HAGEMAN-AGUIAR, INC.

Underground Contamination Investigations, Groundwater Consultants, Environmental Engineering

QUARTERLY

GROUNDWATER SAMPLING REPORT

(Sampled February 20, 1997)

PACIFIC CRYOGENIC COMPANY
2311 Magnolia Street
Oakland, California

April 4, 1997

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 wells MW-1, MW-2 and MW-3 were installed.

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. 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. The three monitoring wells MW-4, MW-5 and MW-6 were installed within the excavation at the time of the backfilling operation.

On February 20, 1997, on-site monitoring wells MW-3 and MW-4 were sampled for the laboratory analysis for dissolved petroleum constituents. This "round" of groundwater sampling has been conducted as part of the quarterly groundwater monitoring program at the site, as required by the Alameda County Environmental Health Department and the California Regional Water Quality Control Board (RWQCB), San Francisco Bay Region. Currently, wells MW-3 and MW-4 are sampled quarterly, well MW-1 is sampled semi-annually, and sampling at well MW-2 has been discontinued.

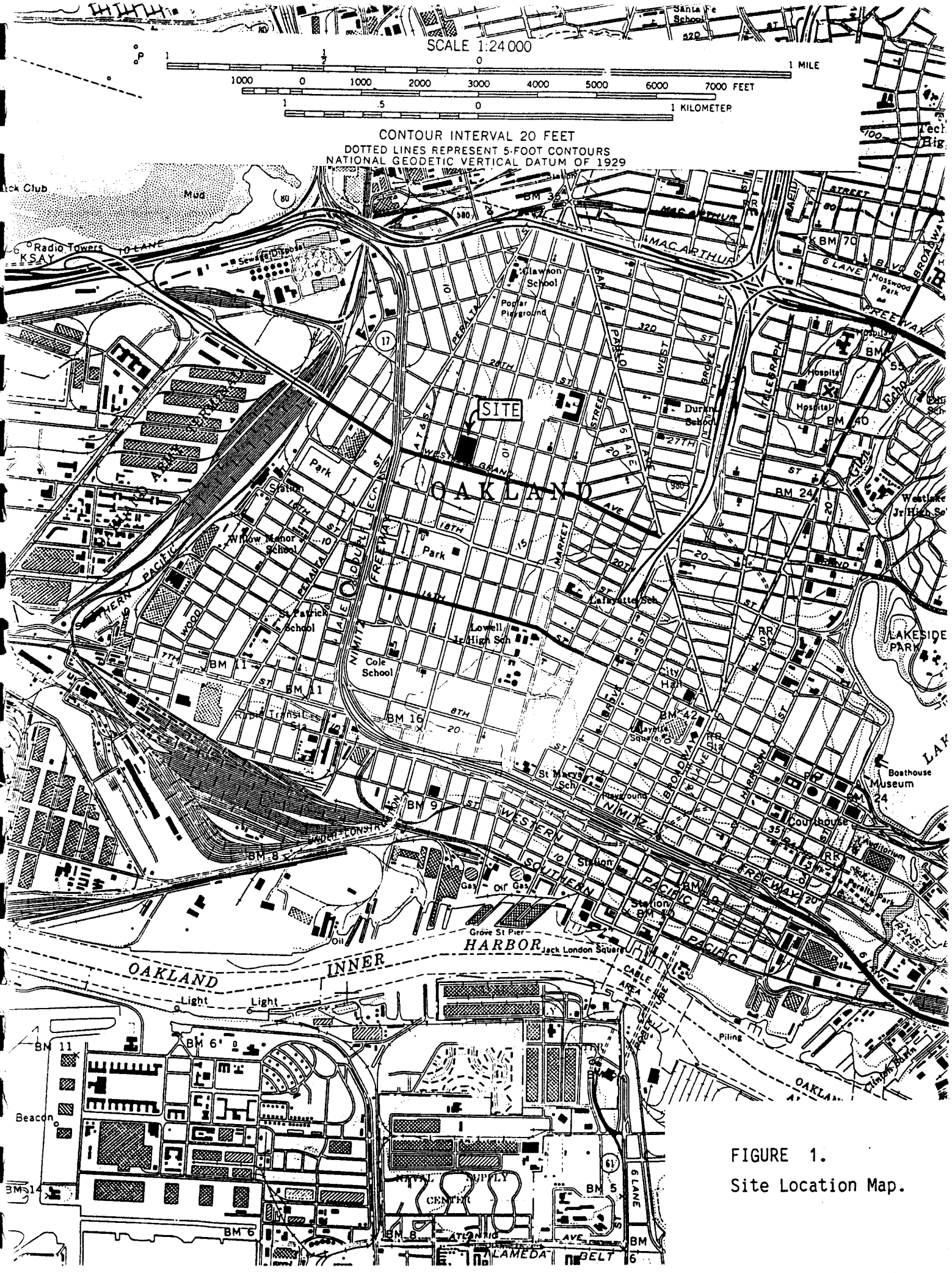

FIGURE 1.
Site Location Map.

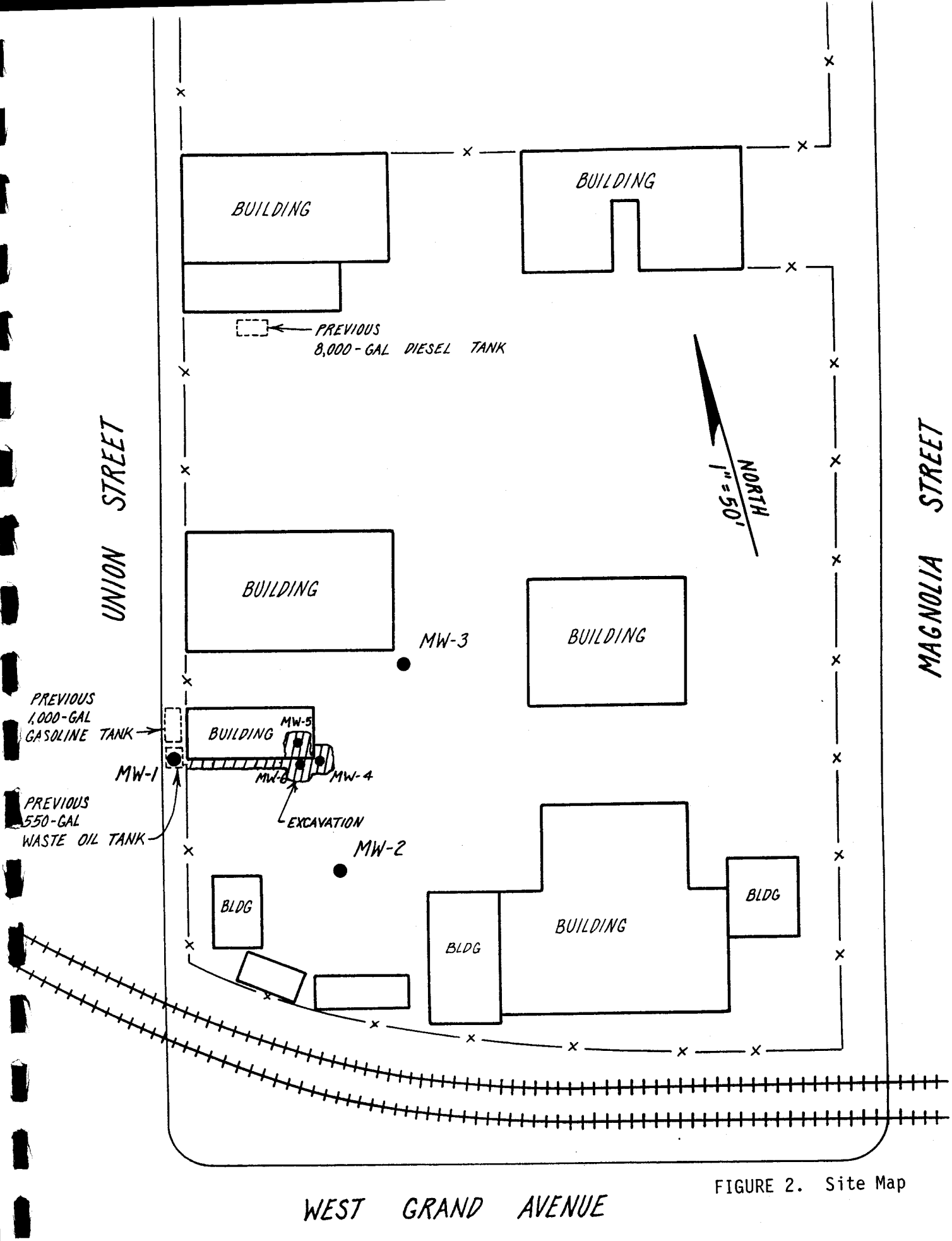

FIGURE 2. Site Map

II. FIELD WORK

Monitoring Well Sampling

On February 20, 1997, groundwater samples were collected from monitoring wells MW-3 and MW-4. Prior to groundwater sampling, each well was purged by bailing several 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. A groundwater sample was subsequently collected using a new clean disposable sampling bailer. The water sample was placed inside appropriate 40 ml VOA vials 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 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 to an appropriate TSD facility for treatment and disposal.

The ultimate disposal of this waste water is the responsibility of the property owner (waste generator), and is beyond the scope of work as outlined in this report.

III. RESULTS OF WATER LEVEL MEASUREMENTS

Shallow Groundwater Flow Direction

Shallow water table elevations were measured on February 20, 1997. These measurements are shown in Table 1. Figure 3 presents a contour map for the shallow groundwater table beneath the site. As shown in this figure, the data from monitoring wells MW-1, MW-2, MW-3 and MW-4 indicate that the shallow groundwater flow was in the easterly direction during this round of groundwater sampling. The figure gives clear evidence of "mounding" of groundwater in the area between the street (well MW-1) and the previous soil excavation location.

Shallow Water Table Hydraulic Gradient

Figure 3 presents the contour map for the shallow groundwater table beneath the site. As shown in this figure, the shallow groundwater table beneath the site appears to have a calculated hydraulic gradient of dH/dL = 1'/30' = 0.033.

Historical Water Level Measurements

Table 2 presents the results of all water level measurements collected between April 3, 1992, and the present time.

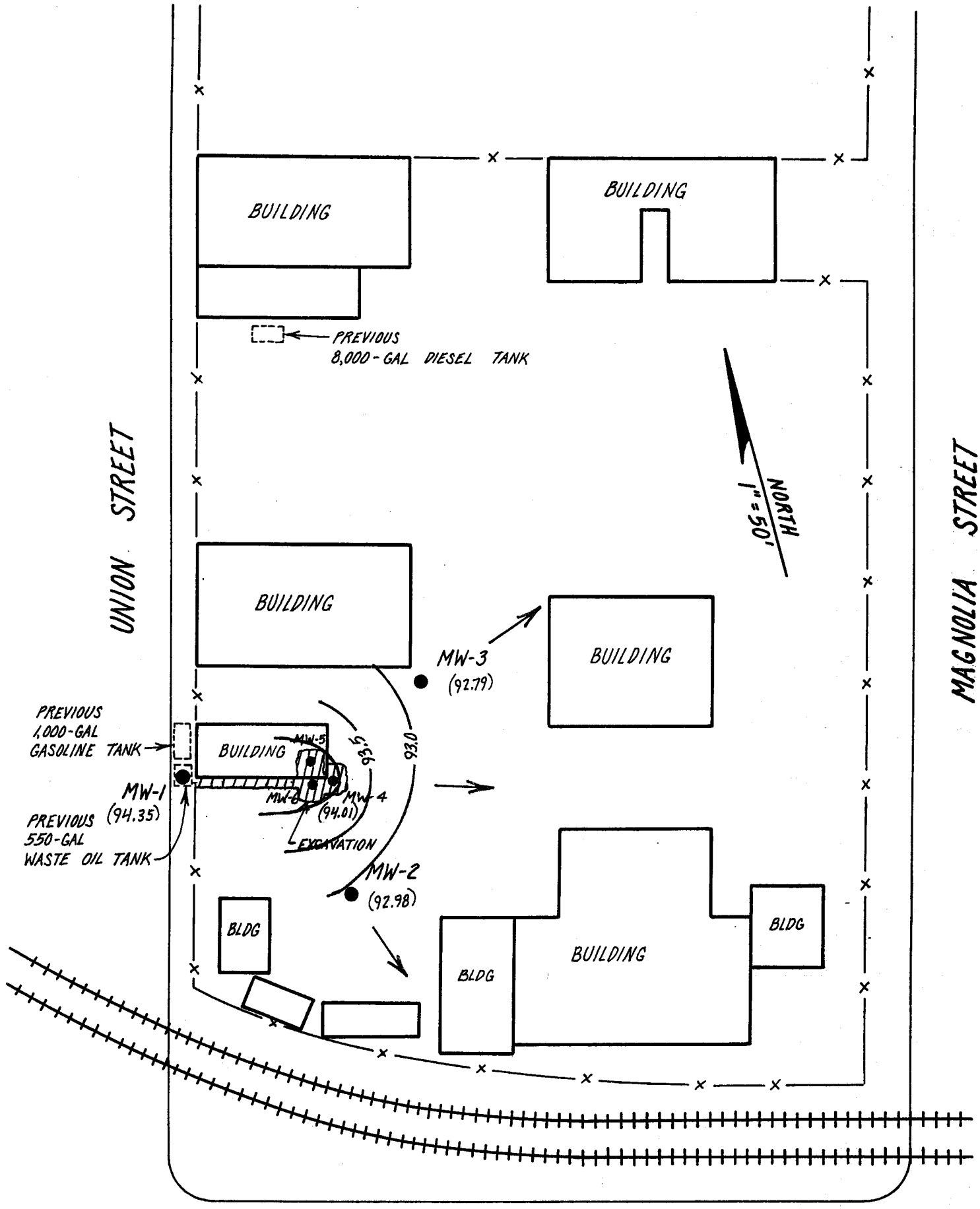

FIGURE 3.
Shallow Groundwater Table Contour Map,
measured on February 20, 1997.

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	7-16-93	11-8-93	2-2-94	5-2-94
MW-1	95.58	92.01	91.11	97.17	95.17	92.07	91.78	94.42	93.55
MW-2	93.25	91.60	90.83	94.24	92.69	91.46	91.04	92.55	92.19
MW-3	92.52	91.87	90.65	94.43	92.64	91.21	91.14	92.21	91.94
MW-4	---	---	---	---	---	91.48	91.16	92.67	92.37
Flow Direction	SE	SE	E	SE	SE	E	SE	E	E

Well	Date of Measurement								
	8-3-94	8-3-94	11-4-94	3-14-95	8-23-95	5-8-96	8-12-96	11-15-96	2-20-97
MW-1	---	90.96	90.96	96.33	91.70	93.72	91.96	---	94.35
MW-2	91.25	90.77	90.77	95.08	91.30	92.64	91.55	91.09	92.98
MW-3	91.00	90.57	90.57	94.96	91.10	92.84	91.21	90.84	92.79
MW-4	91.26	90.74	90.74	95.60	91.38	93.28	91.72	91.18	94.01
Flow Direction	E	E	E	E	E	E	E	E	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), and for Benzene, Toluene, Ethylbenzene, Total Xylenes and MTBE (EPA method 602).

Results of Groundwater Sampling

Table 3 presents the most recent results of the laboratory analysis of groundwater samples from wells MW-3 and MW-4, as well as the results of all previous "rounds" of sampling from wells MW-1, MW-2, MW-3 and MW-4.

As shown in Table 3, for this round of sampling, Gasoline was detected in the groundwater sample collected from well MW-3 at a concentration of 1,100 µg/L (ppb). In addition, Benzene was detected in the groundwater sample collected from well MW-3 at a concentration of 68 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)	MTBE (ug/L)
MW-1	10-26-90	---	1200	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	---
	07-16-93	110	ND	ND	0.5	1.1	---
	11-08-93	ND	ND	ND	ND	ND	---
	01-28-94	190	5.7	4.9	6.7	21	---
	05-02-94	ND	ND	ND	ND	ND	---
	08-03-94	ND	ND	ND	ND	ND	---
	11-04-94	ND	ND	ND	ND	ND	---
	03-14-95	ND	ND	ND	ND	ND	---
	08-23-95	ND	ND	ND	ND	ND	---
	05-08-96	110	1.0	ND	ND	2.8	---
	08-12-96	---	---	---	---	---	---
	11-15-96	---	---	---	---	---	---
	02-20-97	---	---	---	---	---	---
Detection Limit		50	0.5	0.5	0.5	0.5	0.5

ND = Not Detected

TABLE 3. (continued)
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)	MTBE (ug/L)
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	---
	07-16-93	16,000	19	21	25	78	---
	11-08-93	10,000	4.3	5.7	7.9	35	---
	01-28-94	7,500	8.5	10	50	95	---
	05-02-94	22,000	69	39	60	110	---
	08-03-94	2,500	35	12	27	25	---
	11-04-94	2,900	4.0	8.1	18	27	---
	03-14-95	2,500	9.5	3.0	4.6	8.3	---
	08-23-95	12,000	35	8.2	14	20	---
	05-08-96	19,000	57	17	32	56	---
	08-12-96	8,900	47	7.6	14	16	---
	11-15-96	4,900	66	13	33	41	ND
	02-20-97	1,100	68	21	18	23	ND
Detection Limit		50	0.5	0.5	0.5	0.5	0.5

ND = Not Detected

TABLE 3. (continued)
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)	MTBE (ug/L)
MW-4	01-07-93	4,800	6.4	25	60	110	---
	04-23-93	2,700	8.3	11	31	59	---
	07-16-93	3,000	3.7	4.2	4.9	15	---
	11-08-93	1,400	0.6	0.8	1.1	4.8	---
	01-28-94	830	8.5	10	12	27	---
	05-02-94	900	7.3	3.2	0.5	14	---
	08-03-94	1,000	22	0.7	8.0	7.4	---
	11-04-94	160	0.6	ND	1.9	2.9	---
	03-14-95	120	3.6	ND	ND	3.7	---
	08-23-95	ND	ND	ND	ND	ND	---
	05-08-96	ND	ND	ND	ND	ND	---
	08-12-96	ND	ND	ND	ND	ND	ND
	11-15-96	320	19	3.2	5.6	15	ND
	02-20-97	ND	ND	ND	ND	ND	ND
Detection Limit		50	0.5	0.5	0.5	0.5	0.5

ND = Not Detected

QUARTERLY GROUNDWATER SAMPLING REPORT

PACIFIC CRYOGENIC COMPANY

2311 Magnolia Street, Oakland, CA

April 4, 1997

Gary Aguiar **RCE 34262**

ATTACHMENT A

Well Sampling Logs

Hageman-Aguiar, Inc.

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

Project: 0096 Pacific Cryogenics **Date:** 02/20/97

WELL #	ELEVATION	DTW	PRODUCT	WELL DEPTH	COMMENTS
MW-1		4.92'	sheen	19.49'	grease like droplets
MW-2		7.02'	none	23.36'	
MW-3		7.23'	none	22.94'	
MW-4		5.94'	none	14.28'	

WELL SAMPLING LOG

Project/No. 0096 Page 1 of 2

Site Location Pacific Cryogenics

Date 02/20/97

Well No. MW-3

Time Began 13:21
Completed 13:38

Weather Sunny 55°-65°

Sampling Personnel R Wilson

EVACUATION DATA

Description of Measuring Point (MP) WB @ G

Total Sounded Depth of Well Below MP 22.67' + 0.27'

Diameter of Casing 2"

- Depth to Water Below MP 7.23'

= Water Column in Well 15.71'

Gallons in Casing 2.65 + Annular Space _____ (30% porosity) = Total Gallons _____

Gallons Pumped Prior to Sampling 12

Evacuation Method PVC Bailer

Sample Method Disposable Bailer

Sample Collected 2-VOA

SAMPLING DATA / FIELD PARAMETERS

Inspection for Free Product: none, clear
(thickness to 0.1 inch, if any)

Time	13:26	13:30	13:34	13:38
Gals Removed	3	6	9	12
Temperature	68.7	66.9	66.3	66.1
Conductivity	5.16×10^2	4.98×10^2	4.88×10^2	4.83×10^2
pH	6.73	6.84	7.01	7.08
Color / Odor	grey	grey	grey	grey
Turbidity	low	low	med	med

Comments: _____

WELL SAMPLING LOG

Project/No. 0096 Page 2 of 2

Site Location Pacific Cryogenics

Date 02/20/97

Well No. MW-4

Time Began 14:27
Completed 15:00

Weather Sunny 60°-70°

Sampling Personnel R Wilson

EVACUATION DATA

Description of Measuring Point (MP) WB @ G

Total Sounded Depth of Well Below MP 14.01' + 0.27

Diameter of Casing 4"

- Depth to Water Below MP 5.94'

= Water Column in Well 8.34'

Gallons in Casing 5.45 + Annular Space _____ (30% porosity) = Total Gallons _____

Gallons Pumped Prior to Sampling 30

Evacuation Method PVC Bailer
Sample Method Disposable Bailer
Sample Collected 2-VOA

SAMPLING DATA / FIELD PARAMETERS

Inspection for Free Product: none, clear
(thickness to 0.1 inch, if any)

Time	14:38	14:50	15:00	
Gals Removed	10	20	30	
Temperature	60.0	60.1	60.0	
Conductivity	2.54×10^2	2.47×10^2	2.45×10^2	
pH	6.73	6.71	6.70	
Color / Odor	clear	clear	clear	
Turbidity	low	low	low	

Comments: _____

ATTACHMENT B

Analytical Results: Groundwater

PRIORITY ENVIRONMENTAL LABS

Precision Environmental Analytical Laboratory

February 24, 1997 PEL # 9702036

HAGEMAN - AGUIAR, INC.

Attn: Gary Aguiar

Re: Two water sample for Gasoline/BTEX with MTBE analysis.

Project name: Pacific Cryogenics
Project location: 2311 Magnolia St., - Oakland

Date sampled: Feb 20, 1997 Date submitted: Feb 21, 1997
Date extracted: Feb 21-22, 1997 Date analyzed: Feb 21-22, 1997

RESULTS:

SAMPLE I.D.	Gasoline (ug/L)	MTBE (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl Benzene (ug/L)	Total Xylene (ug/L)
MW-3	11000	N.D.	68	21	18	23
MW-4	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Blank	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Spiked Recovery	98.9%	---	88.4%	95.1%	97.2%	99.3%
Detection limit	50	0.5	0.5	0.5	0.5	0.5
Method of Analysis	5030 / 8015	602	602	602	602	602

David Duong
Laboratory Director

1764 Houret Court Milpitas, CA. 95035 Tel: 408-946-9636 Fax: 408-94[illegible]3

PEL # 9702036
INV # 27568

CHAIN OF CUSTODY RECORD

PROJECT NAME AND ADDRESS:

Pacific Cryogenics
2311 Magnolia St.
Oakland

SAMPLER: (Signature) Randal Wilson

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

CROSS REFERENCE NUMBER	DATE	TIME	SOIL	WATER	STATION LOCATION	ANALYSIS REQUESTED: TPH-Gas, BTEX, MTBE	REMARKS
MW-3	02/20/97	13:38		X	Monitoring well #3	X	
MW-4	02/20/97	15:00		X	Monitoring well #4	X	

RELINQUISHED BY: (Signature) Randal Wilson	DATE 02/21/97 TIME 11:30	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) PEL	DATE 02/21/97 TIME 11:30