



# HydroSolutions of California, Inc.

P.O. Box 922 • 13975 Wings of Morning  
Nevada City, California 95959  
(916) 478-1260 • Fax (916) 478-1264

October 23, 1996

STIP 4987

Susan Hugo  
Alameda County Department of Environmental Health  
1131 Harbor Bay Parkway  
Alameda, California 94502-6577

**SUBJECT: QUARTERLY PROGRESS & GROUNDWATER  
MONITORING REPORT (OCTOBER 1996)  
4800 SAN PABLO AVENUE  
EMERYVILLE, CALIFORNIA**

RRSP: 96286-06-39

Dear Susan:

As requested by the County (correspondence dated February 7, 1996), HydroSolutions of California, Inc. (HSCI) submits this fourth quarterly progress report of activities conducted on behalf of the City of Emeryville Redevelopment Agency. This groundwater monitoring program was initiated for the purpose of: 1) evaluating trends in TPH-G, BTXE, TPH-D and motor oil concentrations through time, 2) observing potential petroleum migration in groundwater and 3) monitoring dissolved oxygen and sulfate seasonal variability.

#### **STATUS OF INVESTIGATION**

HSCI submitted a draft copy of a request to establish a containment zone to the County two quarters ago. HSCI was informed by the County that the submittal will be reviewed after four quarters of monitoring are completed. This quarterly report represents four quarters of groundwater monitoring.

The October 1996 water sampling event (three groundwater monitoring wells [WB-8, WB-9, WB-14]) was completed on October 2, 1996. This quarterly report includes a summary of groundwater data to date.

#### **PROPOSED ACTIVITIES**

Emeryville Redevelopment Agency awaits a response from the County regarding the draft request for closure submitted March 22, 1996.

Page 2 of 4  
HydroSolutions of California, Inc.  
RRSP: 96286-06-39  
October 23, 1996

No quarterly groundwater monitoring is scheduled for January 1996.

**TIME SCHEDULES**

Not applicable. Awaiting County response.

**METHOD OF CLEANUP**

Containment zone. *RISK MANAGEMENT PLAN*

**METHOD AND LOCATION OF DISPOSAL OF RELEASED HAZARDOUS SUBSTANCES**

Purged groundwater is being placed in one 55-gallon drum.

**MANIFESTS**

None since January 1996.

**MONITOR WELL DATA**

Table 1 illustrates well data including; 1) well designation, 2) total depth, 3) screened interval, 4) sample date, 5) depth to groundwater, 6) target constituent concentrations and 7) comments.

A figure illustrating the relative groundwater elevation and direction of slope is included.

Lastly, six graphs have been prepared for your use: 1) water level (depth to groundwater) at WB-8, WB-9 and WB-14 versus time, 2) BTXE concentrations versus time at WB-8 (central area of plume), WB-9 (down-gradient area of plume) and WB-14 (perched groundwater condition).

**GROUNDWATER ELEVATION DATA**

Table 1 illustrates groundwater elevation data. Based on measurements collected during the last four quarters, ground water table slopes to the north. Hydrograph, WB-8, depicts a rising trend in groundwater table elevation versus no apparent trend in WB-9 and WB-14. This interpretation of trend is based on graphics only.

**TRENDS**

Concentration data was analyzed by graphic methods only. Due to limitations of data base size, nonparametric statistics were not applied.

Generally, concentrations of BTXE and TPH-G have been less than 3 mg/l (ppm) during the last year of monitoring. Due to no

Page 3 of 4  
HydroSolutions of California, Inc.  
RRSP: 96286-06-39  
October 23, 1996

detectable TPH-G, TPH-D and motor oil in WB-12 and WB-7, these wells were removed from the sampling program. Nondetectable levels of TPH-D and motor oil have also been reported for WB-8 and WB-14. Based on four quarters of groundwater data, the contaminants of concern include BTXE and TPH-G.

Groundwater from WB-8 appears to display a decreasing trend during the last four quarters. BTXE concentrations are lower in WB-8 (6 ug/l or less) and generally have diminished to less than 2 ug/l. In light of an apparent increase in water table elevation, concentrations appear to diminish. This is contrary to typical contaminant mobilization trends in rising water table conditions. Groundwater quality is improving as a result of dispersion, sorption, diffusion and biodegradation. Individual contributions of each mechanism is not possible with available data.

Monitor well, WB-9, BTXE concentrations have been less than 11 ug/l with exception to the July 1996 sampling event. Concentrations of ethylbenzene during July rose from 3 ug/l to 153 ug/l. Benzene and xylene had similar increases. Toluene concentrations increased the least. No trend in BTXE is noted in WB-9 data during the last year.

Monitor well, WB-14, data suggests an increase during the October 1996 sampling event. Prior to October, levels of BTXE have been less than 6 ug/l. A possible increasing trend is noted during the last year.

#### MIGRATION

Monitor well, WB-9, continues to contain detectable levels of BTXE and TPH however concentrations are less than 3 mg/l (ppm). Due to the location of this well along the down-gradient portion of the plume and subject property and intermittent elevated dissolved oxygen (DO) levels, it is likely that low levels of BTXE which migrate down-gradient encounter aquifer zones containing significant levels of DO. Intrinsic bioremediation occurs under these conditions.

#### ELECTRON ACCEPTOR VARIABILITY

DO concentrations vary depending on the time of year. Generally, DO levels are elevated during the rainy season (January through April) and diminish during the drier seasons (July through October). Background DO concentration was noted during the October sampling event to be 3.9 mg/l (WB-12). DO levels in WB-8 and WB-9 were 0.3 mg/l and 0.4 mg/l. Reduction in DO within the

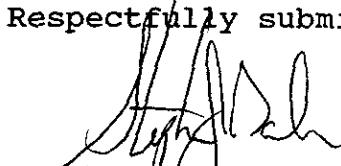
Page 4 of 4  
HydroSolutions of California, Inc.  
RRSP: 96286-06-39  
October 23, 1996

contaminated zone as compared to background is evidence that aerobic degradation occurs and becomes limited by the supply of oxygen in the aquifer.

Sulfate levels appear to vary erratically during the year. No explanation for this condition is available.

If you have questions, comments or require modification of future progress reports, please contact me.

Respectfully submitted,



Stephen J. Baker  
Registered Geologist (No. 4354)  
Registered Hydrogeologist (No. 181)

Attachment:

- Laboratory data results
- Chain-of-custody
- BTXE Concentration vs Time at WB-8
- BTXE Concentration vs Time at WB-9
- BTXE Concentration vs Time at WB-14
- Depth to Groundwater vs Time at WB-8
- Depth to Groundwater vs Time at WB-9
- Depth to Groundwater vs Time at WB-14
- Table 1. Monitor Well Data
- Groundwater Elevation Map

cc: Maryann Leshin, City of Emeryville Redevelopment Agency

TABLE 1. MONITOR WELL DATA  
 4800 SAN PABLO AVENUE, EMERYVILLE, CALIFORNIA  
 JULY 16, 1996

WELL DESIGNATION	WB-8	WB-9	WB-14	WB-12	WB-7
TOTAL DEPTH	31	31	11	31	31
SCREENED INTERVAL	20-30	20-30	7-12	20-30	20-30
SAMPLE DATE	<del>6-20-94</del>				
DEPTH TO WATER	10.87	13.48	7.00	10.40	9.62
GROUNDWATER ELEVATION	83.45	80.42	87.42	84.16	83.95
TPH-G	<del>230</del>	<del>270</del>	<del>1900</del>	ND	ND
TPHR	ND	ND	1100	1700	ND
BENZENE	<del>0.2</del>	<del>2.8</del>	<del>65</del>	ND	ND
TOLUENE	1	1.3	3.2	ND	ND
XYLENE	ND	ND	10	ND	ND
ETHYLBENZENE	0.6	ND	ND	ND	ND
SAMPLE DATE	<del>7-11-96</del>				
DEPTH TO WATER	10.08	12.67	6.52	9.85	8.88
GROUNDWATER ELEVATION	84.24	81.23	87.90	84.71	84.69
TPH-G	<del>230</del>	<del>300</del>	<del>220</del>	ND	ND
TPH-D	ND	-	ND	ND	-
TPH-motor oil	-	-	-	ND	-
TPHR	160000	-	6900	-	-
BENZENE	<del>2</del>	<del>10</del>	<del>3.2</del>	ND	ND
TOLUENE	ND	1.1	ND	ND	ND
XYLENE	2	4.4	1.4	ND	ND
ETHYLBENZENE	5.5	9.6	0.8	ND	ND
DISSOLVED OXYGEN	2.4	3.0	0.6	1.4	1.4
SULFATE	8	12	160	35	40
SAMPLE DATE	<del>7-05-96</del>				
DEPTH TO WATER	10.87	13.48	7.00	9.79	7.98
GROUNDWATER ELEVATION	85.04	82.02	88.78	84.77	85.59
TPH-G	<del>200</del>	<del>420</del>	<del>130</del>		
TPH-D	ND	---	ND		
TPH-motor oil	ND	---	ND		
BENZENE	<del>0.5</del>	<del>11</del>	<del>1.9</del>		
TOLUENE	ND	ND	ND		
XYLENE	0.9	11	1.4		
ETHYLBENZENE	1.6	3.0	ND		
DISSOLVED OXYGEN	3.1	2.4	0.9		
SULFATE	10	44	2		

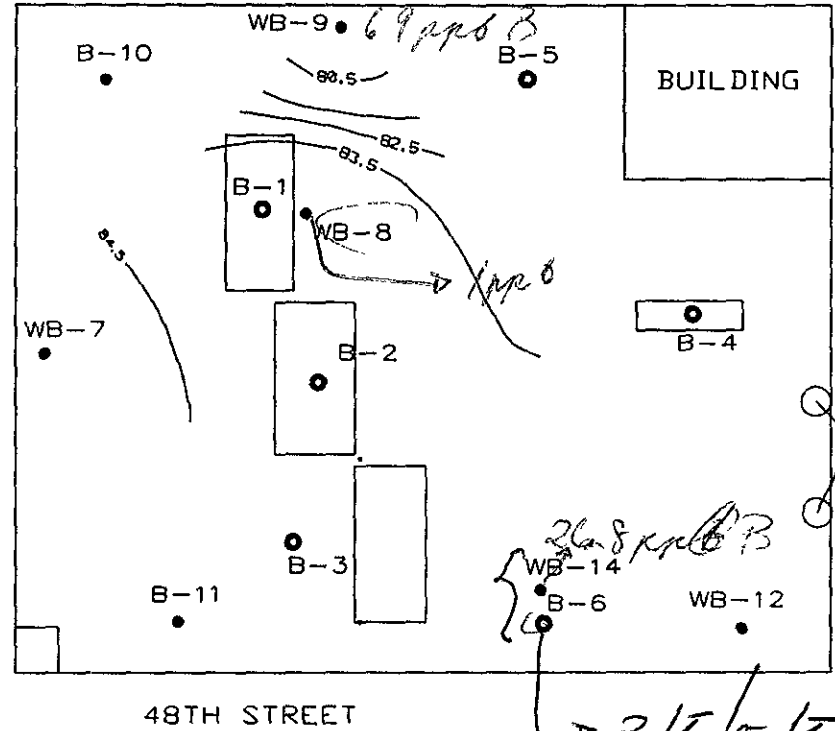
TABLE 1. MONITOR WELL DATA (CONTINUED)  
 4800 SAN PABLO AVENUE, EMERYVILLE, CALIFORNIA  
 JULY 16, 1996

WELL DESIGNATION	WB-8	WB-9	WB-14	WB-12	WB-7
TOTAL DEPTH	31	31	11	31	31
SCREENED INTERVAL	20-30	20-30	7-12	20-30	20-30
SAMPLE DATE	7-03-96				
DEPTH TO WATER	9.62	12.70	6.58	9.50	8.21
GROUNDWATER ELEVATION	84.70	81.20	87.84	85.06	85.36
TPH-G	<del>289</del>	<del>2930</del>	<del>71</del>		
TPH-D	ND	---	ND		
TPH-motor oil	ND	---	ND		
BENZENE	<del>2.6</del>	<del>62.5</del>	<del>0.8</del>		
TOLUENE	0.6	4.0	ND		
XYLENE	0.7	131	ND		
ETHYLBENZENE	ND	153	ND		
DISSOLVED OXYGEN	1.8	<0.2	3.4		
SULFATE	12	<1	4		
SAMPLE DATE	10-02-96				
DEPTH TO WATER	10.32	13.51	7.49	10.42	8.86
GROUNDWATER ELEVATION	84.00	880.39	87.07	84.00	84.71
TPH-G	<del>56</del>	<del>250</del>	<del>415</del>		
TPH-D	ND	---	ND		
TPH-motor oil	ND	---	ND		
BENZENE	<del>1.0</del>	<del>6.4</del>	<del>26.8</del>		
TOLUENE	ND	ND	ND		
XYLENE	ND	1.0	2.7		
ETHYLBENZENE	ND	1.5	ND		
DISSOLVED OXYGEN	0.4	0.3	0.3		
SULFATE	24	29	<4		

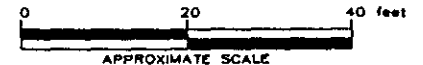
- Results reported in ug/l.
- NA means is not applicable or no data generated
- ND means nondetectable
- Petroleum analysis completed by Excelchem Environmental Labs during last three quarterly groundwater sampling events
- TPH-G reported in ug/l (ppb). Analyzed by EPA Method 5030 purge and trap. Detectable limit is 50 ug/l.
- Benzene, toluene, xylene, and ethylbenzene reported in ug/l (ppb). Analyzed by EPA Method 602. Detectable limit is 0.5 ug/l.
- TPH-D analyzed by EPA Method 3510 followed by modified EPA Method 8015 with direct sample injection into a GC equipped with a FID detector. Detectable limit is 0.050 ug/l.
- TPH-motor oil analyzed by extraction using EPA Method 3510 followed by modified EPA Method 8015 with direct sample injection into a GC equipped with a FID. Detectable limit is 500 ug/l.
- TPHR analyzed by Modified EPA Method 418.1. Detectable limit is 10 mg/l.

# EXPLANATION

- B-5 BORING
- WB-7 GROUNDWATER MONITOR WELL
- 80 GROUNDWATER TABLE CONTOUR LINE AND RELATIVE ELEVATION (FT)



LAMP POSTS



**NOTES:**

Exploratory drilling completed December 23, 1993 and June 16-17, 1994.

A Geoprobe system was used as the coring device for B-1 through B-6. A hollow stem augur was utilized for WB-7 through B-13.

Groundwater was encountered in boring, B-6, at 8.5 feet. Borings, B-1 through B-5 did not penetrate groundwater.

Ground water monitoring wells designated as WB-\_\_\_\_. All wells except WB-14 are 30 feet deep, perforated between the 20 and 30 foot depths, gravel pack to 18 foot depth and grouted to the ground surface. A locking well head is constructed at grade for each well.

Well, WB-14, is 12 feet in depth, perforated between 7 and 12 feet, gravel packed to a 5 foot depth and grouted to the ground surface.

Ground water level elevations are relative elevations.

Borings, WB-7 through B-13, were surveyed with a transit and rod.

Groundwater contour lines calculated by inverse distance method. Data includes WB-7,8,9 and 12.

Water level measurements collected October 2, 1996.

*Handwritten note:* 3 ft / 5 ft



HydroSolutions of California, Inc.

P.O. Box 922  
Nevada City, California 95959  
(916) 478-1260

Title: **GROUNDWATER TABLE MAP**

Site: 4800 SAN PABLO AVENUE  
EMERYVILLE, CALIFORNIA

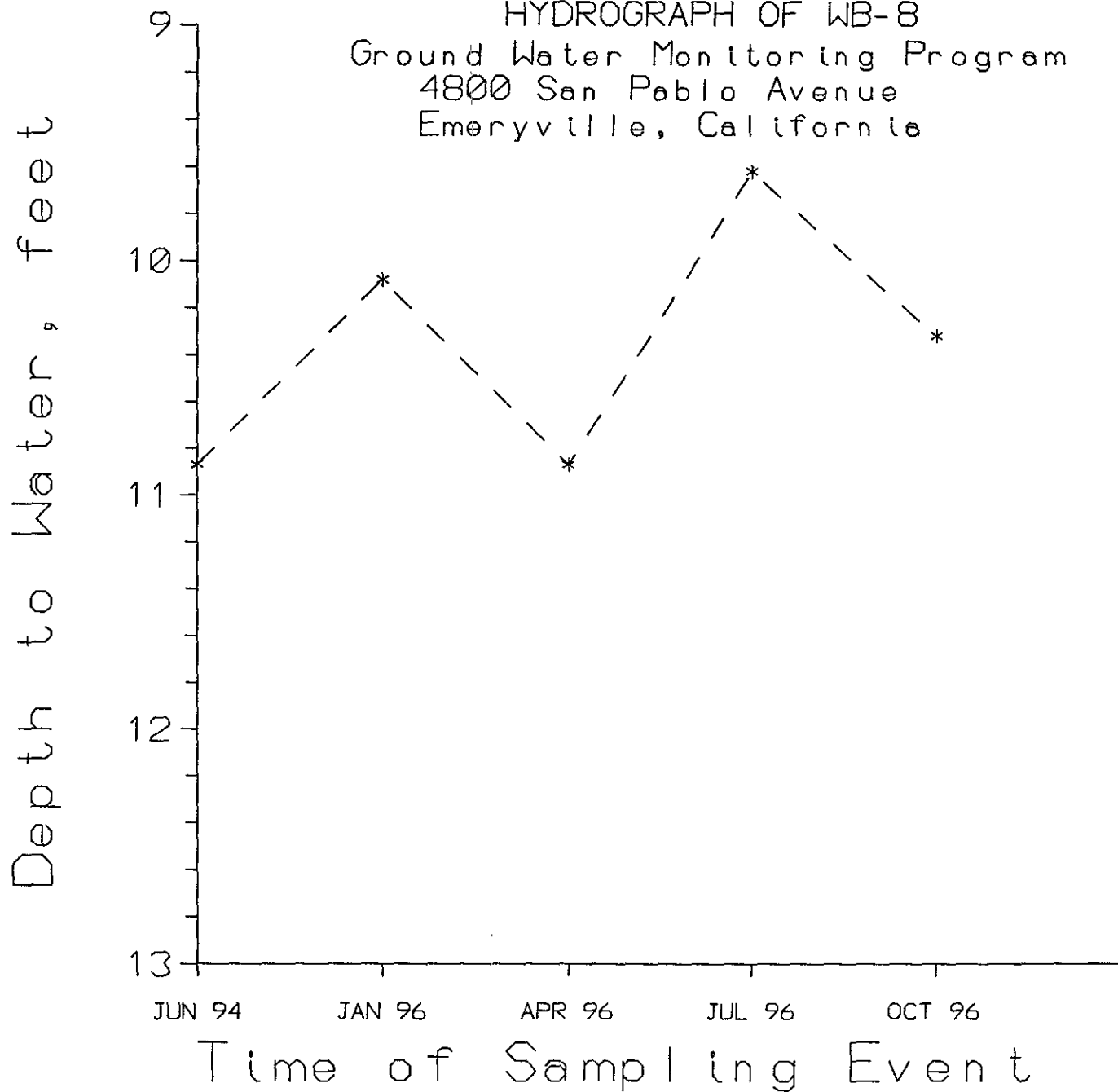
Project Number  
96286

Date  
10-02-96

Scale  
AS SHOWN

FIGURE

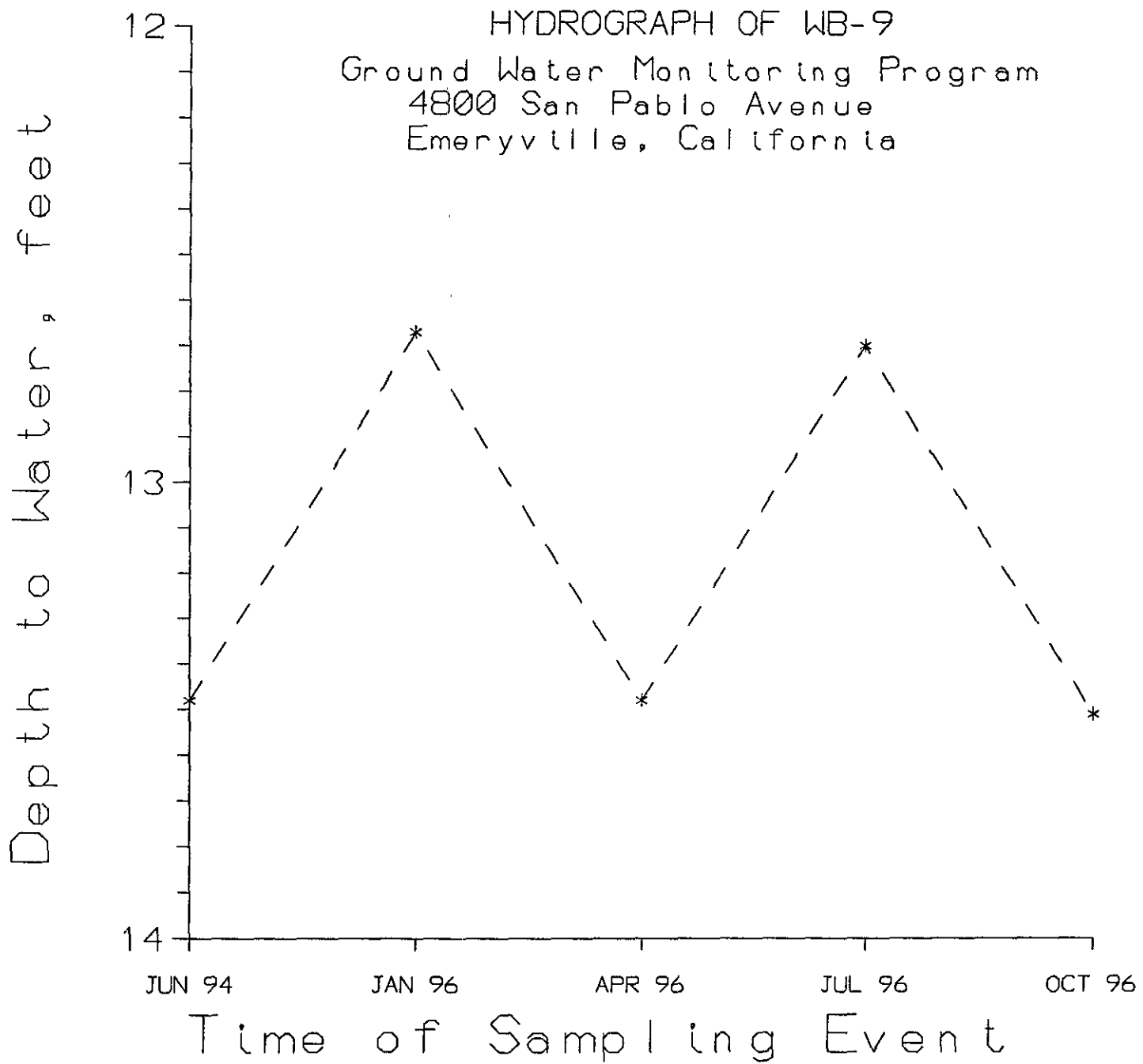
HYDROGRAPH OF WB-8  
Ground Water Monitoring Program  
4800 San Pablo Avenue  
Emeryville, California



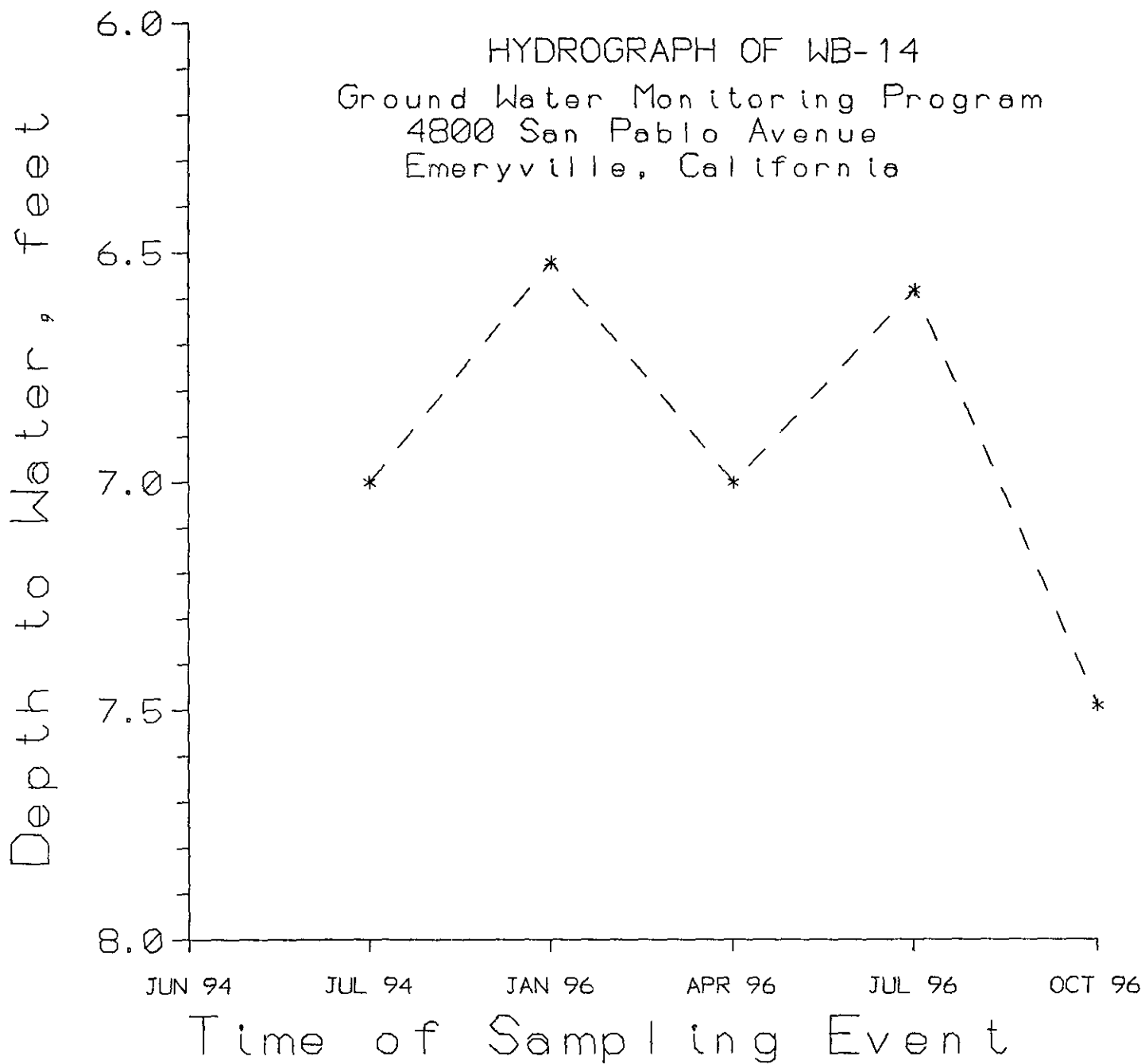


HYDROGRAPH OF WB-9

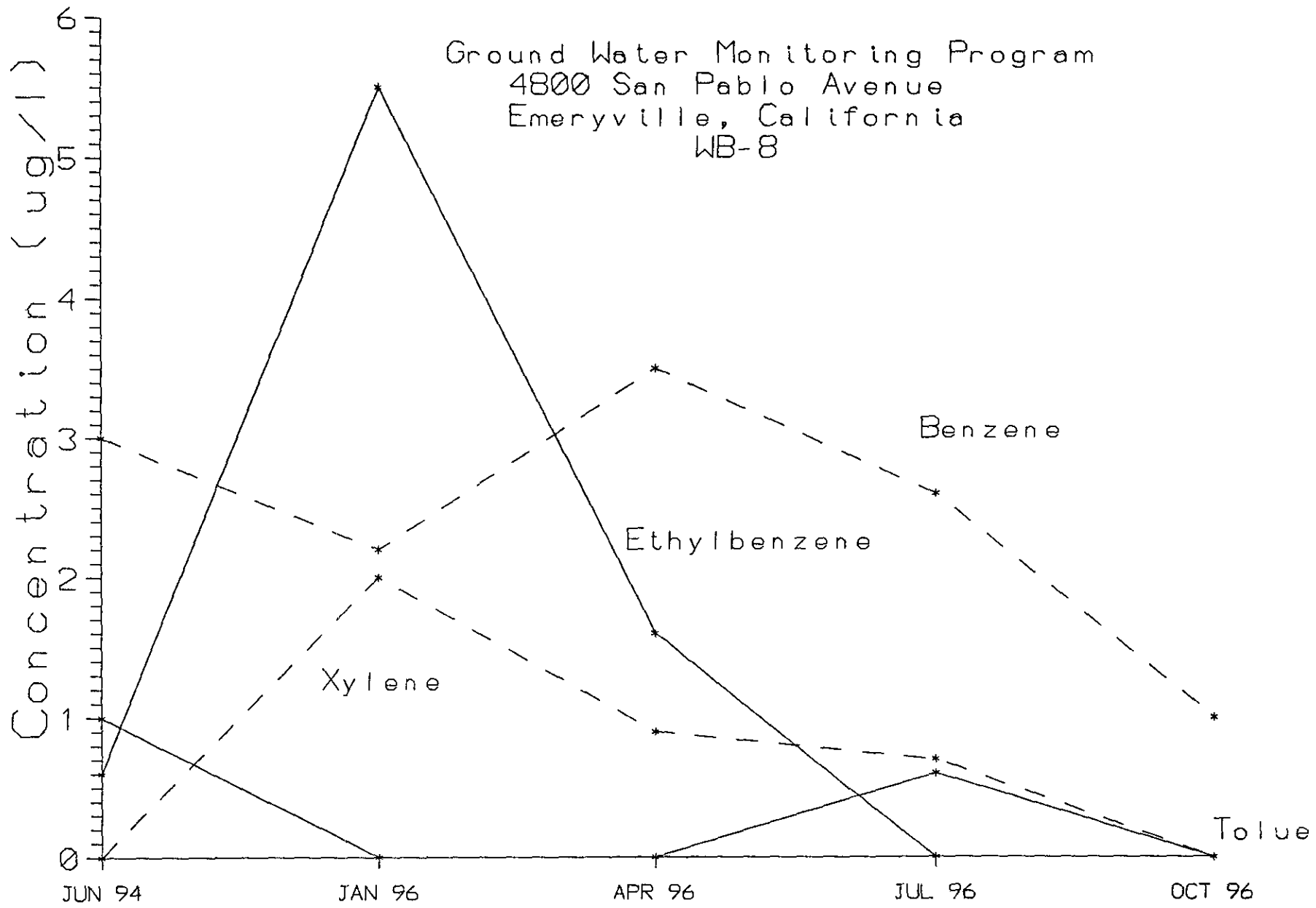
Ground Water Monitoring Program  
4800 San Pablo Avenue  
Emeryville, California



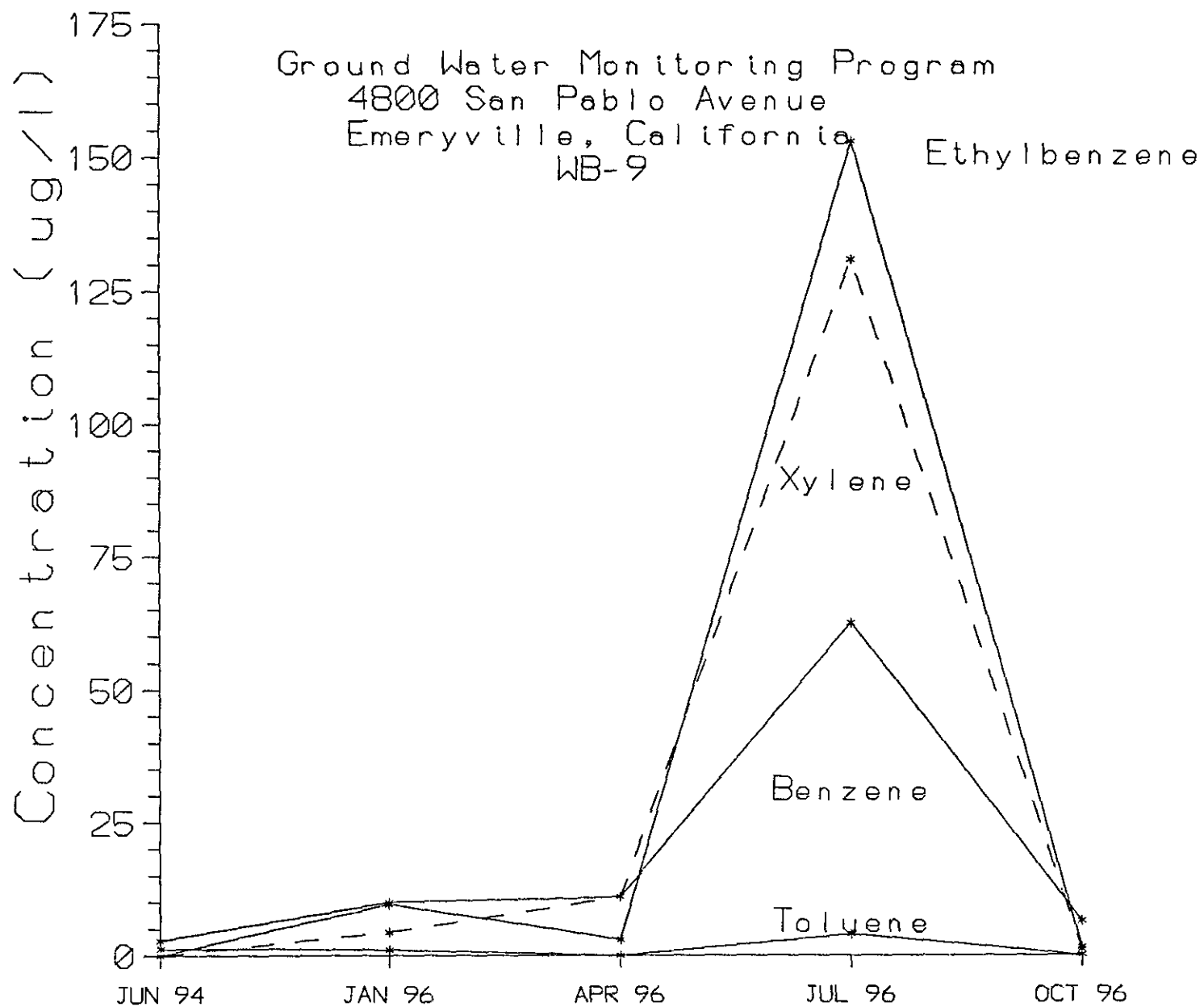
HYDROGRAPH OF WB-14  
Ground Water Monitoring Program  
4800 San Pablo Avenue  
Emeryville, California



Ground Water Monitoring Program  
4800 San Pablo Avenue  
Emeryville, California  
WB-8

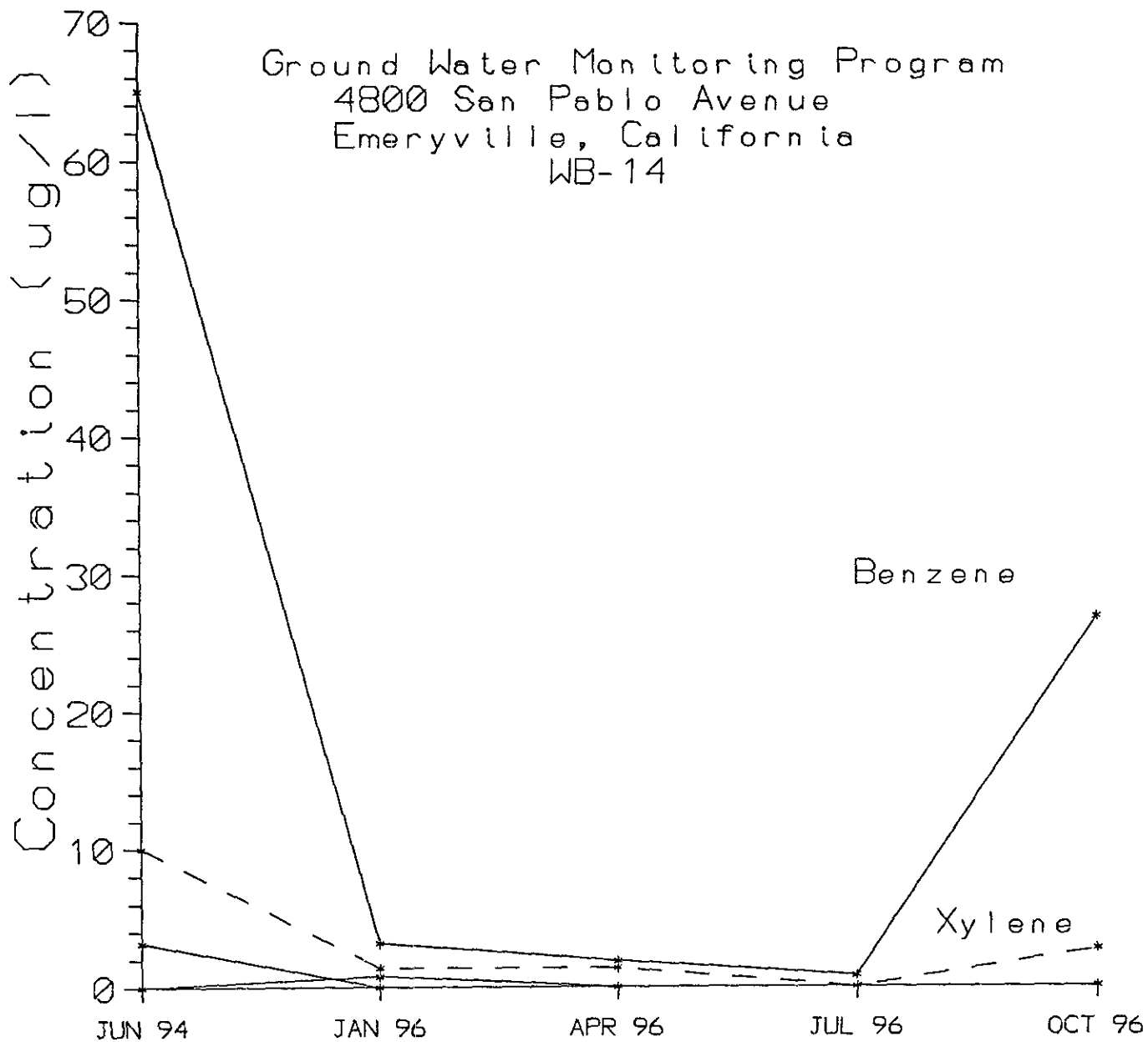


Time of Sampling Event



Time of Sampling Event

Ground Water Monitoring Program  
4800 San Pablo Avenue  
Emeryville, California  
WB-14

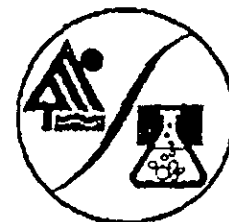


Time of Sampling Event

**EXCELCHEM  
ENVIRONMENTAL LABS**

500 Giuseppe Court, Suite 9  
Roseville, CA 95678

Phone#: (916) 773-3664 Fax#: (916) 773-4784



**ANALYSIS REPORT**

Attention:	Mr. Steve Baker	Date Sampled:	10-02-96
	HydroSolutions of CA, Inc.	Date Received:	10-02-96
	P.O. Box 922	BTEX Analyzed:	10-09-96
	Nevada City, CA 95959	TPHg Analyzed:	10-09-96
		Matrix:	Water
Project :	96286		

	Benzene	Toluene	Ethyl- benzene	Total Xylenes	TPHg
	<u>PPB</u>	<u>PPB</u>	<u>PPB</u>	<u>PPB</u>	<u>PPB</u>
Reporting Limit:	0.5	0.5	0.5	0.5	50

**SAMPLE**

Laboratory Identification:

WB-8 W1096063	1.0	ND	ND	ND	56
WB-9 W1096064	6.4	ND	1.5	1.0	250

ppb= Parts per billion = ug/l. = micrograms per liter

ND - Not detected. Compound(s) may be present at concentrations below the reporting limit

**ANALYTICAL PROCEDURES**

**BTEX**-- Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are analyzed by using EPA Method 602 which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID).

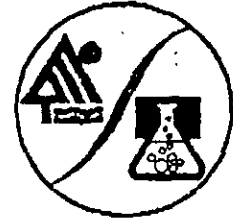
**TPHg**--Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are analyzed by using modified EPA Method 8015, which utilizes a GC equipped with an FID.

  
Laboratory Representative

10-14-96  
Date Reported

**EXCELCHEM  
ENVIRONMENTAL LABS**

500 Giuseppe Court, Suite 9  
Roseville, CA 95678  
Phone#: (916) 773-3664 Fax#: (916) 773-4784



**ANALYSIS REPORT**

Attention: Mr. Steve Baker  
HydroSolutions of CA, Inc.  
P.O. Box 922  
Nevada City, CA 95959

Date Sampled : 10-02-96  
Date Received: 10-02-96  
BTEX Analyzed: 10-09-96  
TPHg Analyzed: 10-09-96  
Matrix: Water

Project : 96286

	Benzene	Toluene	Ethyl- benzene	Total Xylenes	TPHg
	<u>PPB</u>	<u>PPB</u>	<u>PPB</u>	<u>PPB</u>	<u>PPB</u>
Reporting Limit:	5.0	5.0	5.0	5.0	500

**SAMPLE**

**Laboratory Identification:**

WB-14	26.8	ND	ND	2.7	415
W1096065					

ppb - Parts per billion = ug/L = micrograms per liter

ND - Not detected. Compound(s) may be present at concentrations below the reporting limit.

**ANALYTICAL PROCEDURES**

BTEX-- Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are analyzed by using EPA Method 602 which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID).

TPHg-- Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are analyzed by using modified EPA Method 8015, which utilizes a GC equipped with an FID.

  
Laboratory Representative

10-14-96  
Date Reported

**ANALYSIS REPORT**

Attention:	Mr. Steve Baker	Date Sampled:	10-02-96
	HydroSolutions of CA, Inc.	Date Received:	10-02-96
	P.O. Box 922	Date Analyzed:	10-08-96
	Nevada City, CA 95959	Matrix:	Water

Project : 96286

	TPHd
	PPB
<u>Reporting Limit:</u>	50

**SAMPLE**

**Laboratory Identification**

WB-8	ND
W1096063	

WB-14	ND
W1096065	

PPB = Parts per billion = ug/L = micrograms per Liter  
 ND = Not detected Compound(s) may be present at concentrations below the reporting limit.

**ANALYTICAL PROCEDURES**

TPHd-- Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are analyzed by using modified EPA Method 8015 which utilizes a GC equipped with an FID

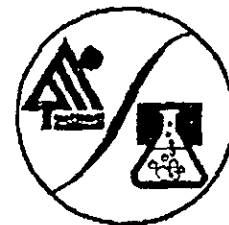
\_\_\_\_\_  
Laboratory Representative

10-14-96  
Date Reported



**EXCELCHEM  
ENVIRONMENTAL LABS**

500 Giuseppe Court, Suite 9  
Roseville, CA 95678  
Phone#: (916) 773-3664 Fax#: (916) 773-4784



**ANALYSIS REPORT**

Attention:	Mr. Steve Baker	Date Sampled:	10-02-96
	HydroSolutions of CA, Inc.	Date Received:	10-02-96
	P.O. Box 922	Date Analyzed:	10-08-96
	Nevada City, CA 95959	Matrix:	Water

Project : 96286

TPHo

PPB

500

Reporting Limit:

SAMPLE

Laboratory Identification

WB-8 ND  
W1096063

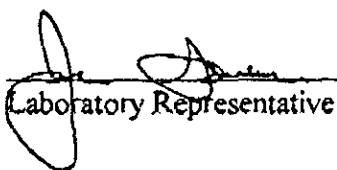
WB-14 ND  
W1096065

PPB = Parts per billion = ug/l. = micrograms per Liter

ND = Not detected. Compound(s) may be present at concentrations below the reporting limit

**ANALYTICAL PROCEDURES**

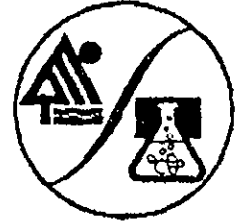
TPHo—Total petroleum hydrocarbons as oil (high boiling points) are measured by extraction using EPA Method 3510 followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID

  
Laboratory Representative

10-14-96  
Date Reported

**EXCELICHEM  
ENVIRONMENTAL LABS**

500 Giuseppe Court, Suite 9  
Roseville, CA 95678  
Phone#: (916) 773-3664 Fax#: (916) 773-4784



QA/QC REPORT

Attention: Mr. Steve Baker  
HydroSolutions of CA, Inc.  
P.O. Box 922  
Nevada City, CA 95959

Date Analyzed: 10-08-96  
Matrix: Water

Project : 96286

	TPHd PPB
Reporting Limit:	50
<hr/>	
QA/QC PARAMETER	

Matrix Blank	ND
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PERCENT RECOVERIES

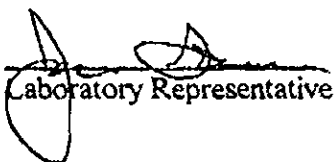
Laboratory Control Spike	87%
Laboratory Control Spike Duplicate	77%

ppb = parts per billion = ug/L = microgram per liter  
ND = Not detected. Compound(s) may be present at concentrations below the reporting limit.

Spikes & Spike Duplicates were each spiked with 5000 ug of diesel standard.

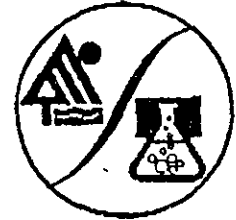
ANALYTICAL PROCEDURES

TPHd--Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3510, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID

  
Laboratory Representative

10-14-96  
Date Reported

**EXCELCHEM  
ENVIRONMENTAL LABS**



500 Giuseppe Court, Suite 9  
Roseville, CA 95678  
Phone#: (916) 773-3664 Fax#: (916) 773-4784

QA/QC REPORT

Attention: Mr. Steve Baker Date Analyzed: 10-09-96  
HydroSolutions of CA, Inc. Matrix: Water  
P.O. Box 922  
Nevada City, CA 95959

Project : 96286

	Benzene <u>PPB</u>	Toluene <u>PPB</u>	Ethyl- benzene <u>PPB</u>	Total Xylenes <u>PPB</u>
Reporting Limit:	0.5	0.5	0.5	0.5

QA/QC PARAMETER

Matrix Blank	ND	ND	ND	ND
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PERCENT RECOVERIES

Matrix Spike	100%	99%	97%	98%
Matrix Spike Duplicate	93%	92%	91%	92%

ppb = parts per billion = ug/L = microgram per liter  
ND ~ Not detected. Compound(s) may be present at concentrations below the reporting limit.

All surrogate recoveries were within 30% of target values.  
Spikes & Spike Duplicates were each spiked with 250 ng BTEX standard.

**ANALYTICAL PROCEDURES**

BTEX-- Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 602 which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID).

  
Laboratory Representative

10-14-96  
Date Reported

Phone - 478-1260

PROJECT NO.				ANALYSES							REMARKS (Sample preservation, handling procedure, etc.)		
SAMPLES (Signature)				Ground Water	Priority Pollutant Metals	EPA Method 826	EPA Method 875	EPA Method 838	THM-G	PVC		TPH-D, Ind. & O.	NUMBER OF CONTAINERS
DATE	TIME	SAMPLE NUMBER											
		96286											
S. Baker													
		10/29/95	WS-8	W1091063					X	X	X	3	
			WS-9	W1091064					X	X	X	2	
			WS-14	W1091065					X	X	X	3	
											(2) 40 ml VOA's (1) i l auto		
											Stand chilled		
											Standard furnished F results to 916-478-1264		
				TOTAL NUMBER OF CONTAINERS							8		
RELINQUISHED BY: (Signature)		DATE/TIME	RECEIVED BY: (Signature)		RELINQUISHED BY: (Signature)		DATE/TIME		RECEIVED BY: (Signature)				
S. Baker		10/29/95	Janet Taylor 10/02/96 5:2										
METHOD OF SHIPMENT:			SHIPPED BY: (Signature)		CARRIER: (Signature)		RECEIVED FOR LAB BY: (Signature)		DATE/TIME				