



Underground Contamination Investigations, Groundwater Consultants, Environmental Engineering

REPORT OF QUARTERLY GROUNDWATER SAMPLING

(sampled May 2, 1994)

PACIFIC CRYOGENIC COMPANY 2311 Magnolia Street Oakland, CA

May 9, 1994

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	FIELD WORK	
	Wastewater Generation	6
III.	RESULTS OF WATER LEVEL MEASUREMENTS	7
	Shallow Groundwater Flow Direction	7
	Shallow Water Table Hydraulic Gradient	7
	Historical Water Level Measurements	7
IV.	SHALLOW GROUNDWATER SAMPLING RESULTS	
	Laboratory Analysis	11
	Results of Groundwater Sampling	
	Chemical Concentration Contours	
ATTA	CHMENT A Well Sampling Logs	
מייי ם	CHMENT B Analytical Results: Groundwater	

I. INTRODUCTION

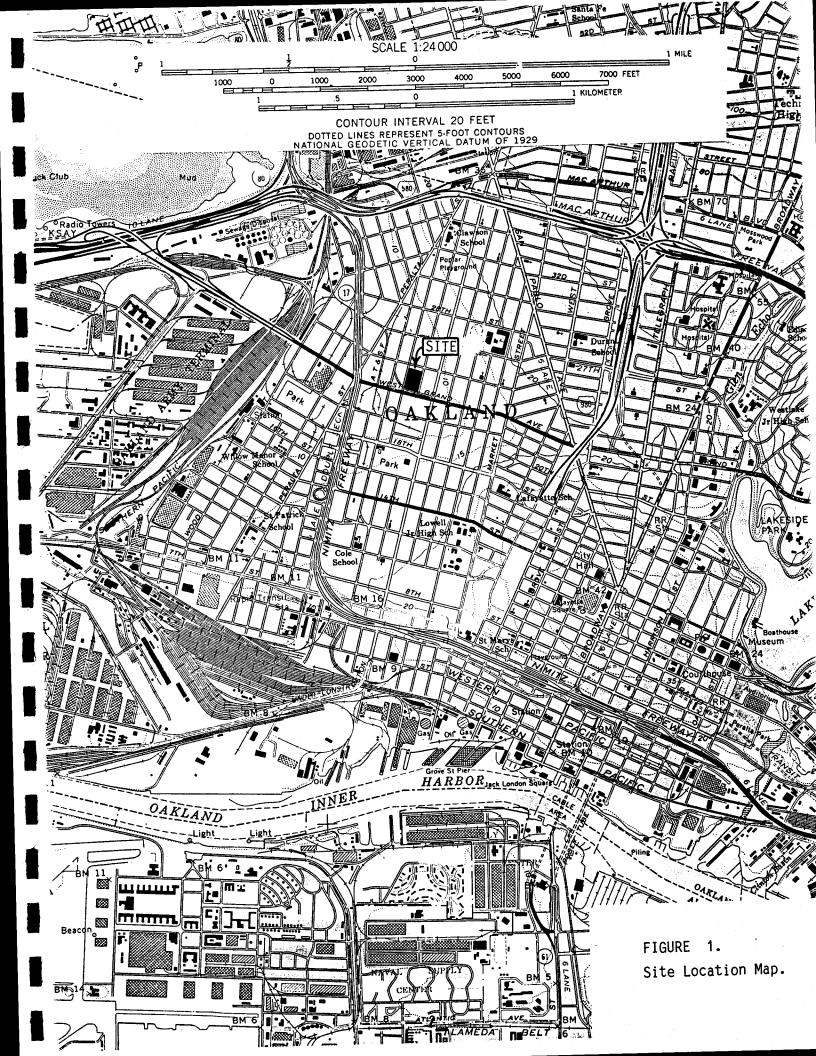
The subject site is the historical location of Pacific Cryogenic Company at 2311 Magnolia Street, Oakland, California. The location of the site is shown on Figure 1 (site location map).

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 μ g/L, and Benzene, Toluene, Ethylbenzene, and Total Xylenes at concentrations of 1,200 μ g/L, 18 μ g/L, 7.1 μ g/L, and 37 μ g/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,



Site Map.

Inc. (see Figure 2). During the removal process, several 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 May 2, 1994, 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 May 2, 1994, groundwater samples were collected from monitoring wells MW-1, MW-2, MW-3, and MW-4. groundwater sampling, each well was purged by bailing approximately 5 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 1liter 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 mater should.

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.

III. RESULTS OF WATER LEVEL MEASUREMENTS

Shallow Groundwater Flow Direction

Shallow water table elevations were measured on May 2, 1994. 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 the three monitoring wells indicate that the shallow groundwater flow was easterly direction during

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 = 0.5'/27' = 0.0185.

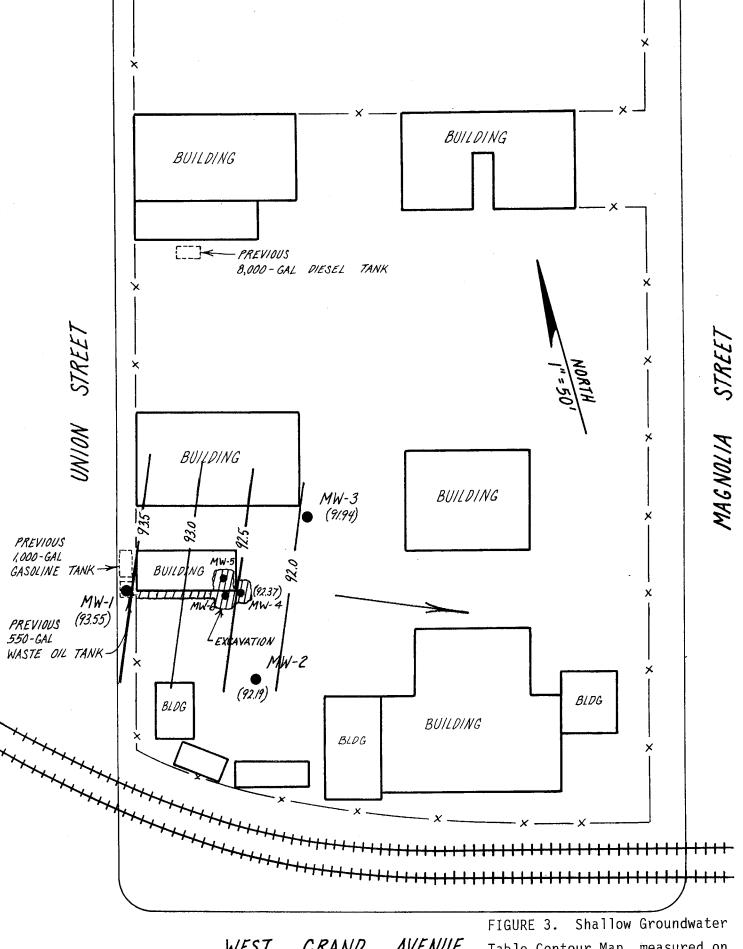
Historical Water Level Measurements

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

TABLE 1.

Shallow Water Table Elevations
May 2, 1994

Well	Top of Casing Elevation (feet)	Depth to Water (feet)	Water Table Elevation (feet)
MW-1	99.27	5.72	93.55
MW-2	100.00	7.81	92.19
MW-3	100.02	8.08	91.94
MW-4	99.95	7.58	92.37



WEST GRAND AVENUE Table Contour Map, measured on May 2, 1994.

TABLE 2.

Historical Water Table Elevations (feet)

	Date of Measurement								
Well	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

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, Kerosene, Mineral Spirits and Motor Oil (EPA method 8015).

Results of Groundwater Sampling

Tables 3 and 4 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-3 and MW-4 at concentrations of 22,000 μ g/L (ppb) and 900 μ g/L (ppb), respectively. In addition, Benzene was detected in the groundwater samples collected from wells MW-3 and MW-4 at concentrations of 69 μ g/L (ppb) and 7.3 μ g/L (ppb), respectively.

As shown in Table 4, for this round of sampling, Total Petroleum Hydrocarbons as Diesel, Kerosene, Mineral Spirits or Motor Oil were not detected in the groundwater samples collected from wells MW-1, MW-2, MW-3 and MW-4.

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

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		1200	18	7.1	37
101 44 - 1	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
	45-52-54	ND	ND	ND	ND	ND
MW-2	03-04-92	ND	ND	ND	ND	ND
14144-5	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
	07-16-93	ND	ND	ND	ND	ND
	11-08-93	ND	ND	ND	ND	ND
	01-28-94	ND	ND	ND	ND	ND
	05-03-94	ND	ND	ND	ND	ND
Detection	on Limit	50	0.5	0.5	0.5	0.5

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)
MW-3	03-04-92 04-03-92 06-16-92 10-09-92 01-07-93 04-23-93 07-16-93 11-08-93 01-28-94	14,000 5,200 6,000 11,000 4,200 21,000 16,000 10,000 7,500 22,000	6,200 120 180 87 3.3 23 19 4.3 8.5 69	60 32 45 49 13 43 21 5.7 10 39	110 57 82 94 44 49 25 7.9 50	740 180 190 200 92 130 78 35 95
MW-4	01-07-93 04-23-93 07-16-93 11-08-93 01-28-94	4,800 2,700 3,000 1,400 830 900	6.4 8.3 3.7 0.6 8.5 7.3	25 11 4.2 0.8 10 3.2	60 31 4.9 1.1 12 0.5	110 59 15 4.8 27 14
Detection	on Limit	50	0.5	0.5	0.5	0.5

TABLE 4.

Shallow Groundwater Sampling Results

Well	Date	TPH as Kerosene (ug/L)	TPH as Diesel (ug/L)	TPH as Mineral Spirits (ug/L)	TPH as Motor Oil (ug/L)
MW-1	10-26-90		5,400		<u></u>
141 44 - 1	03-04-92	·	590		
	04-03-92	ND	ND		ND
	06-16-92		730		
i	10-09-92	ND	ND		ND
	01-07-93	ND	ND		ND
	04-23-93		ND		
	07-16-93		59		
	11-08-93		ND		
	01-28-94	ND	ND	ND	ND
	05-02-94	ND	ND	ND	ND
	00.04.00		ND		,
MW-2	03-04-92	ND	ND		ND
	04-03-92	ND	ND		
	10-09-92	ND	ND		ND
	01-07-93	ND ND	ND		ND
	01-07-93		ND		
# :	07-16-93		ND		
	11-08-93		ND		
	01-28-94	ND	ND	ND	ND
	05-02-94	ND	ND	ND	ND
Detect	ion Limit	50	50	50	50

TABLE 4. (continued)

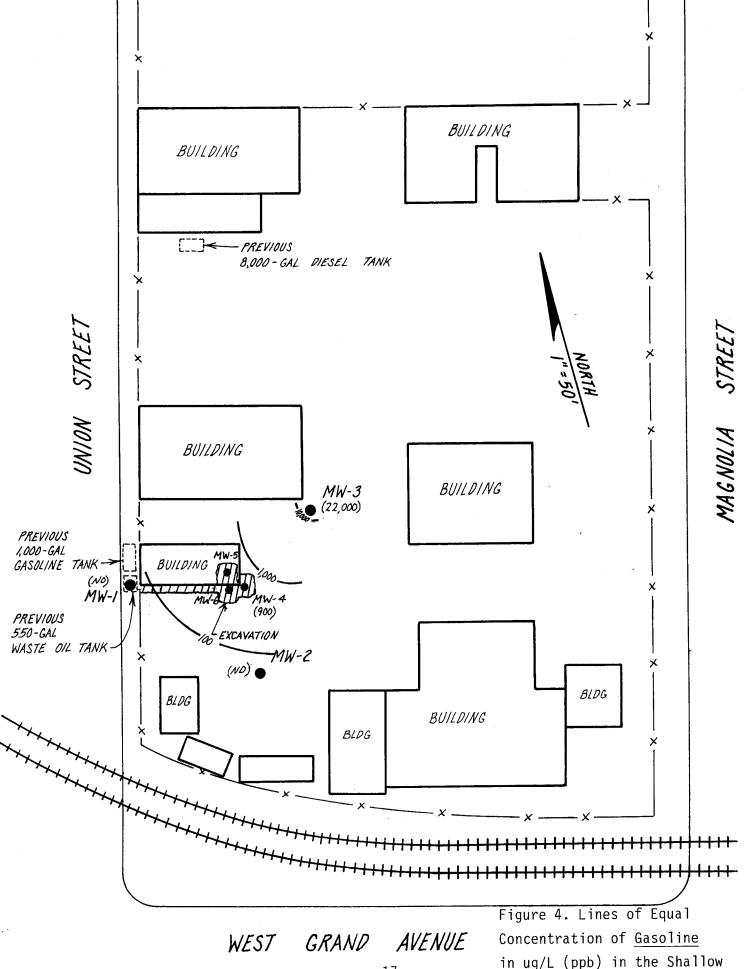
Shallow Groundwater Sampling Results

Well	Date	TPH as Kerosene (ug/L)	TPH as Diesel (ug/L)	TPH as Mineral Spirits (ug/L)	TPH as Motor Oil (ug/L)
MW-3	03-04-92 04-03-92	 ND	360 ND		 ND
	06-16-92		ND		
	10-09-92	ND	ND		ND
	01-07-93	ND	ND		ND
·	04-23-93		ND		
	07-16-93		ND		
	11-08-93		ND	*	
	01-28-94	ND	310	370	ND
	05-02-94	ND	ND	ND	ND
					ND
MW-4	01-07-93	ND	ND		ND
	04-23-93		ND		
	07-16-93		ND		
	11-08-93		ND	180	ND
	01-28-94	ND	160		1
	05-02-94	ND	ND	ND	ND
Detection	on Limit	50	50	50	50

Chemical Concentration Contours

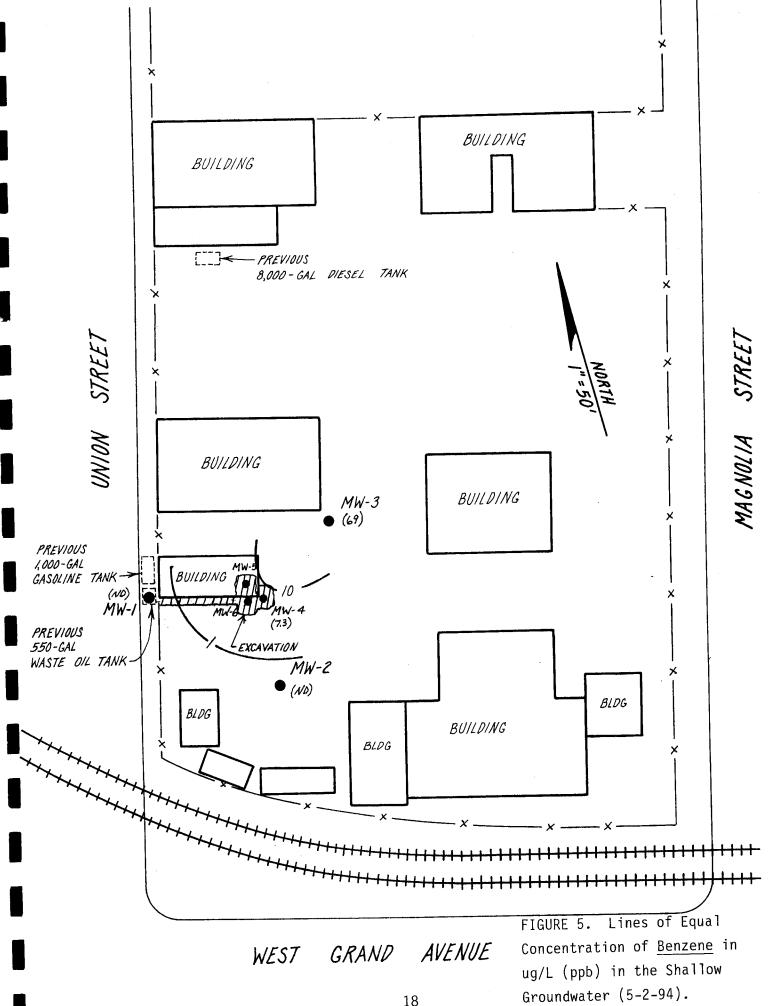
Figures 4 and 5 show lines of equal concentration for Gasoline and Benzene in the shallow groundwater. Since these lines have been drawn based upon relatively limited data (four data points), the plot represents only a small portion of the respective concentration plume. The plot does suggest, however, that the dissolved concentrations are now 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 elevated petroleum hydrocarbons concentrations detected 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.



17

in ug/L (ppb) in the Shallow Groundwater (5-2-94).



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

May 9, 1994

No. C-34262

No. C-34262

REPORT PROFESSIONAL PROFESSIONA

Gerard F. Aarons

Geologist

ATTACHMENT A

WELL SAMPLING LOGS

Project/No. PACIFIC OXYGEN Page 1 of 4
Site Location CARLAND, CA Date 5-3-94
Well No. MNI Time Began 0930
Weather CLEAR 70°F Completed 0955
EVACUATION DATA
Description of Measuring Point (MP) WELL BOX AT GRADE
Total Sounded Depth of Well Below MP 19,50
- Depth to Water Below MP 5,72 of Casing 2"
= Water Column in Well 13,78
Gallons in Casing $\frac{2 \cdot 2}{(30\% \text{ porosity})}$ + Annular Space $\frac{(\times 10)}{(\times 10)}$ = Total Gallons $\frac{22}{(\times 10)}$
Gallons Pumped Prior to Sampling 22
Evacuation Method PVC BAILER
SAMPLING DATA / FIELD PARAMETERS
Inspection for Free Product: None Devectes (thickness to 0.1 inch, if any)
(thickness to 0.1 inch, if eny) Time 0942 0950 6938 0945
Gals Removed 0 10 16 22

Temperature 17.4 17.6 17.9 18.5

Conductivity 430 430 380 340

color / Odor CLR/CAS GRY/ORG GRE/ORE GRY/ORG

Turbidity Low HIEH LOW MED (5-2-94)

Comments: NovE

рн 6.9 6.8 6.7

Project/No. PACIFIC OXYGER	
Site Location <u>CAKCAND</u> , CA	5-2-94 Date 5-3-94
Well No. MN2	
Weather CLETTE 70°F	Time Began <u>1025</u> Completed <u>1150</u>
EVACUATION DATA	
Description of Measuring Point (MP) WEL	L BOX AT GRABE
Total Sounded Depth of Well Below MP 23.24	
- Depth to Water Below MP 7,8/	Diameter of Casing
= Water Column in Well <u>15,43</u>	
Gallons in Casing 2-5 + Annular Space	(x/0) = Total Gallons 25
(30% porosity)	25
_	lons Pumped Prior to Sampling 25
Evacuation Method PVC E	BAILER
SAMPLING DATA / I	FIELD PARAMETERS
Inspection for Free Product: Nove (thickness to 0.1 inch, if any)	1
Time 1015 1025	1025 /130
Gals Removed	20 25
Temperature <u>16,5</u> <u>16.8</u>	17.9 18.5
Conductivity 600 650	600 600
ph 6.8 6.7	
color / Odor Low/ace GRY/DRG	Gerlone Gor/ Oct
Turbidity Lon HICH	MED HIGH
(5-2-94)	

Project/No. PACIFIC OXYCEN Page 3 of 4 Site Location ORKIAND, CA Well No. MW 3 Weather CIERR 7000 Completed 1030
EVACUATION DATA
Description of Measuring Point (MP) WELL Box AT Geabe
Total Sounded Depth of Well Below MP 22-96 - Depth to Water Below MP 8:08 Diameter of Casing 2"
= Water Column in Well <u>14.88</u>
Gallons in Casing $\frac{2-4}{2}$ + Annular Space $\frac{24}{2}$ = Total Gallons $\frac{24}{2}$
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 1028 1035 0920 1030
Gals Removed 0 6 9

Turbidity MED HIGH HIGH

Turbidity $M \in \Delta$ H (5-2-94)

Comments: * SENATERET

Project/No. PACIFIC OXYG	Page 4 of 4
Site Location OAKLAND, CA	5-2-94 Date 5-3-94
Well No. MW 4	Time Began 1045 Completed 1115
Weather CLEAR 70°F	Completed /// 5
EVACUATION DAT	' A
Description of Measuring Point (MP)	u Box AT GRADE
Total Sounded Depth of Well Below MP 14.30	-
- Depth to Water Below MP 7, 58	Diameter // "
= Water Column in Well 6.72	
Gallons in Casing $4.3 + Annular Space$	(NONE) = Total Gallons 4.3
(Jon porosity)	
	allons Pumped Prior to Sampling /5
Evacuation Method PVC B	AILER
•	·
SAMPLING DATA /	FIELD PARAMETERS
Inspection for Free Product: None	DETECTED
(thickness to 0.1 inch, if any)	
Time 1045 1050	
Gals Removed	10 15
Temperature <u>18.6</u> 18.7	18.8 18.9
Conductivity <u>380</u> <u>385</u>	
ph 6.7 6.6	6.5 6.5
color / Odor CLA/ORE CLA/OR	e ciplose cirlose
Turbidity Low Low (5-2-94)	Lon Lon
(5-2-94) Comments: $NonE$	(5-2-74)
Comments: / VOIVC	



Underground Contamination Investigations, Groundwater Consultants, Environmental Engineering

Project:	PACIFIC OXYGEN	
Date:	5-2-94	

WELL #	ELEVATION	DTW	PRODUCT	COMMENTS
mu 1		5.72	_	
mn 2		7.81	_	
mn3		8.08		·
MN 3 MN 4 MN 5 MN 6		7.58		
mn5	(In	accessil	U)	
mn6		7,57	_	
	· · · · · · · · · · · · · · · · · · ·			
	Vicinitation of the second of			

ATTACHMENT B

ANALYTICAL RESULTS: GROUNDWATER



PRIORITY ENVIRONMENTAL LABS

Precision Environmental Analytical Laboratory

May 09, 1994

PEL # 9405014

HAGEMAN - AGUIAR, INC.

Attn: Jeffrey Roth

Re: Four water samples for Gasoline/BTEX and TEPH analyses.

Project name: Pacific Oxygen

Project location: Union St., - Oakland, CA.

Date sampled: May 03, 1994

Date extracted: May 05-06, 1994

Date submitted: May 05, 1994 Date analyzed: May 05-06, 1994

RESULTS:

SAMPLE I.D.	(ug/L)	Gasoline (ug/L)	Diesel (ug/L)	(ug/L)	I	Benzene	Total in Xylenes (ug/L)	s Oil S	pirits
MW 1 MW 2 MW 3 MW 4	N.D. N.D. N.D. N.D.	N.D. N.D. 22000 900	N.D. N.D. N.D.	N.D. N.D. 69 7.3	N.D. N.D. 39 3.2	N.D. N.D. 60 0.5	N.D. N.D. 110 14	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.	N.D.	N.D.	N.D.
Spiked Recove	ry	80.2%	100.1%	72.7%	76.8%	92.0%	98.0%	- -	
Duplica Spiked Recove				88.6%	ጸብ ሰጅ	84.5%	73.8%	p 77 81	
Detecti	on	•							
limit	50	50	50	0.5	0.5	0.5	0.5	0.5	50
Method Analy			3510 8015	602	602	602	602	3510 / 8015	3510 / 8015

David Duong Laboratory Director

1764 Houret Court Milpitas, CA. 95035

Tel: 408-946-9636

Fax: 408-946-9563

CHAIN OF CUSTODY RECORD

PROJECT NAME AND ADDRESS: PACIFIC OXYGEN LINION ST. OAKLAND, CA				HAGEMAN - AGUIAR, INC. 3732 Mt. Diablo Blvd., Suite 372 Lafayette, CA 94549 (415)284-1661 (415)284-1664 (FAX)			ANALYSIS REQUESTED						
CROSS REFERENCE NUMBER	DATE	TIME	S O I L	W A T E R	STATION LOCATION			/ Ř	TO SE	X/	/	/	REMARKS
mnl	5/3/94			X	MONITOR WELL		×						NORM TAT
MNZ	5/3/94			X		#2	X						1
MN3	5/2/94			X	V	#3	\rightarrow	-/`					
MN 4	5/3/94		 	X	<u> </u>	7-4	\perp	\times					ν
			<u> </u>					+					
								┪					
	:		<u> </u>					+					
								<u> </u>					
W								1_					
			<u> </u>			\mathcal{U}		\mathcal{V}			<u> </u>		
RELINQUISHED BY	(Signature)	$ \prec $			DATE 5/5/90 1 TIME 0800	RECEIVED BY/ (Signa	iture)	Ca	w	-			DATE \$5/9 TIME 080
RELINQUISHED BY	: (Signature)	, ,				RECEIVED BY: (Signa	iture)	1					DATE TIME
RELINQUISHED BY: (Signature)					TIME	***************************************						DATE TIME	
RELINQUISHED BY: (Signature)					DATE-5/5/9 4 TIME 0 4 0 0	RECEIPED FOR LABO	A LABORATORY BY: (Signature)					DATE S/5/4 TIME 9:50	