

SUFEB 16 AMILY

Underground Contamination Investigations, Groundwater Consultants, Environmental Engineering

REPORT OF
QUARTERLY GROUNDWATER SAMPLING

(sampled January 28, 1994)

PACIFIC CRYOGENIC COMPANY 2311 Magnolia Street Oakland, CA

February 3, 1994

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

FIGURE 2. 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 January 28, 1994, 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 January 28, 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. conductivity, temperature, and pH meters were present on-site during the monitoring well sampling. As the purging process proceeded, the three parameters were monitored. 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. 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 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.

#### III. RESULTS OF WATER LEVEL MEASUREMENTS

#### Shallow Groundwater Flow Direction.

Shallow water table elevations were measured on February 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 in the easterly direction during this round of groundwater sampling.

#### 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 = 0.3'/25' = 0.012.

#### 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
February 2, 1994

Well	Top of Casing Elevation (feet)	Depth to Water (feet)	Water Table Elevation (feet)
MW-1	99.27	4.85	94.42
MW-2	100.00	7.45	92.55
MW-3	100.02	7.81	92.21
MW-4	99.95	7.28	92.67

FIGURE 3. Shallow Groundwater Table Contour Map. (2-2-94)

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	
MW-1	95.58	92.01	91.11	97.17	95.17	92.07	91.78	94.42	
MW-2	93.25	91.60	90.83	94.24	92.69	91.46	91.04	92.55	
MW-3	92.52	91.87	90.65	94.43	92.64	91.21	91.14	92.21	
MW-4		<b></b>				91.48	91.16	92.67	
Flow Direction	SE	SE	E	SE	SE	E	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, Kerosene, Motor Oil and Mineral Spirits (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-1, MW-3 and MW-4 at concentrations of 190  $\mu$ g/L (ppb), 7,500  $\mu$ g/L (ppb) and 830  $\mu$ g/L (ppb), respectively. In addition, Benzene was detected in the groundwater samples collected from wells MW-1, MW-3 and MW-4 at concentrations of 5.7  $\mu$ g/L (ppb), 8.5  $\mu$ g/L (ppb) and 8.5  $\mu$ g/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-3 and MW-4 at concentrations of 310  $\mu g/L$  (ppb) and 160  $\mu g/L$  (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 03-04-92 04-03-92 06-16-92 10-09-92 01-07-93 04-23-93 07-16-93 11-08-93 <b>01-28-94</b>	 460 300 220 ND 210 280 110 ND	1,200 120 21 54 ND 0.7 0.9 ND ND	18 9.0 6.0 17 ND 3.7 1.3 ND ND 4.9	7.1 16 15 29 ND 4.4 2.9 0.5 ND 6.7	37 44 36 73 ND 9.6 6.2 1.1 ND
MW-2	03-04-92 04-03-92 06-16-92 10-09-92 01-07-93 04-23-93 07-16-93 11-08-93	ND ND ND ND ND ND ND	ND ND ND ND ND ND ND	ND ND ND ND ND ND ND	ND ND ND ND ND ND ND	ND ND ND ND ND ND ND
Detectio	n 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	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
	01-26-94	7,500	8.5	10	50	95
MW-4	01-07-93	4,800	6.4	25	60	110
141 44	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
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 03-04-92 04-03-92 06-16-92 10-09-92 01-07-93 04-23-93	 ND  ND ND	5,400 590 ND 730 ND ND ND		 ND  ND ND
	07-16-93 11-08-93 <b>01-28-94</b>	  ND	ND ND	 ND	 ND
MW-2	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	 ND  ND ND   ND	ND ND ND ND ND ND ND	     ND	 ND  ND ND   ND
Detecti	on 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 06-16-92 10-09-92 01-07-93 04-23-93 07-16-93 11-08-93 <b>01-28-94</b>	 ND  ND   ND	360 ND ND ND ND ND ND ND	370	 ND  ND ND   ND
MW-4	01-07-93 04-23-93 07-16-93 11-08-93 <b>01-28-94</b>	ND    ND	ND ND ND ND	   480	ND    ND
Detection	on Limit	50	50	50	50

respectively. Mineral Spirits were also detected for the first time in the groundwater samples collected from well MW-3 and MW-4 at concentrations of 370  $\mu g/L$  (ppb) and 180  $\mu g/L$  (ppb), respectively.

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

#### Chemical Concentration Contours.

Figures 4, 5 and 6 show lines of equal concentration for Gasoline, Diesel and Mineral Spirits 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.

AVENUE GRAND WEST

FIGURE 4. Lines of Equal Concentration of <u>Gasoline</u> in ug/L (ppb) in the Shallow

FIGURE 5. Lines of Equal

Concentration of <u>Diesel</u> in ug/L

(ppb) in the Shallow Groundwater

(1-28-94).

FIGURE 6. Lines of Equal

Concentration of Mineral Spirits

in the Shallow

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

February 3, 1994

No. C-34262

No. C-34262

RCE 34262

Gerard F. Aarons

Geologist

## ATTACHMENT A

Project/No. PACIFIC OXYGEN Page 1 of 4
Site Location BAKKAND Date 1/27/94
Well No. MW / Time Began 1003
Weather <u>CLEAR</u> 60°F Completed 1040
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 3.46 Diameter of Casing 2"
= Water Column in Well 16,04
Gallons in Casing $\frac{2.6}{4}$ + Annular Space $\frac{(x/0)}{4}$ = Total Gallons $\frac{2.6}{4}$
Gallons Pumped Prior to Sampling 26
Evacuation Method PVC BAILER
SAMPLING DATA / FIELD PARAMETERS
Inspection for Free Product: None Devected (thickness to 0.1 inch, if any)
Time 1003 1010 1023 1031
Gals Removed 0 10 18 26
$C^{\circ}$ Temperature 19.5 19.9 20.1 19.5
Conductivity 350 360 380 380
pH 6,8 6.7 6,4 6,4
color , odor CLR/ORE GRY/ORE GRY/ORE GRY/ORE
Turbidity LOW HIGH HIGH HIGH
Comments: None

Project/No. PACIFIC UXYEEN	Page 6 4
Site Location CAKLAND	+ 1/28/94
Well No. MN 2	Date 1/27/94
Time	Began <u>//20</u>
Weather <u>CLEAR 60°F</u> Comp	oleted 1015
EVACUATION DATA	
Description of Measuring Point (MP) West Box	AT GRASE
Total Sounded Depth of Well Below MP 23.24	•
- Depth to Water Below MP 6,74 of Co	asing 2"
= Water Column in Well 16.50	
Gallons in Casing $2.6 + \text{Annular Space} \left( \frac{\times 10}{} \right) =$	Total Gallons 26
(30% porosity)	
Gallons Pumped Pric	or to Sampling 26
Evacuation Method PVC BAILER	
SAMPLING DATA / FIELD PARAME	TERS
16 11 1	_ <b>X</b>
Inspection for Free Product: Nove DETEC  (thickness to 0.1 inch, if any)	TED
Time 1120 1127 1135	į .
Gals Removed 0 10 18	26
C'Temperature 16.4 17.9 18.6	17.5
Conductivity <u>550</u> 600 700	650
pH 6.8 6.8 6.8	6.9
Color / Odor CLR/ORE BRN/ORE BRN/ORE	Berlaco
Turbidity LOW HIGH HIGH	HIGH
Comments: NONE * DELIGIEREN	1-28-94

Project/No. PACITIC OXYGEN Page 3 of 4
Site Location <u>Ogkumb</u> Date 28/94
Well No. MW 3
Weather CLEAR 60° F Completed 1035
EVACUATION DATA
Description of Measuring Point (MP) WELL BOX AT CRASE
Total Sounded Depth of Well Below MP 22-96 Diameter
- Depth to Water Below MP 7.15 of Casing 2
= Water Column in Well 15-81
Gallons in Casing $\frac{2.5}{}$ + Annular Space $\frac{(x/0)}{}$ = Total Gallons $\frac{2.5}{}$
(30% porosity)
Gallons Pumped Prior to Sampling
Evacuation Method PVC Bances
SAMPLING DATA / FIELD PARAMETERS
Inspection for Free Product: NONE DETECTED
(thickness to 0.1 inch, if any)
Time <u>0932 0938 1005 1035</u>
Gals Removed 0 4 7
Co Temperature 19.8 21.1 20.2
Conductivity <u>550</u> <u>550</u> <u>550</u>
pH 6.4 6.4 6.7 10
color / Odor CLR/HC GRY/HC GRY/HC SI
Turbidity Low HIGH HIGH
1 20 00
Comments: * DENATERED

Project/No. PACIFIC OXYGEN	Page 4 of 4
Site Location <u>OAKLAND</u>	Date 1/27/94
Well No. <u>MW 4</u>	Began <u>1055</u>
	pleted
EVACUATION DATA	
Description of Measuring Point (MP) WELL BOX	AT GRADE
Total Sounded Depth of Well Below MP 14.30	
- Depth to Water Below MP 7.72 of C	eter dasing
= Water Column in Well 6.58	
Gallons in Casing $\frac{4-2}{}$ + Annular Space (NONE) =	Total Gallons 4.2
(30% porosity)	
	or to Sampling /5
Evacuation Method	
CAMPLIANC DATA / FIELD DADAM	TERC
SAMPLING DATA / FIELD PARAM	LIEKS
Inspection for Free Product: NONE DETEC (thickness to 0.1 inch, if any)	TED
Time 1055 1859 1104	1110
Gals Removed	_15_
C <sup>o</sup> Temperature 19.5 19,9 20,1	19.5
Conductivity <u>350</u> <u>360</u> <u>380</u>	300
ph <u>6.8</u> 6.7 6.4	6.4
color / Odor <u>CLR/ORE GRY/ORE GRY/ORE</u>	GRY/ORG
Turbidity Low HIGH HIGH	HIEH
Comments: NONE	·



Underground Contamination Investigations, Groundwater Consultants, Environmental Engineering

Project:	PACIFIC	OXYGEN
Date:	2-2-94	

WELL #	ELEVATION	DTW	PRODUCT	COMMENTS
/		4.85		
2		4.85 7.45		
3		7.81 7.28		
4		7.28		
·				

ATTACHMENT B

ANALYTICAL RESULTS: GROUNDWATER



# PRIORITY ENVIRONMENTAL LABS

Precision Environmental Analytical Laboratory

January 29, 1994

PEL # 9401093

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: Jan 27-28, 1994 Date extracted: Jan 28-29, 1994 Date submitted: Jan 28, 1994 Date analyzed: Jan 28-29, 1994

RESULTS:

SAMPLE I.D.	Gasoline	Diesel	Benzene	Toluene	Ethyl Benzene	Total Xylenes	
	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	
MW 1	190	N.D.	5.7	4.9	6.7	21	
MW 2	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	
MW 3	7500	310	18	25	50	95	
MW 4	830	160	8.5	10	12	27	
Blank	N.D.	N.D.	Ņ.p.	N.D.	N.D.	N.D.	
Spiked Recovery	84.3%	94.4%	94.6%	99.3%	88.4%	105.1%	
Duplicate Spiked							
Recovery	102.4%	107.9%	102.78	109.8%	106.6%	101.4%	
Detection							
limit	50	50	0.5	0.5	0.5	0.5	
Method of	5030 /	3510	/				
Analysis	801\$	8015	60.2	602	2 602	602	

David Duong Laboratory Director

1764 Houret Court Milpitas, CA. 95035

Tel: 408-946-9536

Fax: 408-946-9663



# PRIORITY ENVIRONMENTAL LABS

Precision Environmental Analytical Laboratory

January 29, 1994

PEL # 9401093

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: Jan 27-28, 1994 Date extracted: Jan 28-29, 1994 Date submitted: Jan 28, 1994 Date analyzed: Jan 28-29, 1994

#### RESULTS:

SAMPLE I.D.	Kerosene	Gasoline	Diesel	Benzene	Toluene	Ethyl enzene	Total Xylenes		Minera Spirit
1.0.	(ug/L)	(ug/L)	(ug/L)	(ug/L)		(ug/L)	(ug/L)	(mg/L)	(nd/T)
MW 1 MW 2 MW 3 MW 4	N.D. N.D. N.D. N.D.	190 N.D. 7500 830	N.D. N.D. 310 160	5.7 N.D. 18 8.5	4.9 N.D. 25 10	6.7 N.D. 50 12	21 N.D. 95 27	N.D. N.D. N.D.	N.D. N.D. 370 180
Blank	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Spiked Recover	y 83.1%	84.3%	94.48	94.68	99.3%	88.49	ł 105.	18	91.2
Duplicat Spiked Recover		102.4%	107.9%	102.7%	109.8%	106.6	<b>&amp;</b> 101.	4%	da de ti-
Detectio limit	ກ 50	50	50	0.5	0.5	0.5	0.5	0.	<b>5</b> 50
Method o	-	5030 / 8015	3510 / 8015	602	602	602	602	3510 801	•

David Duong Laboratory Director

1764 Hourst Court Milnitas CA 05035

Tal. 409 046,0636

Esv. 408-046-0665

**PEL** # <sup>9401093</sup>

## CHAIN OF CUSTODY RECORD

INV # 24437

PROJECT NAME AND ADDRESS: PACIFIC OXYGEN  LINION ST  CANCIAND, 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 0 - L	W A T E R	STA	TION LOCATION	ON		/.	TPH			/	REMARKS
mn/	1-27-94	1035		X	MONIT	or Wer	L # 1		X	X				NORM TAT
MW2				X	1		#2		X	×				1
	1-2894			X	/_	<del></del>	#3		X	X				
MW 4	1-27 94	1140		X	V		# 4		X	X		<u> </u>	<u> </u>	
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RELINQUISHED BY:	(Simplema)													
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RELINQUISHED BY:	(Signature)					DATE	RECEIVED BY: (Signa	ature)						DATE
RELINQUISHED BY:	(Signatura)	· ·				TIME								TIME
The Industries of Taylands						DATE TIME					DATE /- 28- TIME //25			