HAGEMAN-AGUIAR, INC.
Underground Contamination Investigations, Groundwater Consultants, Environmental Engineering

1211

REPORT OF
QUARTERLY GROUNDWATER SAMPLING

(sampled July 16, 1993)

PACIFIC CRYOGENIC COMPANY
2311 Magnolia Street
Oakland, CA

August 2, 1993

3732 Mt. Diablo Blvd. Suite 372 Lafayette, California 94549 (510) 284-1661 FAX (510) 284-1664

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I. INTRODUCTION

The subject site is the historical location of Pacific Cryogenic Company at 2311 Magnolia Street, Oakland, California. The location of the site is shown on Figure 1 (site location map).

On June 30 and July 12, 1989, Geo-Environmental Technology removed three underground storage tanks from the subject site: one 8,000-gallon underground Diesel tank, one 1,000-gallon underground Gasoline tank, and one 550-gallon underground Waste Oil tank.

Due to the detection of subsurface contamination in the vicinity of the Gasoline and Waste Oil tanks, shallow groundwater monitoring well MW-1 was installed by Geo-Environmental Technology at the previous tank locations (see Figure 2). The results of shallow groundwater sampling on October 26, 1990, indicated the presence of Diesel at a concentration of 5,400 µg/L, and Benzene, Toluene, Ethylbenzene, and Total Xylenes at concentrations of 1,200 µg/L, 18 µg/L, 7.1 µg/L, and 37 µg/L, respectively. Subsequent to the installation and sampling of monitoring well MW-1, two additional shallow groundwater monitoring wells were installed on the subject site (wells MW-2 and MW-3). No data regarding these well installations appear to be available at the present time.

On November 12, 1992, the underground piping running between the previous Gasoline and Waste Oil underground tanks and the previous dispenser pedestal were removed by Hageman-Aguiar, Inc. (see Figure 2). During the removal process, several

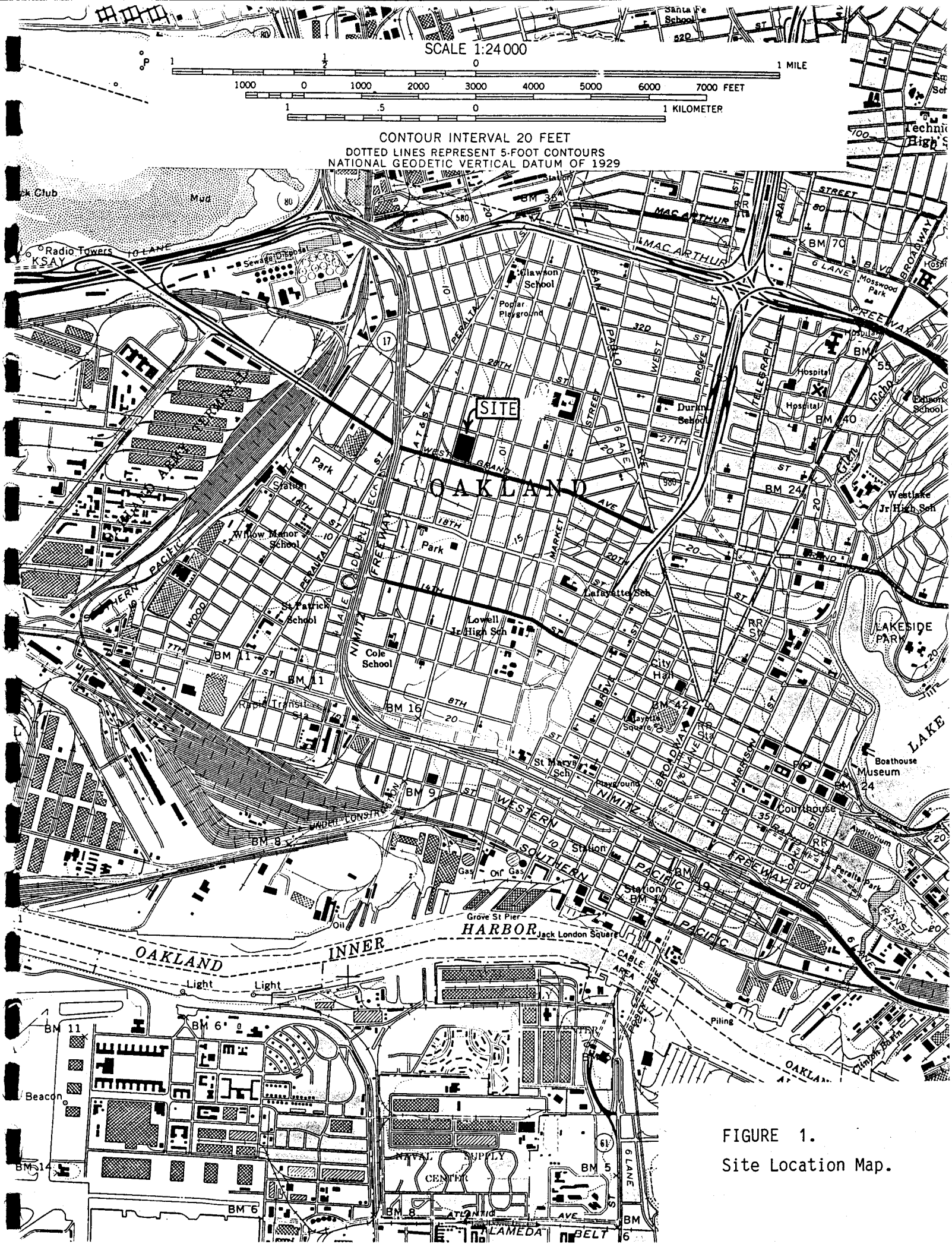


FIGURE 1.
Site Location Map.

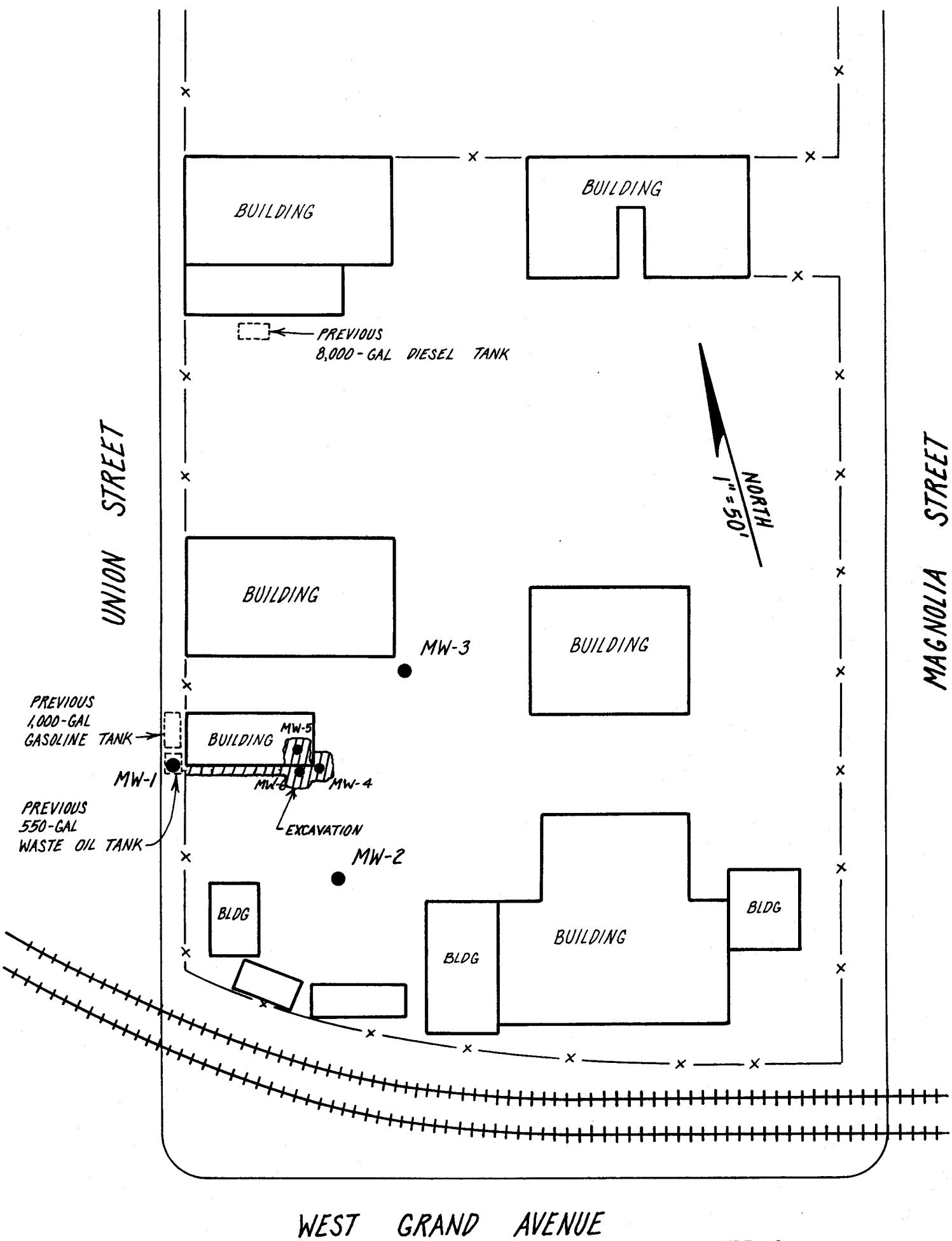


FIGURE 2.
Site Map.

holes were noted in both the waste oil and the gasoline underground pipelines. At one location, significant gasoline contamination was apparent in the soil (based upon odor and color).

Subsequent to the piping removal, additional excavation was conducted on November 18, 1992. The excavation extended to a depth of approximately 15 feet below ground surface and was conducted in order to mitigate the apparent subsurface gasoline contamination. Upon completion of the soil excavation on November 18, 1992, three excavation backfill wells were installed. The locations of these monitoring wells MW-4, MW-5 and MW-6 are shown in Figure 2.

On July 16, 1993, all on-site monitoring wells MW-1, MW-2 MW-3 and MW-4 were sampled for the laboratory analysis for dissolved petroleum constituents.

II. FIELD WORK

Monitoring Well Sampling

On July 16, 1993, groundwater samples were collected from monitoring wells MW-1, MW-2, MW-3, and MW-4. Prior to groundwater sampling, each well was purged by removing approximately 3 to 10 casing volumes of water. Field conductivity, temperature, and pH meters were present on-site during the monitoring well sampling. As the purging process proceeded, the three parameters were monitored. Purging continued until readings appeared to have reasonably stabilized. After the water level in the well had attained 80% or more of the original static water level, a groundwater sample was collected using a clean teflon bailer. The water sample was placed inside appropriate 40 mL VOA vials and 1 liter amber bottles free of any headspace. The samples were immediately placed on crushed ice, then transported under chain-of-custody to the laboratory at the end of the work day.

At the time each monitoring well was sampled, the following information was recorded in the field: 1) depth-to-water prior to purging, using an electrical well sounding tape, 2) identification of any floating product, sheen, or odor prior to purging, using a clear teflon bailer, 3) sample pH, 4) sample temperature, and 5) specific conductance of the sample.

Copies of the well sampling logs are included as Attachment A.

Wastewater Generation

All water removed from the wells during purging and sampling was drummed and stored on-site until the results of laboratory analyses were obtained. Based upon these results, the water should be transported as a hazardous liquid waste under proper manifest to an appropriate TSD facility for treatment and disposal. The disposal of wastewater is the responsibility of the property owner (waste generator), and is beyond the scope of work as described in this report.

follow up

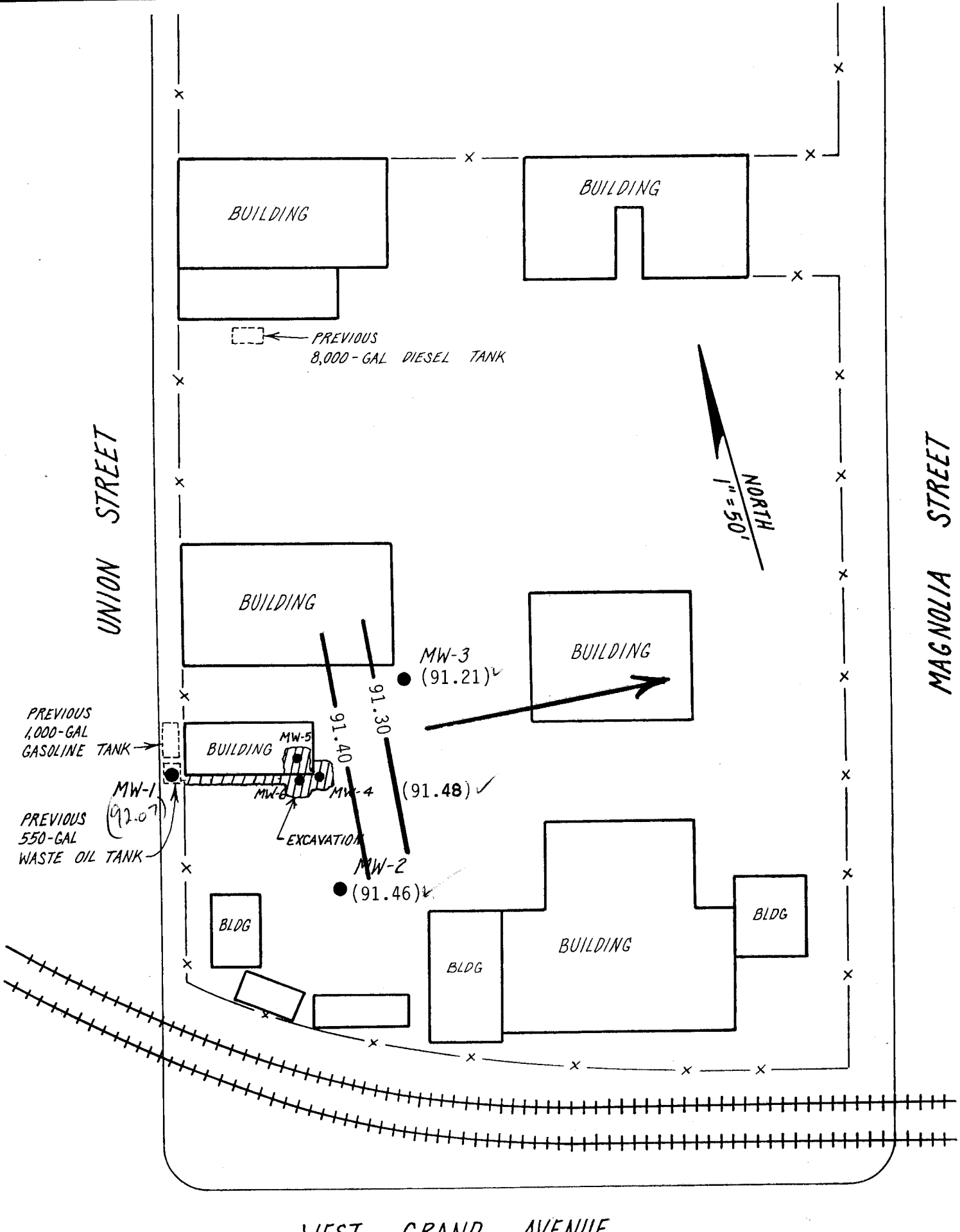


FIGURE 3.

Shallow Groundwater Table Contour

TABLE 2.

Historical Water Table Elevations
(feet)

Well	Date of Measurement								
	4-3-92	6-16-92	10-8-92	1-7-93	4-23-93	6-17-93			
MW-1	95.58	92.01	91.11	97.17	95.17	92.07			
MW-2	93.25	91.60	90.83	94.24	92.69	91.46			
MW-3	92.52	91.87	90.65	94.43	92.64	91.21			
MW-4	---	---	---	---	---	91.48			
Flow Direction	SE	SE	E	SE	SE	E			

IV. SHALLOW GROUNDWATER SAMPLING RESULTS

Laboratory Analysis

All analyses were conducted by a California State DOHS certified laboratory in accordance with EPA recommended procedures (Priority Environmental Labs, Milpitas, CA). All Groundwater samples were analyzed for Total Petroleum Hydrocarbons as Gasoline (EPA method 8015), Benzene, Toluene, Ethylbenzene, and Total Xylenes (EPA method 602) and Total Petroleum Hydrocarbons as Diesel (EPA method 8015).

Results of Groundwater Sampling

Table 3 presents the results of the laboratory analysis of the groundwater samples collected from monitoring wells MW-1, MW-2, MW-3 and MW-4.

As shown in Table 3, for this round of sampling, Total Petroleum Hydrocarbons as Gasoline were detected in the groundwater samples collected from wells MW-1, MW-3 and MW-4 at concentrations of 110 µg/L (ppb), 16,000 µg/L (ppb) and 3,000 µg/L (ppb), respectively. In addition, Benzene was detected in the groundwater samples collected from wells MW-3 and MW-4 at concentrations of 19 µg/L (ppb) and 3.7 µg/L (ppb), respectively.

As shown in Table 4, for this round of sampling, Total Petroleum Hydrocarbons as Diesel were detected in the groundwater samples collected from well MW-1 at a concentration of 59 µg/L (ppb).

TABLE 3.
Shallow Groundwater Sampling Results

Well	Date	TPH as Gasoline (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl-benzene (ug/L)	Total Xylenes (ug/L)
MW-1	10-26-90	---	1,200	18	7.1	37
	03-04-92	460	120	9.0	16	44
	04-03-92	300	21	6.0	15	36
	06-16-92	220	54	17	29	73
	10-09-92	ND	ND	ND	ND	ND
	01-07-93	210	0.7	3.7	4.4	9.6
	04-23-93	280	0.9	1.3	2.9	6.2
	[redacted]	110	ND	ND	0.5	1.1
MW-2	03-04-92	ND	ND	ND	ND	ND
	04-03-92	ND	ND	ND	ND	ND
	06-16-92	ND	ND	ND	ND	ND
	10-09-92	ND	ND	ND	ND	ND
	01-07-93	ND	ND	ND	ND	ND
	04-23-93	ND	ND	ND	ND	ND
	[redacted]	ND	ND	ND	ND	ND
MW-3	03-04-92	14,000	6,200	60	110	740
	04-03-92	5,200	120	32	57	180
	06-16-92	6,000	180	45	82	190
	10-09-92	11,000	87	49	94	200
	01-07-93	4,200	3.3	13	44	92
	04-23-93	21,000	23	43	49	130
	[redacted]	[redacted]	[redacted]	21	25	78
MW-4	01-07-93	4,800	6.4	25	60	110
	04-23-93	2,700	8.3	11	31	59
	[redacted]	[redacted]	[redacted]	4.2	4.9	15
Detection Limit		50	0.5	0.5	0.5	0.5

ND = Not Detected

TABLE 4.
Shallow Groundwater Sampling Results

Well	Date	TPH as Kerosene (ug/L)	TPH as Diesel (ug/L)	TPH as Motor Oil (ug/L)
MW-1	10-26-90	---	**5,400**	---
	03-04-92	---	**590**	---
	04-03-92	ND	ND	ND
	06-16-92	---	**730**	---
	10-09-92	ND	ND	ND
	01-07-93	ND	ND	ND
	04-23-93	---	ND	---
	[illegible]	---	**59**	---
MW-2	03-04-92	---	ND	---
	04-03-92	ND	ND	ND
	06-16-92	---	ND	---
	10-09-92	ND	ND	ND
	01-07-93	ND	ND	ND
	04-23-93	---	ND	---
	[illegible]	---	ND	---
MW-3	03-04-92	---	**360**	---
	04-03-92	ND	ND	ND
	06-16-92	---	ND	---
	10-09-92	ND	ND	ND
	01-07-93	ND	ND	ND
	04-23-93	---	ND	---
	[illegible]	---	ND	---
MW-4	01-07-93	ND	ND	ND
	04-23-93	---	ND	---
	[illegible]	---	ND	---
Detection Limit		50	50	50

ND = Not Detected

A copy of the laboratory certificate for the water sample analysis is included in Attachment B.

Chemical Concentration Contours.

Figures 4 and 5 show lines of equal concentration for Gasoline and Benzene in the shallow groundwater. Since these lines have been drawn based upon relatively limited data (four data points), the plot represents only a small portion of the respective concentration plume. The plot does [redacted] centered somewhere around the area of monitoring well MW-3.

The shift in the location of the center of the concentration plume appears to coincide with the removal of the subsurface contamination source (contaminated soil beneath piping leak). The [redacted] in well MW-3 are representative of residual concentrations that have migrated down gradient of this location. With continued shallow groundwater movement beneath the site, future shallow groundwater sampling results are likely to reflect continued attenuation of concentrations due to hydrodynamic dispersion.

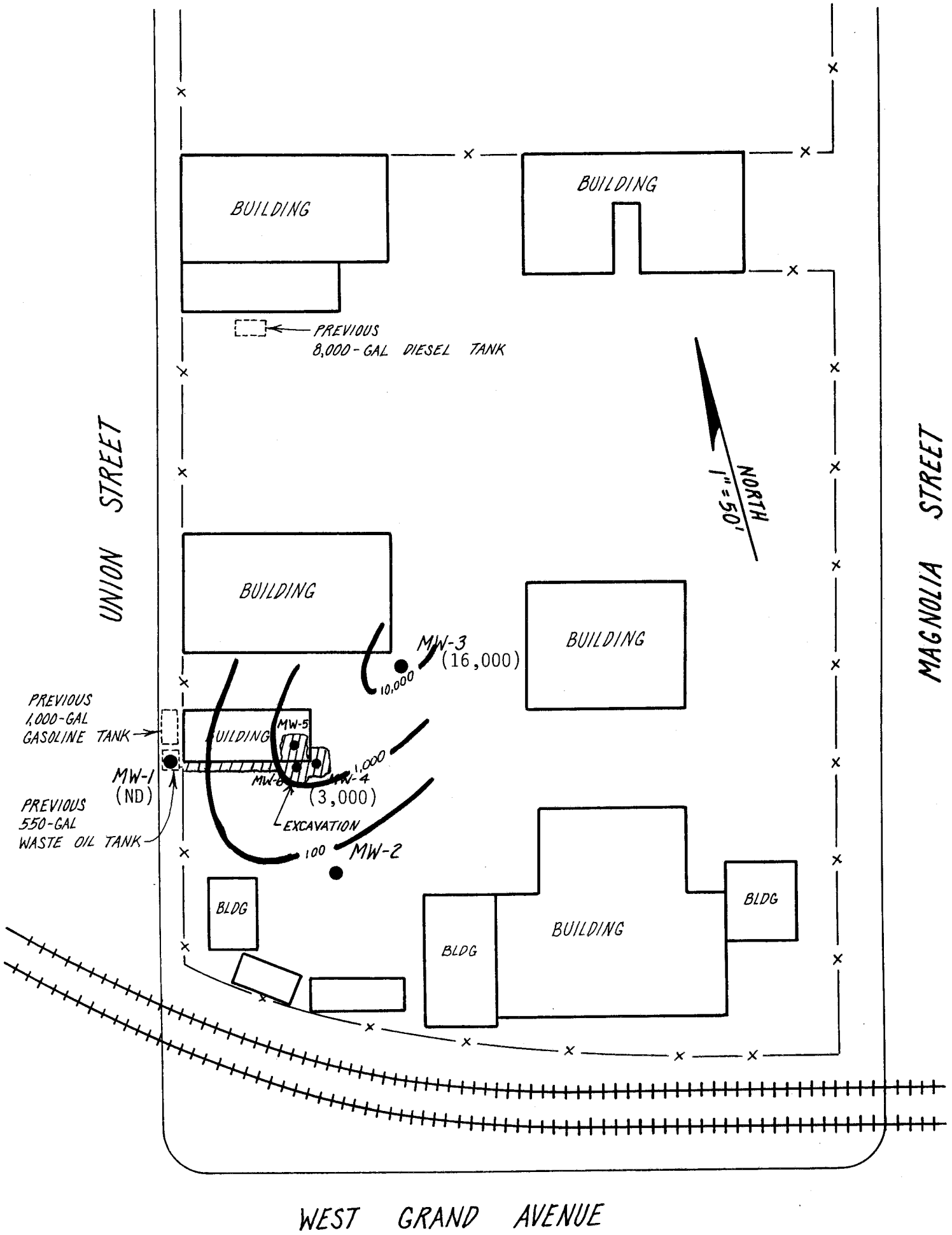


FIGURE 4.

Lines of Equal Concentration of Gasoline in ug/L (ppb) in the Shallow Groundwater.

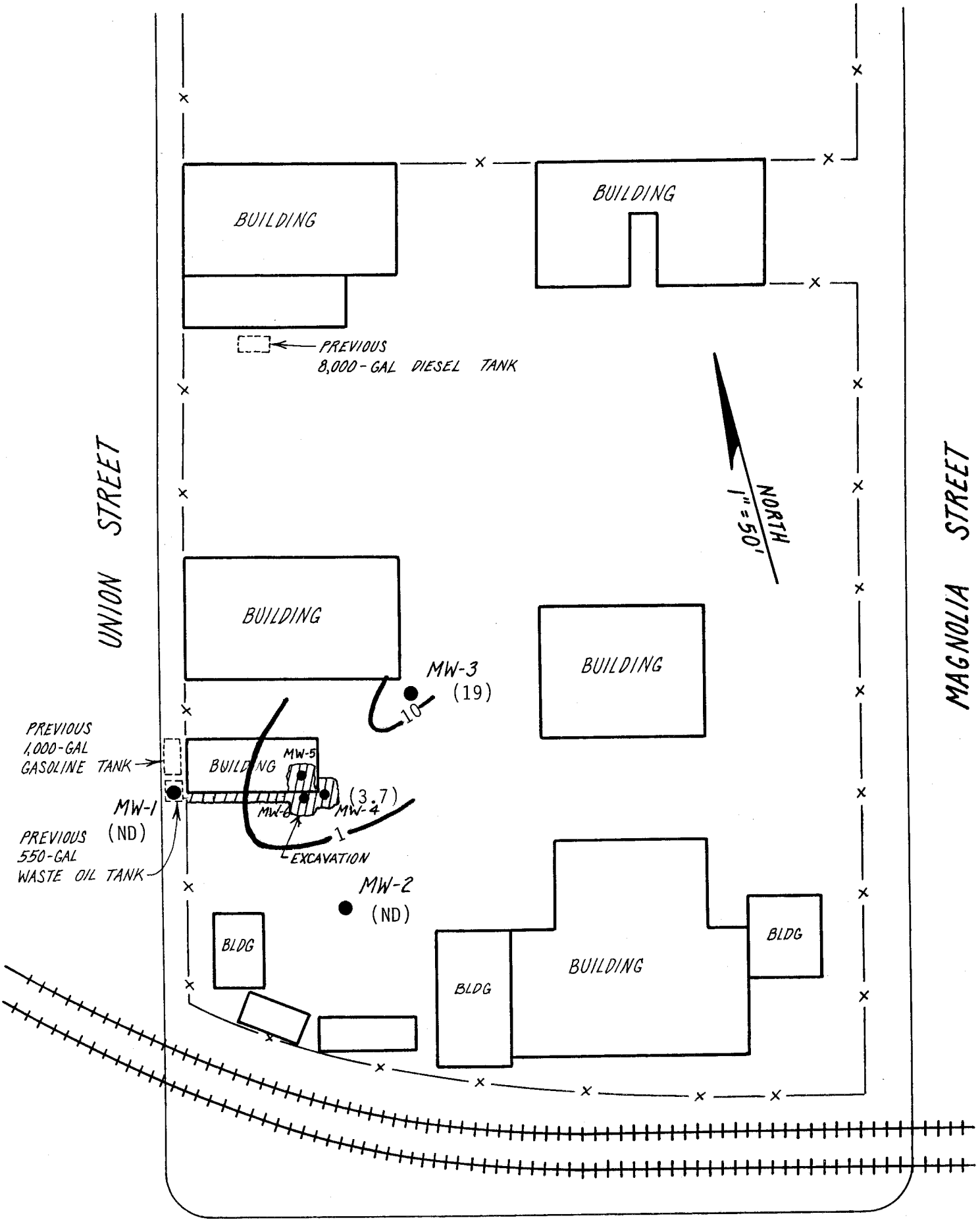
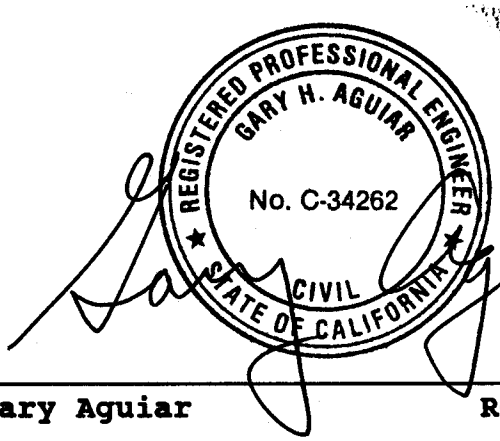


FIGURE 5.

Lines of Equal Concentration of Benzene in ug/l (ppb) in the Shallow Groundwater.

QUARTERLY GROUNDWATER SAMPLING REPORT
PACIFIC CRYOGENIC COMPANY
2311 Magnolia Street, Oakland, CA

August 2, 1993



EXP. 9-30-95

Gary Aguiar **RCE 34262**

Rick Milelli **Env. Engineer**

ATTACHMENT A

Well Sampling Logs

DTW

PACIFIC OXYGEN (7-16-93)

MW		DW	DB
1		7.20	19.50
2	8.54	~~8.81~~	23.24
3		8.81	22.96
4		8.47	14.30
5		(INACCESSABLE)	
6		8.48	14.54

WELL SAMPLING LOG

Project/No. PACIFIC OXYGEN

Page 1 of 4

Site Location OAKLAND, CA

Date 7/16/93

Well No. MW1

Time Began 1015
Completed 1510

Weather CLEAR/75°F

EVACUATION DATA

Description of Measuring Point (MP) WELL BOX AT GRADE

Total Sounded Depth of Well Below MP 19.50

Diameter of Casing 2"

- Depth to Water Below MP 7.20

= Water Column in Well 12.3

Gallons in Casing 2.0 + Annular Space (30% porosity) (X10) = Total Gallons 20

Gallons Pumped Prior to Sampling 20

Evacuation Method PVC BAILER

SAMPLING DATA / FIELD PARAMETERS

Inspection for Free Product: NONE DETECTED
(thickness to 0.1 inch, if any)

Time	1015	1020	1028	1035
Gals Removed	0	7	14	20
Temperature	22.3	20.2	19.6	20.3
Conductivity	550	600	550	500
pH	7.5	7.4	7.3	7.2
Color / Odor	CLR/ORG	LT. GRY/ORG	LT. GRY/ORG	GRY/ORG
Turbidity	LOW	LOW	LOW	MED

Comments: NONE

WELL SAMPLING LOG

Project/No. PACIFIC OXYGEN

Page 2 of 4

Site Location OAKLAND, CA

Date 7/16/93

Well No. MW 2

Weather CLEAR / 75°F

Time Began 0900

Completed 1535

EVACUATION DATA

Description of Measuring Point (MP) WELL BOX AT GRADE

Total Sounded Depth of Well Below MP 23.24

Diameter of Casing 2"

- Depth to Water Below MP 8.54

= Water Column in Well 14.7

Gallons in Casing 2.3 + Annular Space (30% porosity) (X10) = Total Gallons 23

Gallons Pumped Prior to Sampling _____

Evacuation Method PVC BAILER

SAMPLING DATA / FIELD PARAMETERS

Inspection for Free Product: NONE DETECTED
(thickness to 0.1 inch, if any)

Time	0900	0906	0918	0932
Gals Removed	0	8	16	23
Temperature	19.9	19.1	18.9	18.9
Conductivity	900	900	1000	1100
pH	7.2	7.2	7.4	7.3
Color / Odor	CLR/NO	LT GRY/NO	BRN/NO	BRN/NO
Turbidity	LOW	MED	HIGH	HIGH

Comments: NONE

WELL SAMPLING LOG

Project/No. PACIFIC OXYGEN

Page 3 of 4

Site Location OAKLAND, CA

Date 7/16/93

Well No. MW 3

Time Began 0845
Completed 1550

Weather CLEAR / 75°F

EVACUATION DATA

Description of Measuring Point (MP) WELL BOX AT GRADE

Total Sounded Depth of Well Below MP 22.96

Diameter of Casing 2"

- Depth to Water Below MP 8.81

= Water Column in Well 14.15

Gallons in Casing 2.3 + Annular Space (30% porosity) (X10) = Total Gallons 23

Gallons Pumped Prior to Sampling 8

Evacuation Method PVC BAILER

SAMPLING DATA / FIELD PARAMETERS

Inspection for Free Product: NONE DETECTED
(thickness to 0.1 inch, if any)

		*	*	
Time	0845	0850	0	
Gals Removed	0	5		
Temperature	22.2	20.6	21.8	
Conductivity	700	700	700	
pH	7.0	7.0	7.1	
Color / Odor	CLR/ORG	GRY/HC	GRY/HC	
Turbidity	LOW	HIGH	HIGH	

Comments: * DEWATERED (VERY SLOW RECHARGE)

NOTE: ONE CASING VOLUME WAS ALLOWED TO RECHARGE BEFORE SAMPLING

WELL SAMPLING LOG

Project/No. PACIFIC OXYGEN

Page 4 of 4

Site Location OAKLAND, CA

Date 7/16/93

Well No. MW 4

Time Began 0940
Completed 1525

Weather CLEAR / 75°F

EVACUATION DATA

Description of Measuring Point (MP) WELL BOX AT GRADE

Total Sounded Depth of Well Below MP 14.30

Diameter of Casing 4"

- Depth to Water Below MP 8.47

= Water Column in Well 5.83

Gallons in Casing 3.7 + Annular Space (30% porosity) (NONE) = Total Gallons 3.7

Gallons Pumped Prior to Sampling 20

Evacuation Method PVC BAILER

SAMPLING DATA / FIELD PARAMETERS

Inspection for Free Product: NONE DETECTED
(thickness to 0.1 inch, if any)

Time	0940	0945	0950	1000
Gals Removed	0	7	14	20
Temperature	21.3	21.3	20.9	21.1
Conductivity	800	800	800	750
pH	7.2	7.1	6.9	6.9
Color / Odor	CLR/SLT	GRY/HC	GRY/HC	GRY/HC
Turbidity	LOW	HIGH	HIGH	HIGH

Comments: NONE

ATTACHMENT B

ANALYTICAL RESULTS: GROUNDWATER

PRIORITY ENVIRONMENTAL LABS

Precision Environmental Analytical Laboratory

July 26, 1993 PEL # 9307064

HAGEMAN - AGUIAR, INC.

Attn: Jeffrey Roth
Re: Four water samples for Gasoline/BTEX and Diesel analyses.

Project name: Pacific Oxygen
Project location: Union St., - Oakland, CA.

Date sampled: Jul 16, 1993 Date submitted: Jul 23, 1993
Date extracted: Jul 23-24, 1993 Date analyzed: Jul 23-24, 1993

RESULTS:

SAMPLE I.D.	Gasoline (ug/L)	Diesel (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl Benzene (ug/L)	Total Xylenes (ug/L)
MW 1	110	59	N.D.	N.D.	0.5	1.1
MW 2	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
MW 3	16000	N.D.	19	21	25	78
MW 4	3000	N.D.	3.7	4.2	4.9	15
Blank	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Spiked Recovery	82.4%	97.6%	80.5%	83.9%	92.1%	95.6%
Duplicate Spiked Recovery	89.8%	91.2%	87.8%	93.2%	96.5%	104.1%
Detection limit	50	50	0.5	0.5	0.5	0.5
Method of Analysis	5030 / 8015	3510 / 8015	602	602	602	602

David Duong
Laboratory Director

1764 Houret Court Milpitas, CA. 95035 Tel: 408-946-9636 Fax: 408-946-9663

PEL # 9307064

INV # 23821

CHAIN OF CUSTODY RECORD

PROJECT NAME AND ADDRESS:
PACIFIC OXYGEN
UNION ST
OAKLAND, AVE

SAMPLER: (Signature)

HAGEMAN - AGUIAR, INC.
3732 Mt. Diablo Blvd., Suite 372
Lafayette, CA 94549
(415)284-1661 (415)284-1664 (FAX)

ANALYSIS REQUESTED: TPH GAS/BTXE; TPH DIESEL

CROSS REFERENCE NUMBER	DATE	TIME	SOIL	WATER	STATION LOCATION									REMARKS
MW 1	7-16-93			X	MONITORING WELL		#1		X	X							NORM TAT
MW 2	7-16-93			X	"	"	#2		X	X							
MW 3	7-16-93			X	"	"	#3		X	X							
MW 4	7-16-93			X	"	"	#4		X	X							

RELINQUISHED BY: (Signature)	DATE 7-23-93 TIME 1600	RECEIVED BY: (Signature)	DATE TIME
RELINQUISHED BY: (Signature)	DATE TIME	RECEIVED BY: (Signature)	DATE TIME
RELINQUISHED BY: (Signature)	DATE TIME	RECEIVED BY: (Signature)	DATE TIME
RELINQUISHED BY: (Signature)	DATE TIME	RECEIVED FOR LABORATORY BY: (Signature)	DATE 07/23/93 TIME 4:00 PM