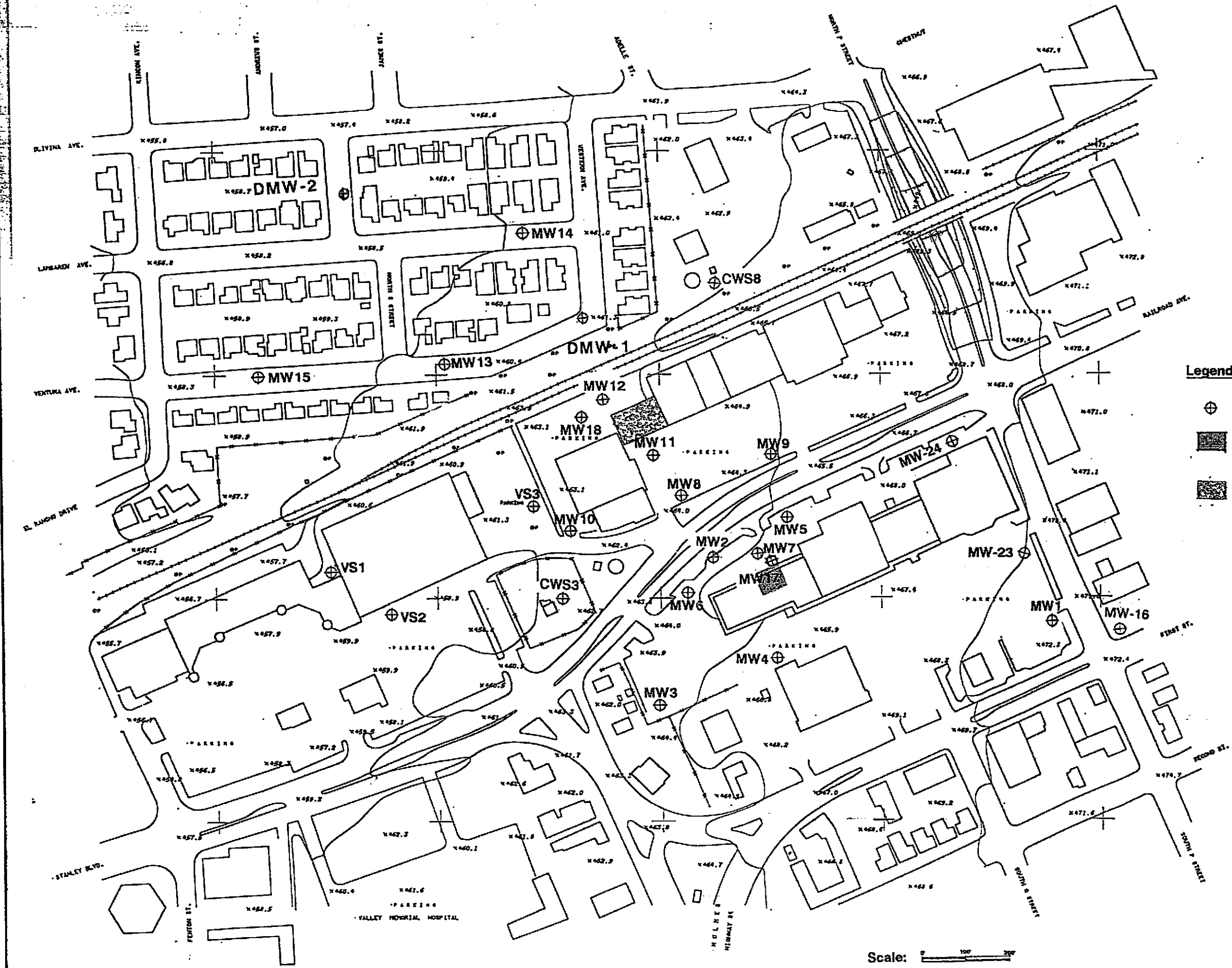
Source: California State Automobile Association, Bay and River Area, 1989

**SITE LOCATION**



PROJECT NO	<b>FIGURE 1</b>	DATE
DRAWN BY		
REV	DATE	DESCRIPTION

171354



- Legend**
- ⊕ Location of Monitoring Well
  - Location of Mike's Cleaners
  - Location of Paul's Cleaners

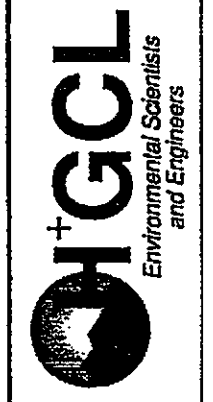
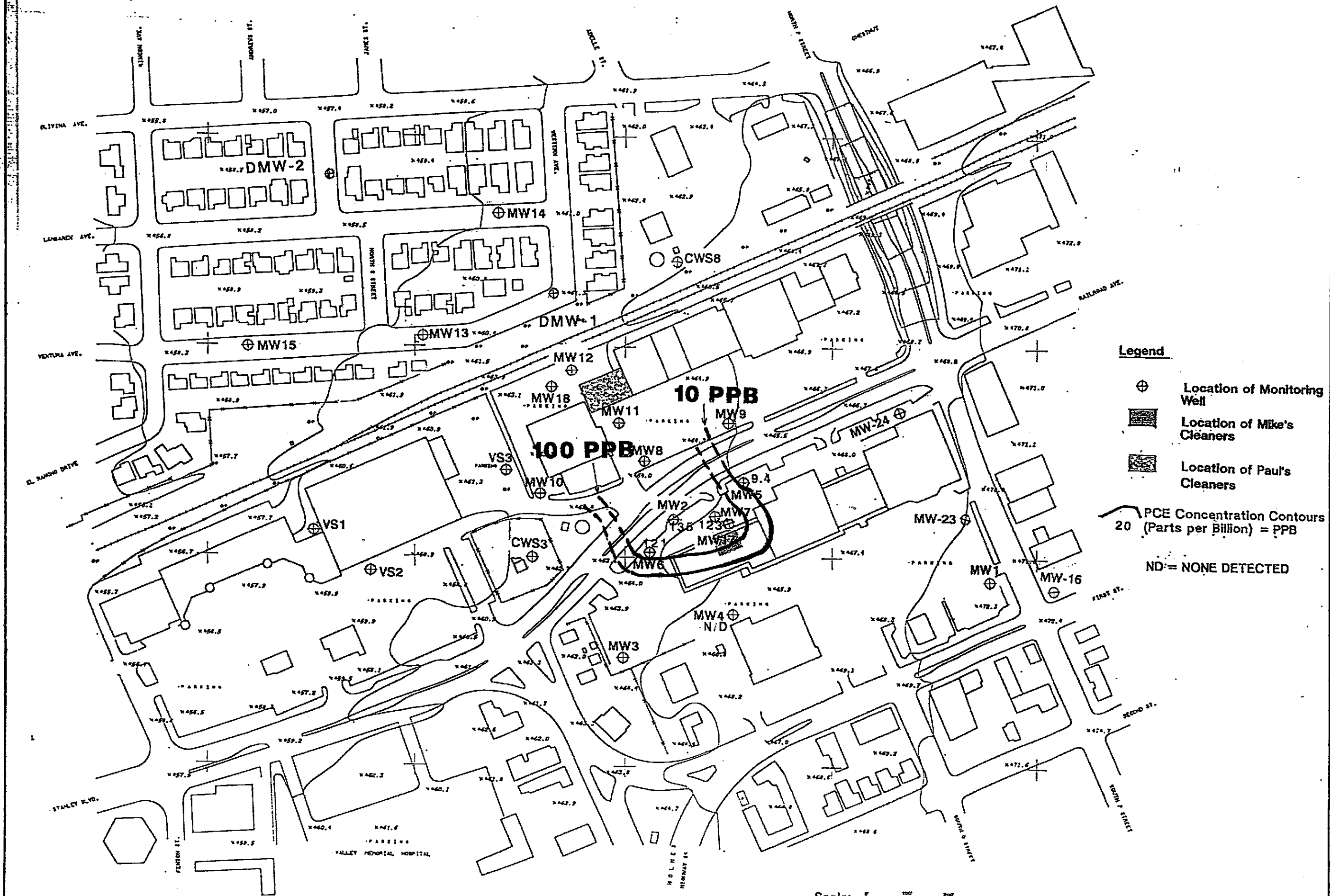


FIGURE 2  
SITE MAP

PROJECT NO.	DATE	BY	CHKD BY	DATE

FIGURE 3

PROJECT NO.	
DATE	
BY	
DATE	
BY	
DATE	
BY	

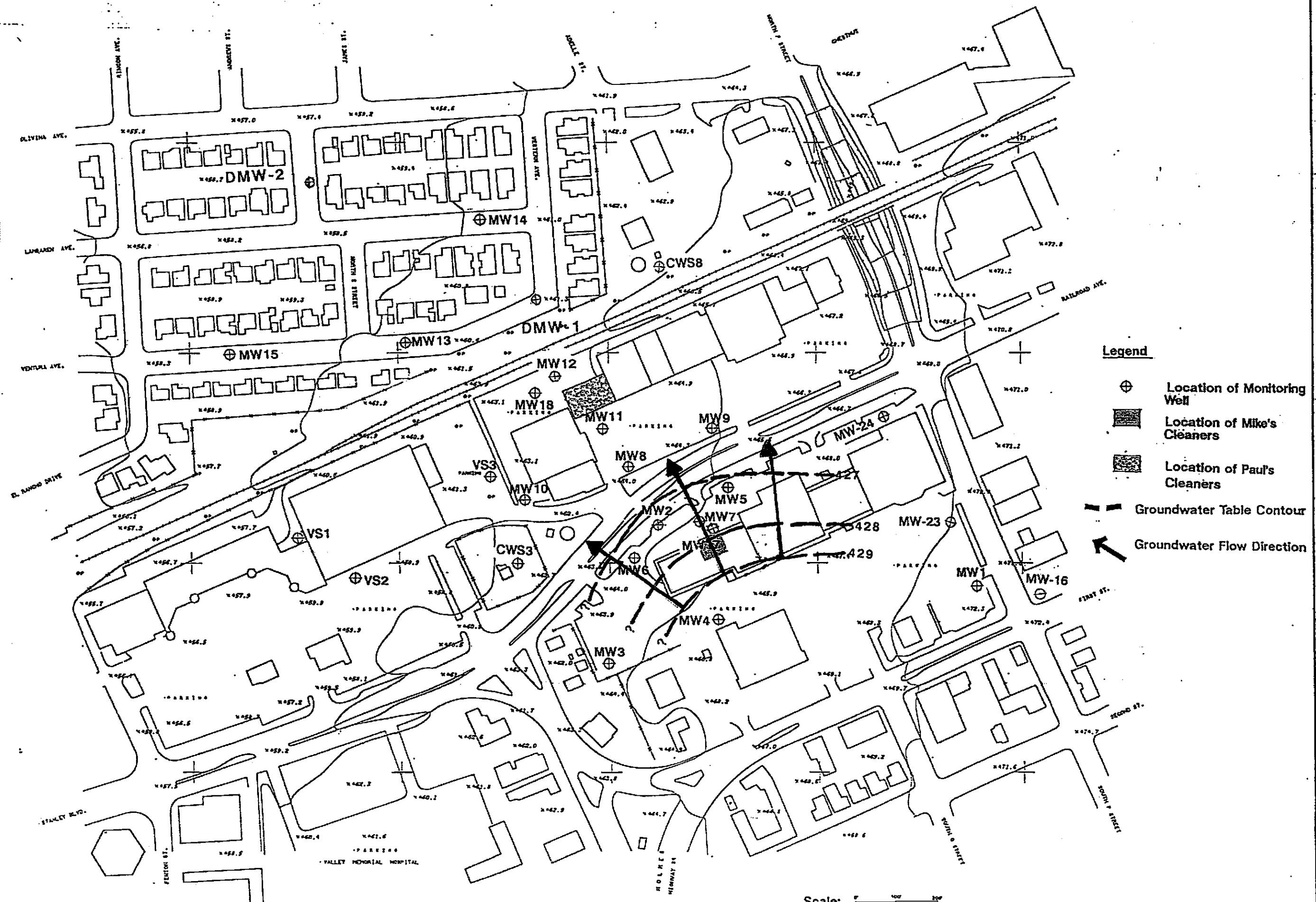


**Legend**

- ⊕ Location of Monitoring Well
- ▒ Location of Mike's Cleaners
- ▓ Location of Paul's Cleaners
- PCE Concentration Contours  
20 (Parts per Billion) = PPB
- ND = NONE DETECTED

**PCE CONCENTRATIONS IN GROUNDWATER**

Scale: 1" = 100'



- Legend**
- ⊕ Location of Monitoring Well
  - ▒ Location of Mike's Cleaners
  - ▓ Location of Paul's Cleaners
  - Groundwater Table Contour
  - ↖ Groundwater Flow Direction

Scale: 1" = 100'

**GROUNDWATER TABLE (ELEVATION ABOVE MEAN SEA LEVEL)**

FIGURE 4

PROJECT NO.	DATE	BY	CHKD BY	APPV'D BY

DATE

**TABLE 1: SHALLOW, UNCONFINED GROUNDWATER TABLE  
ELEVATIONS, LASC, LIVERMORE, CA.**

Monitoring Well	Elevation (ft AMSL)	Depth to groundwater (ft bsg)	Groundwater table elevation (ft AMSL)
MW-2	463.70	36.19	427.51
MW-4	465.40	38.55	426.85
MW-5	465.70	35.63	430.07
MW-6	464.70	37.38	427.32
MW-7	464.80	37.25	427.55

ft AMSL = feet above mean sea level

ft bsg = feet below surface grade from casing marker

TABLE 2: SUMMARY OF GROUNDWATER ANALYTICAL RESULTS, LASC,  
LIVERMORE, CA.

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Monitoring Well Designation	PCE Concentration in ppb*
MW-2	135
MW-4	N.D.
MW-5	9.4
MW-6	121
MW-7	123 (20 ppb TCE)

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Notes:

\* All other VOC compounds were not detected unless otherwise noted.

N.D. = Not Detected. Samples are below method detection limits.



**APPENDIX C**

**CHAIN-OF-CUSTODY RECORDS  
DHS CERTIFIED LABORATORY DATA SHEETS**



Albuquerque  
505 Marcuette NW, Ste. 1100  
Albuquerque, NM 87102  
(505) 842-0001  
FAX: (505) 842-0595

NASA-WSTF  
PO Drawer MM  
Las Cruces, NM 88004  
(505) 524-5353  
FAX: (505) 524-5315

Boston  
180 Canal Street  
Boston, MA 02114  
(617) 723-4564  
FAX: (617) 367-1386

Chicago  
626 W. Jackson Blvd., Ste. 800  
Chicago, IL 60606  
(312) 640-9988  
FAX: (312) 648-0818

KPI - 7240  
Project

6477

# Chain of Custody

Date 12-1-93 Page 1 of 1

Hartford  
390 South Center Street  
Windsor Locks, CT 06095  
(203) 627-6528  
FAX: (203) 627-7815

Los Angeles  
19600 Fairchild, Ste. 120  
Irvine, CA 92715  
(714) 955-0201  
FAX: (714) 955-0955

Mid Atlantic Region  
4221 Forbes Blvd., Ste. 240  
Larcham, MD 20706-4325  
(301) 459-9677  
FAX: (301) 459-3084

New York  
261 Madison Avenue  
New York, NY 10016  
(212) 983-8510  
FAX: (212) 983-8795

San Francisco  
2200 Powell Street, Ste. 280  
Emeryville, CA 94508  
(510) 547-3696  
FAX: (510) 547-3631

Lab Name <u>K-Prime</u>			Analysis Request																									
Address			Halogenated Volatiles 601/9010	Aromatic Volatiles 602/9020	Phenols, Sulf Phenols 609/9040	Pesticides/PCB 609/9080	Polynuclear Aromatic Hydrocarbons 610/6110	Volatile Compounds 623/6240	Basic/Neutral Compounds 623/6270	Total Organic Carbon (TOC) 415/9060	Total Organic Halides (TOX) 9020	Petroleum Hydrocarbons 414	TPH/STPH 623/6270	Modifed 623/6270	TCP, Vol., Semi-Vol. Herbicides, Pesticides	TCP, Metals	HCNA Metals(B)	Priority Pollutant Metals (13)	Cadm Metals (16) TLC/STLC	Flash Point	Corrosivity	Reactivity	Oil & Grease	Cyanide Total/Amenable	Chemical Oxygen Demand (COD)	BTEX	Sulfide	Number of Containers
Sample Number	Matrix	Location																										
9311301145	GW	MW-2						X																				6
9311301245		MW-5						X																				6
9311301338		MW-7						X																				5
9311301520		MW-6						X																				6
9311301600	↓	MW-4						X																				6
9311301630	W	Trip Blank						X																				2

KPI  
SL 2  
4317  
4318  
4319  
4320  
4321  
4322

Project Information <u>Livingstone Acute</u>		Sample Receipt		Relinquished By		Relinquished By		Relinquished By	
Project <u>48016-17</u>	Total No. of Containers	Total No. of Containers		<u>Scott Nelson</u> 9:03		<u>Catherine M Steele</u>			
Project Director	Chain of Custody Seals	Chain of Custody Seals		Signature (Time) <u>SCOTT NELSON</u> 12-1-93		Signature (Time) <u>CATHERINE M. STEELE</u> 10:30		Signature (Time)	
Charge Code No. <u>Batch SF 7390</u>	Rec'd Good Condition/Cold	Rec'd Good Condition/Cold		Printed Name (Date) <u>H+GCL, INC.</u>		Printed Name (Date) <u>K PRIME, INC</u> 12/1/93		Printed Name (Date)	
Shipping ID. No.	Conforms to Record	Conforms to Record		Company (Company)		Company (Company)		Company (Company)	
Via:	Lab No.	Lab No.		Received By		Received By		Received By (Laboratory)	
				<u>Catherine M Steele</u> 9:03		<u>Richard A. Kayel</u> 10:30			
				Signature (Time) <u>CATHERINE M STEELE</u> 12/1/93		Signature (Time) <u>Richard A. Kayel</u> 12/1/93		Signature (Time)	
Special Instructions/Comments: <u>Normal turn around -</u>				Printed Name (Date) <u>K Prime, Inc</u>		Printed Name (Date) <u>K Prime, Inc</u>		Printed Name (Date)	
				Company (Company)		Company (Company)		Company (Company)	

K PRIME, INC. TEL: 222-4817 Dec 08 93 10:11 No. 001 P. 14

**K PRIME, INC.**

CONSULTING ANALYTICAL CHEMISTS

4197 Lakeside Dr., Suite 170  
Richmond, CA 94806  
(510) 222-4815  
Fax: 222-4817

## TRANSMITTAL

DATE: 12/7/93

TO: Mr. Bill Motzer  
HGCL  
2200 Powell Street, Ste. 880  
Emeryville, CA 94608Acct#: 100-9240  
Your Project: 48016.17PHONE: 510-547-3886  
FAX: 510-547-3631FROM: Richard A. Kagel, Ph.D. *RAK 12/7/93*  
Laboratory Director

SUBJECT: YOUR PROJECT #48016.17 LABORATORY RESULTS

Enclosed please find K Prime's laboratory reports for the following samples:

SAMPLE ID	SAMPLE TYPE	DATE	KPI LAB #
9311301145	WATER	11/30/93	4317
9311301245	WATER	11/30/93	4318
9311301338	WATER	11/30/93	4319
9311301520	WATER	11/30/93	4320
9311301600	WATER	11/30/93	4321
9311301630	WATER	11/30/93	4322

This sample was tested in our laboratory for Volatile Organic Compounds by EPA 8240/624. Please call me if you have any questions or need further information.

Thank you for this opportunity to be of service.

K PRIME, INC.  
LABORATORY REPORT

SAMPLE ID: 9311301145  
LAB NO: 4317

METHOD: VOLATILE ORGANIC COMPOUNDS  
REFERENCE: EPA 8240/624  
OUR PROJECT: 9240  
YOUR PROJECT: 48016.17

SAMPLE TYPE: WATER  
DATE SAMPLED: 11/30/93  
TIME SAMPLED: 11:45  
DATE ANALYZED: 12/1/93

UNITS: µg/L

COMPOUND NAME	CAS.NO.	REPORTING LIMIT	SAMPLE CONC
CHLOROMETHANE	74-87-3	10	ND
VINYL CHLORIDE	75-01-4	10	ND
BROMOMETHANE	74-83-9	10	ND
CHLOROETHANE	75-00-3	10	ND
TRICHLOROFUOROMETHANE	75-69-4	5.0	ND
TRICHLOROTRIFLUOROETHANE	76-13-1	5.0	ND
ACETONE	67-64-1	20	ND
1,1-DICHLOROETHENE	75-35-4	5.0	ND
CARBON DISULFIDE	75-15-0	5.0	ND
METHYLENE CHLORIDE	75-09-2	5.0	ND
TRANS-1,2-DICHLOROETHENE	156-60-5	5.0	ND
1,1-DICHLOROETHANE	75-34-3	5.0	ND
VINYL ACETATE	108-05-4	10	ND
CIS-1,2-DICHLOROETHENE	156-59-2	5.0	ND
2-BUTANONE	78-93-3	20	ND
CHLOROFORM	67-66-3	5.0	ND
1,1,1-TRICHLOROETHANE	71-55-6	5.0	ND
CARBON TETRACHLORIDE	56-23-5	5.0	ND
1,2-DICHLOROETHANE	107-06-2	5.0	ND
BENZENE	71-43-2	5.0	ND
TRICHLOROETHENE	79-01-6	5.0	ND
1,2-DICHLOROPROPANE	78-87-5	5.0	ND
BROMODICHLOROMETHANE	75-27-4	5.0	ND
2-CHLOROETHYL VINYL ETHER	110-75-8	5.0	ND
TRANS-1,3-DICHLOROPROPENE	10061-02-6	5.0	ND
4-METHYL-2-PENTANONE	108-10-1	10	ND
TOLUENE	108-88-3	5.0	ND
CIS-1,3-DICHLOROPROPENE	10061-01-5	5.0	ND
1,1,2-TRICHLOROETHANE	79-00-5	5.0	ND
TETRACHLOROETHENE	127-18-4	5.0	135
2-HEXANONE	591-78-6	10	ND

K PRIME, INC.  
LABORATORY REPORT

SAMPLE ID: 9311301145  
LAB NO: 4317

METHOD: VOLATILE ORGANIC COMPOUNDS  
REFERENCE: EPA 8240/624  
OUR PROJECT: 9240  
YOUR PROJECT: 48016.17

SAMPLE TYPE: WATER  
DATE SAMPLED: 11/30/93  
TIME SAMPLED: 11:45  
DATE ANALYZED: 12/1/93

UNITS: µg/L

COMPOUND NAME	CAS NO.	REPORTING LIMIT	SAMPLE CONC
DIBROMOCHLOROMETHANE	124-48-1	5.0	ND
CHLORO BENZENE	108-90-7	5.0	ND
ETHYLBENZENE	100-41-4	5.0	ND
XYLENE (M+P)	1330-20-7	5.0	ND
XYLENE (O)	1330-20-7	5.0	ND
STYRENE	100-42-5	5.0	ND
BROMOFORM	75-25-2	5.0	ND
1,1,2,2-TETRACHLOROETHANE	79-34-5	5.0	ND
1,3-DICHLORO BENZENE	541-73-1	5.0	ND
1,4-DICHLORO BENZENE	106-46-7	5.0	ND
1,2-DICHLORO BENZENE	95-50-1	5.0	ND

NOTES:

ND - NOT DETECTED ABOVE THE STATED REPORTING LIMIT

PREPARED BY:                       
DATE:                     12/3/93                    

APPROVED BY:                       
DATE:                     12/7/93

K PRIME, INC.  
LABORATORY REPORT

SAMPLE ID: 9311301245  
LAB NO: 4318

METHOD: VOLATILE ORGANIC COMPOUNDS  
REFERENCE: EPA 8240/624  
OUR PROJECT: 9240  
YOUR PROJECT: 48016.17

SAMPLE TYPE: WATER  
DATE SAMPLED: 11/30/93  
TIME SAMPLED: 12:45  
DATE ANALYZED: 12/1/93

UNITS: µg/L

COMPOUND NAME	CAS NO.	REPORTING LIMIT	SAMPLE CONC
CHLOROMETHANE	74-87-3	10	ND
VINYL CHLORIDE	75-01-4	10	ND
BROMOMETHANE	74-83-9	10	ND
CHLOROETHANE	75-00-3	10	ND
TRICHLOROFLUOROMETHANE	75-69-4	5.0	ND
TRICHLOROTRIFLUOROETHANE	76-13-1	5.0	ND
ACETONE	67-64-1	20	ND
1,1-DICHLOROETHENE	75-35-4	5.0	ND
CARBON DISULFIDE	75-15-0	5.0	ND
METHYLENE CHLORIDE	75-09-2	5.0	ND
TRANS-1,2-DICHLOROETHENE	156-60-5	5.0	ND
1,1-DICHLOROETHANE	75-34-3	5.0	ND
VINYL ACETATE	108-05-4	10	ND
CIS-1,2-DICHLOROETHENE	156-59-2	5.0	ND
2-BUTANONE	78-93-3	20	ND
CHLOROFORM	67-66-3	5.0	ND
1,1,1-TRICHLOROETHANE	71-55-6	5.0	ND
CARBON TETRACHLORIDE	56-23-5	5.0	ND
1,2-DICHLOROETHANE	107-06-2	5.0	ND
BENZENE	71-43-2	5.0	ND
TRICHLOROETHENE	79-01-6	5.0	ND
1,2-DICHLOROPROPANE	78-87-5	5.0	ND
BROMODICHLOROMETHANE	75-27-4	5.0	ND
2-CHLOROETHYL VINYL ETHER	110-75-8	5.0	ND
TRANS-1,3-DICHLOROPROPENE	10061-02-6	5.0	ND
4-METHYL-2-PENTANONE	108-10-1	10	ND
TOLUENE	108-88-3	5.0	ND
CIS-1,3-DICHLOROPROPENE	10061-01-5	5.0	ND
1,1,2-TRICHLOROETHANE	79-00-5	5.0	ND
TETRACHLOROETHENE	127-18-4	5.0	9.4
2-HEXANONE	591-78-6	10	ND

K PRIME, INC.  
LABORATORY REPORT

SAMPLE ID: 9311301245  
LAB NO: 4318

METHOD: VOLATILE ORGANIC COMPOUNDS  
REFERENCE: EPA 8240/624  
OUR PROJECT: 9240  
YOUR PROJECT: 48016.17

SAMPLE TYPE: WATER  
DATE SAMPLED: 11/30/93  
TIME SAMPLED: 12:45  
DATE ANALYZED: 12/1/93

UNITS: µg/L

COMPOUND NAME	CAS NO.	REPORTING LIMIT	SAMPLE CONC
DIBROMOCHLOROMETHANE	124-48-1	5.0	ND
CHLOROBENZENE	108-90-7	5.0	ND
ETHYLBENZENE	100-41-4	5.0	ND
XYLENE (M+P)	1330-20-7	5.0	ND
XYLENE (O)	1330-20-7	5.0	ND
STYRENE	100-42-5	5.0	ND
BROMOFORM	75-25-2	5.0	ND
1,1,2,2-TETRACHLOROETHANE	79-34-5	5.0	ND
1,3-DICHLOROBENZENE	541-73-1	5.0	ND
1,4-DICHLOROBENZENE	106-46-7	5.0	ND
1,2-DICHLOROBENZENE	95-50-1	5.0	ND

NOTES:

ND - NOT DETECTED ABOVE THE STATED REPORTING LIMIT

PREPARED BY: ck  
DATE: 12/3/93

APPROVED BY: RAK  
DATE: 12/7/93

K PRIME, INC.  
LABORATORY REPORT

SAMPLE ID: 9311301338  
LAB NO: 4319

METHOD: VOLATILE ORGANIC COMPOUNDS  
REFERENCE: EPA 8240/624  
OUR PROJECT: 9240  
YOUR PROJECT: 48016.17

SAMPLE TYPE: WATER  
DATE SAMPLED: 11/30/93  
TIME SAMPLED: 13:38  
DATE ANALYZED: 12/1/93

UNITS: µg/L

COMPOUND NAME	CAS NO.	REPORTING LIMIT	SAMPLE CONC
CHLOROMETHANE	74-87-3	10	ND
VINYL CHLORIDE	75-01-4	10	ND
BROMOMETHANE	74-83-9	10	ND
CHLOROETHANE	75-00-3	10	ND
TRICHLOROFLUOROMETHANE	75-69-4	5.0	ND
TRICHLOROTRIFLUOROETHANE	76-13-1	5.0	ND
ACETONE	67-64-1	20	ND
1,1-DICHLOROETHENE	75-35-4	5.0	ND
CARBON DISULFIDE	75-15-0	5.0	ND
METHYLENE CHLORIDE	75-09-2	5.0	ND
TRANS-1,2-DICHLOROETHENE	156-60-5	5.0	ND
1,1-DICHLOROETHANE	75-34-3	5.0	ND
VINYL ACETATE	108-05-4	10	ND
CIS-1,2-DICHLOROETHENE	156-59-2	5.0	ND
2-BUTANONE	78-93-3	20	ND
CHLOROFORM	67-66-3	5.0	ND
1,1,1-TRICHLOROETHANE	71-55-6	5.0	ND
CARBON TETRACHLORIDE	56-23-5	5.0	ND
1,2-DICHLOROETHANE	107-06-2	5.0	ND
BENZENE	71-43-2	5.0	ND
TRICHLOROETHENE	79-01-6	5.0	20.0
1,2-DICHLOROPROPANE	78-87-5	5.0	ND
BROMODICHLOROMETHANE	75-27-4	5.0	ND
2-CHLOROETHYL VINYL ETHER	110-75-8	5.0	ND
TRANS-1,3-DICHLOROPROPENE	10061-02-6	5.0	ND
4-METHYL-2-PENTANONE	108-10-1	10	ND
TOLUENE	108-88-3	5.0	ND
CIS-1,3-DICHLOROPROPENE	10061-01-5	5.0	ND
1,1,2-TRICHLOROETHANE	79-00-5	5.0	ND
TETRACHLOROETHENE	127-18-4	5.0	123
2-HEXANONE	591-78-6	10	ND



K PRIME, INC.  
LABORATORY REPORT

SAMPLE ID: 9311301338  
LAB NO: 4319

METHOD: VOLATILE ORGANIC COMPOUNDS  
REFERENCE: EPA 8240/624  
OUR PROJECT: 9240  
YOUR PROJECT: 48016.17

SAMPLE TYPE: WATER  
DATE SAMPLED: 11/30/93  
TIME SAMPLED: 13:38  
DATE ANALYZED: 12/1/93

UNITS: µg/L

COMPOUND NAME	CAS NO.	REPORTING LIMIT	SAMPLE CONC
DIBROMOCHLOROMETHANE	124-48-1	5.0	ND
CHLOROBENZENE	108-90-7	5.0	ND
ETHYLBENZENE	100-41-4	5.0	ND
XYLENE (M+P)	1330-20-7	5.0	ND
XYLENE (O)	1330-20-7	5.0	ND
STYRENE	100-42-5	5.0	ND
BROMOFORM	75-25-2	5.0	ND
1,1,2,2-TETRACHLOROETHANE	79-34-5	5.0	ND
1,3-DICHLOROBENZENE	541-73-1	5.0	ND
1,4-DICHLOROBENZENE	106-46-7	5.0	ND
1,2-DICHLOROBENZENE	95-50-1	5.0	ND

NOTES:

ND - NOT DETECTED ABOVE THE STATED REPORTING LIMIT

PREPARED BY: ck

DATE: 12/3/93

APPROVED BY: CMK

DATE: 12-17-93

K PRIME, INC.  
LABORATORY REPORT

SAMPLE ID: 9311301520  
LAB NO: 4320

METHOD: VOLATILE ORGANIC COMPOUNDS  
REFERENCE: EPA 8240/624  
OUR PROJECT: 9240  
YOUR PROJECT: 48016.17

SAMPLE TYPE: WATER  
DATE SAMPLED: 11/30/93  
TIME SAMPLED: 15:20  
DATE ANALYZED: 12/1/93

UNITS: µg/L

COMPOUND NAME	CAS NO.	REPORTING LIMIT	SAMPLE CONC
CHLOROMETHANE	74-87-3	10	ND
VINYL CHLORIDE	75-01-4	10	ND
BROMOMETHANE	74-83-9	10	ND
CHLOROETHANE	75-00-3	10	ND
TRICHLOROFLUOROMETHANE	75-69-4	5.0	ND
TRICHLOROTRIFLUOROETHANE	76-13-1	5.0	ND
ACETONE	67-64-1	20	ND
1,1-DICHLOROETHENE	75-35-4	5.0	ND
CARBON DISULFIDE	75-15-0	5.0	ND
METHYLENE CHLORIDE	75-09-2	5.0	ND
TRANS-1,2-DICHLOROETHENE	156-60-5	5.0	ND
1,1-DICHLOROETHANE	75-34-3	5.0	ND
VINYL ACETATE	108-05-4	10	ND
CIS-1,2-DICHLOROETHENE	156-59-2	5.0	ND
2-BUTANONE	78-93-3	20	ND
CHLOROFORM	67-66-3	5.0	ND
1,1,1-TRICHLOROETHANE	71-55-6	5.0	ND
CARBON TETRACHLORIDE	56-23-5	5.0	ND
1,2-DICHLOROETHANE	107-06-2	5.0	ND
BENZENE	71-43-2	5.0	ND
TRICHLOROETHENE	79-01-6	5.0	ND
1,2-DICHLOROPROPANE	78-87-5	5.0	ND
BROMODICHLOROMETHANE	75-27-4	5.0	ND
2-CHLOROETHYL VINYL ETHER	110-75-8	5.0	ND
TRANS-1,3-DICHLOROPROPENE	10061-02-6	5.0	ND
4-METHYL-2-PENTANONE	108-10-1	10	ND
TOLUENE	108-88-3	5.0	ND
CIS-1,3-DICHLOROPROPENE	10061-01-5	5.0	ND
1,1,2-TRICHLOROETHANE	79-00-5	5.0	ND
TETRACHLOROETHENE	127-18-4	5.0	121
2-HEXANONE	591-78-6	10	ND

K PRIME, INC.  
LABORATORY REPORT

SAMPLE ID: 9311301520  
LAB NO: 4320

METHOD: VOLATILE ORGANIC COMPOUNDS  
REFERENCE: EPA 8240/624  
OUR PROJECT: 9240  
YOUR PROJECT: 48016.17

SAMPLE TYPE: WATER  
DATE SAMPLED: 11/30/93  
TIME SAMPLED: 15:20  
DATE ANALYZED: 12/1/93

UNITS: µg/L

COMPOUND NAME	CAS NO.	REPORTING LIMIT	SAMPLE CONC
DIBROMOCHLOROMETHANE	124-48-1	5.0	ND
CHLOROBENZENE	108-90-7	5.0	ND
ETHYLBENZENE	100-41-4	5.0	ND
XYLENE (M+P)	1330-20-7	5.0	ND
XYLENE (O)	1330-20-7	5.0	ND
STYRENE	100-42-5	5.0	ND
BROMOFORM	75-25-2	5.0	ND
1,1,2,2-TETRACHLOROETHANE	79-34-5	5.0	ND
1,3-DICHLOROBENZENE	541-73-1	5.0	ND
1,4-DICHLOROBENZENE	106-46-7	5.0	ND
1,2-DICHLOROBENZENE	95-50-1	5.0	ND

NOTES:

ND - NOT DETECTED ABOVE THE STATED REPORTING LIMIT

PREPARED BY:                       
DATE: 12/3/93

APPROVED BY:                       
DATE: 12/7/93

K PRIME, INC.  
LABORATORY REPORT

SAMPLE ID: 9311301600  
LAB NO: 4321

METHOD: VOLATILE ORGANIC COMPOUNDS  
REFERENCE: EPA 8240/624  
OUR PROJECT: 9240  
YOUR PROJECT: 48016.17

SAMPLE TYPE: WATER  
DATE SAMPLED: 11/30/93  
TIME SAMPLED: 16:00  
DATE ANALYZED: 12/1/93

UNITS:  $\mu\text{g/L}$

COMPOUND NAME	CAS NO.	REPORTING LIMIT	SAMPLE CONC
DIBROMOCHLOROMETHANE	124-48-1	5.0	ND
CHLOROBENZENE	108 90-7	5.0	ND
ETHYLBENZENE	100-41-4	5.0	ND
XYLENE (M+P)	1330-20-7	5.0	ND
XYLENE (O)	1330-20-7	5.0	ND
STYRENE	100-42-5	5.0	ND
BROMOFORM	75-25-2	5.0	ND
1,1,2,2-TETRACHLOROETHANE	79-34-5	5.0	ND
1,3-DICHLOROBENZENE	541-73-1	5.0	ND
1,4-DICHLOROBENZENE	106-46-7	5.0	ND
1,2-DICHLOROBENZENE	95-50-1	5.0	ND

NOTES:

ND - NOT DETECTED ABOVE THE STATED REPORTING LIMIT

PREPARED BY: ckj  
DATE: 12/3/93

APPROVED BY: AMC  
DATE: 12/7/93

K PRIME, INC.  
LABORATORY REPORT

SAMPLE ID: 9311301630  
LAB NO: 4322

METHOD: VOLATILE ORGANIC COMPOUNDS  
REFERENCE: EPA 8240/624  
OUR PROJECT: 9240  
YOUR PROJECT: 48016.17

SAMPLE TYPE: WATER  
DATE SAMPLED: 11/30/93  
TIME SAMPLED: 16:30  
DATE ANALYZED: 12/1/93

UNITS: µg/L

COMPOUND NAME	CAS NO.	REPORTING LIMIT	SAMPLE CONC
CHLOROMETHANE	74-87-3	10	ND
VINYL CHLORIDE	75-01-4	10	ND
BROMOMETHANE	74-83-9	10	ND
CHLOROETHANE	75-00-3	10	ND
TRICHLOROFLUOROMETHANE	75-69-4	5.0	ND
TRICHLOROTRIFLUOROETHANE	76-13-1	5.0	ND
ACETONE	67-64-1	20	ND
1,1-DICHLOROETHENE	75-35-4	5.0	ND
CARBON DISULFIDE	75-15-0	5.0	ND
METHYLENE CHLORIDE	75-09-2	5.0	ND
TRANS-1,2-DICHLOROETHENE	156-60-5	5.0	ND
1,1-DICHLOROETHANE	75-34-3	5.0	ND
VINYL ACETATE	108-05-4	10	ND
CIS-1,2-DICHLOROETHENE	156-59-2	5.0	ND
2-BUTANONE	78-93-3	20	ND
CHLOROFORM	67-66-3	5.0	127
1,1,1-TRICHLOROETHANE	71-55-6	5.0	ND
CARBON TETRACHLORIDE	56-23-5	5.0	ND
1,2-DICHLOROETHANE	107-06-2	5.0	ND
BENZENE	71-43-2	5.0	ND
TRICHLOROETHENE	79-01-6	5.0	ND
1,2-DICHLOROPROPANE	78-87-5	5.0	ND
BROMODICHLOROMETHANE	75-27-4	5.0	9.3
2-CHLOROETHYL VINYL ETHER	110-75-8	5.0	ND
TRANS-1,3-DICHLOROPROPENE	10061-02-6	5.0	ND
4-METHYL-2-PENTANONE	108-10-1	10	ND
TOLUENE	108-88-3	5.0	ND
CIS-1,3-DICHLOROPROPENE	10061-01-5	5.0	ND
1,1,2-TRICHLOROETHANE	79-00-5	5.0	ND
TETRACHLOROETHENE	127-18-4	5.0	ND
2-HEXANONE	591-78-6	10	ND

K PRIME, INC.  
LABORATORY REPORT

SAMPLE ID: 9311301630  
LAB NO: 4322

METHOD: VOLATILE ORGANIC COMPOUNDS  
REFERENCE: EPA 8240/624  
OUR PROJECT: 9240  
YOUR PROJECT: 48016.17

SAMPLE TYPE: WATER  
DATE SAMPLED: 11/30/93  
TIME SAMPLED: 16:30  
DATE ANALYZED: 12/1/93

UNITS: µg/L

COMPOUND NAME	CAS NO.	REPORTING LIMIT	SAMPLE CONC
DIBROMOCHLOROMETHANE	124-48-1	5.0	ND
CHLOROBENZENE	108-90-7	5.0	ND
ETHYLBENZENE	100-41-4	5.0	ND
XYLENE (M+P)	1330-20-7	5.0	ND
XYLENE (O)	1330-20-7	5.0	ND
STYRENE	100-42-5	5.0	ND
BROMOFORM	75-25-2	5.0	ND
1,1,2,2-TETRACHLOROETHANE	79-34-5	5.0	ND
1,3-DICHLOROBENZENE	541-73-1	5.0	ND
1,4-DICHLOROBENZENE	106-46-7	5.0	ND
1,2-DICHLOROBENZENE	95-50-1	5.0	ND

NOTES:

ND - NOT DETECTED ABOVE THE STATED REPORTING LIMIT

PREPARED BY: ckj

DATE: 12/3/93

APPROVED BY: RAK

DATE: 12/7/93

**APPENDIX D**  
**WATER SAMPLING FORMS**



WATER SAMPLING FIELD SURVEY FORM

Job No. 48016-17 Site: LINCOLN Arcade Date: 11-30-93

Well No. MW-2 Sampling Team: SCOTT NELSON

Sampling Method: DISPOSABLE BAILEY

Field Conditions: SUNNY, COOL

Describe equipment D-Con before sampling well: WASH, RINSE, RINSE, NEW POLY. BAILEY.

Total depth of well: 50.0 feet

Depth to water before pumping: 36.19 feet Time: 1102

	Diameter				
	2-in	4-in.			
	(Purge Factors)				
Height of Water Column: <u>13.81</u> feet	*0.16	0.65	=	<u>2.2</u> gal.	* <u>3</u> = <u>6.6</u>

Depth purging from: 36-38 Time purging begins: 1120

Time	Volume Purged (In Gallons)	pH (Units)	Conductivity (umhos/cm@ 25°C)	T (°F)	% Dissolved O2	Notes
<u>1120</u>	<u>0</u>	<u>11.0</u>	<u>4.94 x 100 μS</u>	<u>65.6</u>		
<u>1130</u>	<u>3</u>	<u>8.4</u>	<u>4.70</u>	<u>62.9</u>		
<u>1136</u>	<u>3.5</u>	<u>8.05</u>	<u>4.76</u>	<u>64.1</u>		
<u>1143</u>	<u>5</u>	<u>8.7</u>	<u>5.26</u>	<u>63.8</u>		
<u>1145</u>	<u>7</u>	<u>8.0</u>	<u>5.12</u> ✓	<u>64.3</u>		

SAMPLE # 9311301145





### WATER SAMPLING FIELD SURVEY FORM

Job No. 49016.17 Site: Livermore Arcade Date: 11-30-93

Well No. MW-5 Sampling Team: SCOTT NELSON

Sampling Method: DISPOSABLE BAILER

Field Conditions: WARM, SUNNY

Describe equipment D-Con before sampling well: WASH, RINSE, RINSE  
NEW POLY BAILER

Total depth of well: 50.25 feet

Depth to water before pumping: 38.55 feet Time: 1210

	Diameter				
	2-in	4-in			
	(Purge Factors)	(Purge Factors)			
Height of Water Column: <u>11.70</u> feet	*0.16	0.65	=	<u>7.6</u> gal.	+ <u>3</u> = <u>22.8</u>

Depth purging from: ~38 Time purging begins: 1210

Time	Volume Purged (In Gallons)	pH (Units)	Conductivity (umhos/cm @ 25 °C)	T (°C)	% Dissolved O2	Notes
<u>1210</u>	<u>0</u>	<u>6.3</u>	<u>6.68 x 100 μS</u>	<u>65.4</u>		
<u>1215</u>	<u>5</u>	<u>6.95</u>	<u>6.69</u>	<u>65.8</u>		
<u>1219</u>	<u>8</u>	<u>6.18</u>	<u>6.86</u>	<u>65.6</u>		
<u>1225</u>	<u>11</u>	<u>6.35</u>	<u>6.84</u>	<u>65.1</u>		
<u>1230</u>	<u>16</u>	<u>6.85</u>	<u>6.50</u>	<u>65.0</u>		
<u>1245</u>	<u>27</u>	<u>6.9</u>	<u>6.11</u>	<u>66.3</u>		

sample # 921130245



WATER SAMPLING FIELD SURVEY FORM

Job No. 48016.17 Site: Livermore Arcade Date: 11-30-93

Well No. MW-7 Sampling Team: SCOTT NELSON

Sampling Method: DISPOSABLE BAILER

Field Conditions: WARM, SUNNY

Describe equipment D-Con before sampling well: WASH, RINSE, RINSE, NEW POLY BAILER

Total depth of well: 65.0 feet

Depth to water before pumping: 37.25 feet Time: 1300

	Diameter				
	2-in	4-in.			
	(Purge Factors)	(Purge Factors)			
Height of Water Column: <u>27.75</u> feet	*0.16	0.65	=	<u>18</u> gal.	* <u>3</u> = <u>54</u>

Depth purging from: ~27 Time purging begins: 1300

Time	Volume Purged (In Gallons)	pH (Units)	Conductivity (umhos/cm @ 25 °C)	T (°C)	% Dissolved O2	Notes
<u>1300</u>	<u>0</u>	<u>5.7</u>	<u>5.23 x 100</u> $\mu$ S	<u>63</u>		
<u>1310</u>	<u>10</u>	<u>5.76</u>	<u>5.85</u>	<u>62.7</u>		
<u>1315</u>	<u>13</u>	<u>5.90</u>	<u>5.68</u>	<u>60.7</u>		
<u>1322</u>	<u>25</u>	<u>5.82</u>	<u>5.60</u>	<u>60.3</u>		
<u>1330</u>	<u>33</u>	<u>6.02</u>	<u>5.65</u>	<u>61.1</u>		
<u>1338</u>	<u>53</u>	<u>6.11</u>	<u>5.41</u>	<u>62.0</u>		

Sample # 451101833



WATER SAMPLING FIELD SURVEY FORM

Job No. 48016.17 Site: Livermore Arcade Date: 11-30-93

Well No. MN-6 Sampling Team: SCOTT NELSON

Sampling Method: DISPOSABLE BAILER

Field Conditions: WARM, SUNNY

Describe equipment D-Con before sampling well: WASH, RINSE, RINSE  
NEW POLY BAILER

Total depth of well: 50.0 feet

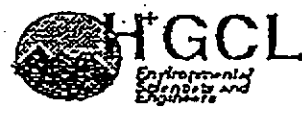
Depth to water before pumping: 37.38 feet Time: 1450

	Diameter				
	2-in	4-in.			
	(Purge Factors)				
Height of Water Column: <u>12.62</u> feet	*0.16	0.65	=	<u>8.2</u> gal.	* <u>3</u> = <u>24.6</u>

Depth purging from: ~37 Time purging begins: 1450

Time	Volume Purged (In Gallons)	pH (Units)	Conductivity (umhos/cm @ 25°C)	T (°F)	% Dissolved O2	Notes
<u>1450</u>	<u>0</u>	<u>6.58</u>	<u>2.77 x 10<sup>3</sup> uS</u>	<u>63.8</u>		
<u>1500</u>	<u>5</u>	<u>6.60</u>	<u>2.75</u>	<u>63.8</u>		
<u>1505</u>	<u>10</u>	<u>6.20</u>	<u>2.87</u>	<u>65.2</u>		
<u>1510</u>	<u>16</u>	<u>6.50</u>	<u>3.30</u>	<u>67.6</u>		
<u>1520</u>	<u>25</u>	<u>6.55</u>	<u>3.11</u>	<u>67.8</u>		

sampled @ 931130 1520



WATER SAMPLING FIELD SURVEY FORM

Job No. 48016-17 Site: LIVERMORE Arcadia Date: 11-30-93

Well No. MW-4 Sampling Team: Scott Nelson

Sampling Method: Disposable Bailer

Field Conditions: SUNNY, WARM

Describe equipment D-Con before sampling well: WASH, RINSE, RINSE  
new poly bailer

Total depth of well: 58.0 feet

Depth to water before pumping: 35.63 feet Time: 1550

	Diameter				
	2-in	4-in			
	(Purge Factors)			Volume	Purge Factor
Height of Water Column: <u>22.37</u> feet				= <u>14.5</u> gal.	* <u>3</u>
	0.16	0.65			= <u>43.6</u>

Depth purging from: ~22.0 Time purging begins: 1530

Time	Volume Purged (In Gallons)	pH (Units)	Conductivity (umhos/cm @ 25°C)	T (°C)	% Dissolved O2	Notes
<u>1530</u>	<u>0</u>	<u>5.89</u>	<u>5.0 X 100 μS</u>	<u>61.5</u>		
<u>1535</u>	<u>5</u>	<u>5.72</u>	<u>4.85</u>	<u>63.2</u>		
<u>1541</u>	<u>12</u>	<u>5.9</u>	<u>5.60</u>	<u>64.3</u>		
<u>1545</u>	<u>18</u>	<u>5.9</u>	<u>5.97</u>	<u>63.9</u>		
<u>1550</u>	<u>25</u>	<u>6.0</u>	<u>5.84</u>	<u>64.0</u>		
<u>1555</u>	<u>35</u>	<u>5.8</u>	<u>5.35</u>	<u>62.6</u>		
<u>1600</u>	<u>45</u>	<u>6.1</u>	<u>5.13</u>	<u>63.5</u>		

Sampled # 931130150