



April 16, 1992

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Alameda County Environmental Health Services
Hazardous Materials Division
80 Swan Way Room 200
Oakland, California 94621

Attn: Mr. Dennis Byrne

**GROUNDWATER MONITORING REPORT
FEBRUARY 1992 SAMPLING EVENT
EMERY BAY PLAZA
1650 65TH STREET, EMERYVILLE, CALIFORNIA**

Dear Mr. Byrne:

This letter presents data collected by PES Environmental, Inc. (PES) during the February 28, 1992 quarterly groundwater monitoring conducted at Emery Bay Plaza, located at 1650 65th Street in Emeryville (the Site, Plate 1). PES has been retained by P. O. Partners, on behalf of Emery Bay Plaza, to conduct groundwater monitoring at the site. PES also provides operation, maintenance and monitoring of a groundwater extraction and treatment system at the site.

The purpose of the groundwater monitoring program at this site is to: 1) evaluate the presence of hydrocarbons in groundwater; 2) provide data to assess the performance and effectiveness of the groundwater remedial program; and 3) monitor seasonal water level variations at the site. The monitoring is performed in accordance with California Regional Water Quality Control Board (RWQCB) guidelines and the approved remedial action plan for this site.

BACKGROUND

Six monitoring wells and one extraction well were installed at the site (Plate 2) following removal of an on-site underground storage tank (UST) in July 1987 and several off-site USTs in September and October 1989. Groundwater has been monitored since November, 1989. An activated carbon groundwater treatment system was installed and its operation was begun in December, 1990. Discharges are to the sanitary sewer under the authority of East Bay Municipal Utility District wastewater discharge permit (Permit No. 502-45131). The present sampling is the tenth consecutive sampling event since groundwater monitoring was initiated, and the second to be conducted by PES. The timing of this sampling event serves to resume the regular quarterly monitoring schedule at the site.

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GROUNDWATER ELEVATIONS

Water-level Measurement Procedures

Prior to sampling the static groundwater level in each of the six monitoring wells was measured to a precision of 0.01 feet using an electronic water-level indicator. Prior to each measurement, the portion of the water-level indicator that was submerged in the well was cleaned with a mild detergent solution and rinsed with de-ionized water.

Results

Water-level data were converted to water-level elevations referenced to mean sea level (MSL). A groundwater elevation map constructed from the data is presented on Plate 3. An historical summary of groundwater elevations for wells at the site is presented in Table 1, with the exception of data from the August 1991 sampling event, which was unavailable at the time this report was prepared.

Water levels increased slightly in all wells since January 1991. Because of malfunctioning equipment, the groundwater extraction system was not operating at the time of sampling. Based on measured water levels on February 28, 1992, groundwater flow direction at the site was calculated to be toward the southwest, with an approximate gradient of 0.01 foot per foot. This is consistent with historical groundwater flow direction and gradient.

GROUNDWATER SAMPLING AND ANALYTICAL TESTING

Sampling Protocol

Groundwater samples were collected on February 28, 1992 by Blaine Tech Services, Inc. (Blaine Tech) from Monitoring Wells MW-2, MW-3, MW-4, MW-5, MW-6, and MW-7. Prior to sampling, the groundwater was visually inspected to assess the presence of floating product. A minimum of three well volumes were evacuated prior to sampling using a teflon bladder pump. During pumping the discharge water was measured for pH, temperature, electrical conductivity and turbidity. Groundwater samples were collected with a clean teflon bailer and decanted into clean 40-milliliter glass vials with teflon lined caps.

A sample was also collected on March 3, 1992 by PES from the extraction well (Well EW-1), to monitor chemical conditions of extracted groundwater. The sample was collected from a sample tap located on piping upstream of the treatment system. Water was purged from the sample tap for approximately one minute prior to collection of the sample. Three 40-milliliter glass vials with teflon-lined caps were filled directly from the sample tap.

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Samples were immediately labeled to designate sample number, time and date collected, and analysis requested, and stored in a chilled, thermally insulated cooler for transport to the analytical laboratory for later chemical analysis. The information collected during the groundwater sampling and the chain of custody records are presented in a groundwater sampling report prepared by Blaine Tech, which is provided in Appendix A.

Analytical Program

Groundwater samples from all wells were sent to Superior Precision Analytical, Inc. (Superior) in San Francisco, California, a State-Certified laboratory. Samples were analyzed for total petroleum hydrocarbons as gasoline (TPH gas) by EPA Test Method 5030/8015-modified, and benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Test Method 5030/8020.

Analytical Results

Analytical results for all wells, including historical monitoring results for the previous sampling events and relevant federal and state standards, are presented in Table 2. Laboratory reports and chain of custody records are provided in Appendix B. The distribution of hydrocarbons in groundwater at the site on February 28, 1992 is presented on Plate 4.

Detectable levels of TPH were found in samples from 4 of the 7 wells, and BTEX was detected in all wells except MW-6. Laboratory notes indicate that the TPH results for wells MW-3, MW-5, and MW-7 are not typical for gasoline. The chemist at Superior indicated that the chromatogram pattern was indicative of a diesel fuel. Consistent with historical monitoring data, Well MW-2, located within the backfill of the soil excavation at the former on-site UST, exhibited the highest levels of dissolved hydrocarbons (TPH and BTEX). EW-1, the extraction well, shows increased levels of TPH gas and BTEX.

SUMMARY

Groundwater elevations have increased slightly since the January, 1992 sampling. The groundwater gradient continues to be toward the southwest. MW-2, the well nearest the former tank location, shows slightly decreased levels of TPH gas and BTEX. EW-1 shows increased concentrations of hydrocarbons, which is likely due to the sporadic operation of the extraction system during the month prior to sampling. Groundwater extraction was resumed on March 9, 1992.

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PES appreciates the opportunity to be of technical assistance on this project. If you have any questions or comments, please do not hesitate to call either of the undersigned.

Yours very truly,

PES ENVIRONMENTAL, INC.

Jane H. Gill

Jane H. Gill
Staff Geologist

Andrew A. Briefer

Andrew A. Briefer, P. E.
Senior Engineer

Robert S. Creps

Robert S. Creps, P. E.
Associate Engineer



Attachments:

- | | |
|------------|--|
| Table 1 | Summary of Groundwater Elevations |
| Table 2 | Summary of Analytical Results for Groundwater Samples |
| Plate 1 | Site Location Map |
| Plate 2 | Well Location Map |
| Plate 3 | Groundwater Elevation Contours on February 28, 1992 |
| Plate 4 | Dissolved Hydrocarbons in Groundwater on February 28, 1992 |
| Appendix A | Groundwater Sampling Reports |
| Appendix B | Analytical Laboratory Reports |

cc: Mr. Thomas Gram - P. O. Partners
Ms. Lynn Tolin - Emery Bay Plaza
Mr. Matt Dulka - Hansen, Bridgett, Marcus, Vlahos & Rudy

Table 1. Summary of Groundwater Elevations Through February 1992
Emery Bay Plaza
1650 65th Street, Emeryville, California

			(feet MSL)	(feet)	(feet MSL)
MW-2	21-Feb-90	ES	15.75	11.72	4.03
	25-May-90	ES	15.75	11.83	3.92
	29-Aug-90	ES	15.75	11.72	4.03
	29-Nov-90	ES	15.75	11.99	3.76
	1-Mar-91	ES	15.79	12.87	2.92
	28-May-91	ES	15.79	12.21	3.58
	1-Aug-91	ES	15.79	NA	NA
	27-Jan-92	PES	15.79	11.78	4.01
	28-Feb-92	PES	15.79	11.70	4.09
MW-3	21-Feb-90	ES	12.45	9.18	3.27
	25-May-90	ES	12.45	9.25	3.20
	29-Aug-90	ES	12.45	9.50	2.95
	29-Nov-90	ES	12.45	9.80	2.65
	1-Mar-91	ES	12.43	9.51	2.92
	28-May-91	ES	12.43	9.03	3.40
	1-Aug-91	ES	12.43	NA	NA
	27-Jan-92	PES	12.43	9.44	2.99
	28-Feb-92	PES	12.43	8.80	3.63
MW-4	21-Feb-90	ES	12.24	8.63	3.61
	25-May-90	ES	12.24	8.58	3.66
	29-Aug-90	ES	12.24	8.50	3.74
	29-Nov-90	ES	12.24	8.74	3.50
	1-Mar-91	ES	12.24	8.65	3.59
	28-May-91	ES	12.24	8.57	3.67
	1-Aug-91	ES	12.24	NA	NA
	27-Jan-92	PES	12.24	8.62	3.62
	28-Feb-92	PES	12.24	8.52	3.72
MW-5	21-Feb-90	ES	12.81	6.91	5.90
	25-May-90	ES	12.81	7.58	5.23
	29-Aug-90	ES	12.81	7.75	5.06
	29-Nov-90	ES	12.81	8.17	4.64
	1-Mar-91	ES	12.82	8.11	4.71
	28-May-91	ES	12.82	7.39	5.43
	1-Aug-91	ES	12.82	NA	NA
	27-Jan-92	PES	12.82	7.90	4.92
	28-Feb-92	PES	12.82	7.73	5.09

Table 1. Summary of Groundwater Elevations Through February 1992
Emery Bay Plaza
1650 65th Street, Emeryville, California

			(feet MSL)	(feet)	(feet MSL)
MW-6	1-Mar-91	ES	12.03	8.59	3.44
	28-May-91	ES	12.03	8.35	3.68
	1-Aug-91	ES	12.03	NA	NA
	27-Jan-92	PES	12.03	8.32	3.71
	28-Feb-92	PES	12.03	8.08	3.95
MW-7	1-Mar-91	ES	12.9	7.51	5.39
	28-May-91	ES	12.9	7.07	5.83
	1-Aug-91	ES	12.9	NA	NA
	27-Jan-92	PES	12.9	7.28	5.62
	28-Feb-92	PES	12.9	7.04	5.86

NOTES: Ft MSL = feet above Mean Sea Level
 ES = Engineering-Science, Inc.
 PES = PES Environmental, Inc.
 NA = Information not available at this date.

Table 2. Summary of Analytical Results for Groundwater Samples Through February 1992
 Emery Bay Plaza
 1650 65th Street, Emeryville, California

Concentrations expressed in milligrams per liter (mg/l) - equivalent to parts per million (ppm)

Well Number	Sample Date	Sampled by	TPH as Gasoline	TPH as Diesel	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	Purgeable Halocarbons	Lead
					MCL = 0.00	DAL = 0.1	MCL = 0.68	MCL = 1.75	MCL = 0.0005	MCL = 0.005
MW-2	Nov-89	ES	100	NA	8.4	7.4	2.4	13	0.015 *	0.05
	Feb-90	ES	54	NA	7.8	5.6	1.6	8.4	0.032 *	0.021
	May-90	ES	40	NA	7.8	7.5	1.6	7.6	0.076 *	0.025
	Aug-90	ES	49	4.6	9	8	ND	8.9	0.040 *	0.0059
	Nov-90	ES	73	3.5	6.9	5.9	1.4	7.4	NA	NA
	Mar-91	ES	72	1.8	5.5	6.6	1	7.7	NA	NA
	May-91	ES	31	ND	8.4	4.7	1.7	6.3	NA	NA
	Aug-91	ES	47	ND	7.6	1.6	7.3	7.8	NA	NA
	Jan-92	PES	77	NA	10	8.7	2	7.6	NA	NA
	Feb-92	PES	70	NA	9.1	6.4	0.53	7.4	NA	NA
MW-3	Nov-89	ES	0.13	NA	0.0022	ND	ND	0.003	ND	ND
	Feb-90	ES	ND	NA	0.0025	ND	ND	ND	NA	0.011
	May-90	ES	ND	ND	0.002	ND	ND	ND	ND	NA
	Aug-90	ES	ND	0.8	0.0044	0.0029	ND	0.0054	NA	NA
	Nov-90	ES	0.9	0.8	0.0034	ND	ND	ND	NA	NA
	Mar-91	ES	ND	ND	0.025	0.025	0.0053	0.32	NA	NA
	May-91	ES	ND	ND	0.0026	ND	ND	ND	NA	NA
	Aug-91	ES	ND	ND	0.0019	ND	ND	ND	NA	NA
	Jan-92	PES	0.092	NA	0.0024	<0.0003	0.0006	<0.0003	NA	NA
	Feb-92	PES	0.160***	NA	0.0028	<0.0003	0.0007	0.0005	NA	NA

Table 2. Summary of Analytical Results for Groundwater Samples Through February 1992
 Emery Bay Plaza
 1650 65th Street, Emeryville, California

Concentrations expressed in milligrams per liter (mg/l) - equivalent to parts per million (ppm)

Well Number	Sample Date	Sampled by	TPH as Gasoline	TPH as Diesel	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	Purgeable Halocarbons	Lead
					MCL = 0.00	DAL = 0.1	MCL = 0.68	MCL = 1.75	MCL = 0.0005	MCL = 0.005
MW-4	Nov-89	ES	0.2	NA	0.0023	ND	ND	ND	ND	ND
	Feb-90	ES	ND	NA	ND	ND	ND	ND	NA	0.006
	May-90	ES	ND	ND	0.001	ND	ND	ND	ND	NA
	Aug-90	ES	ND	0.8	0.0089	0.0071	ND	0.0094	NA	NA
	Nov-90	ES	ND	0.7	0.0027	ND	ND	ND	NA	NA
	Mar-91	ES	NA	ND	0.003	ND	ND	ND	NA	NA
	May-91	ES	NA	ND	0.0024	ND	ND	ND	NA	NA
	Aug-91	ES	NA	ND	0.0015	ND	ND	ND	NA	NA
	Jan-92	PES	<0.05	NA	0.0022	0.0004	<0.0003	0.0007	NA	NA
	Feb-92	PES	<0.05	NA	0.0016	<0.0003	<0.0003	0.0003	NA	NA
MW-5	Nov-89	ES	ND	NA	0.074	ND	ND	0.0042	ND	ND
	Feb-90	ES	ND	NA	0.2	ND	ND	ND	NA	0.012
	May-90	ES	ND	ND	0.11	ND	ND	ND	ND	NA
	Aug-90	ES	ND	0.7	0.066	0.0022	ND	0.0038	NA	NA
	Nov-90	ES	0.6	0.9	0.069	ND	ND	ND	NA	NA
	Mar-91	ES	ND	1.1	0.066	0.0023	ND	ND	NA	NA
	May-91	ES	ND	ND	0.11	ND	ND	ND	NA	NA
	Aug-91	ES	ND	ND	0.078	0.0021	ND	ND	NA	NA
	Jan-92	PES	0.19	NA	0.09	0.0005	<0.0003	0.0006	NA	NA
	Feb-92	PES	0.23***	NA	0.11	0.0009	<0.0003	0.0005	NA	NA

Table 2. Summary of Analytical Results for Groundwater Samples Through February 1992
Emery Bay Plaza
1650 65th Street, Emeryville, California

Concentrations expressed in milligrams per liter (mg/l) - equivalent to parts per million (ppm)

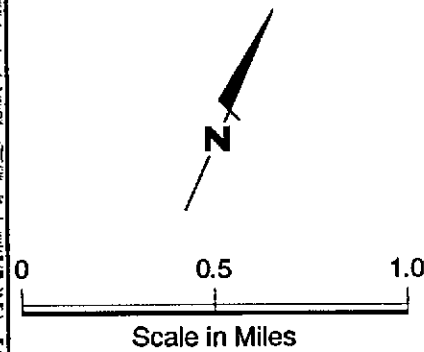
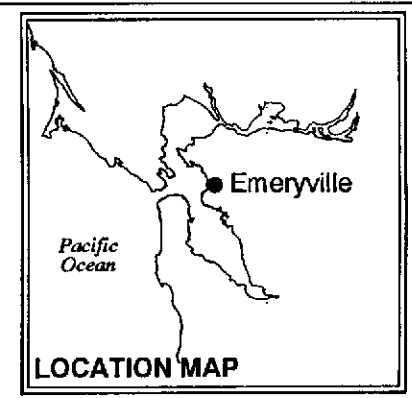
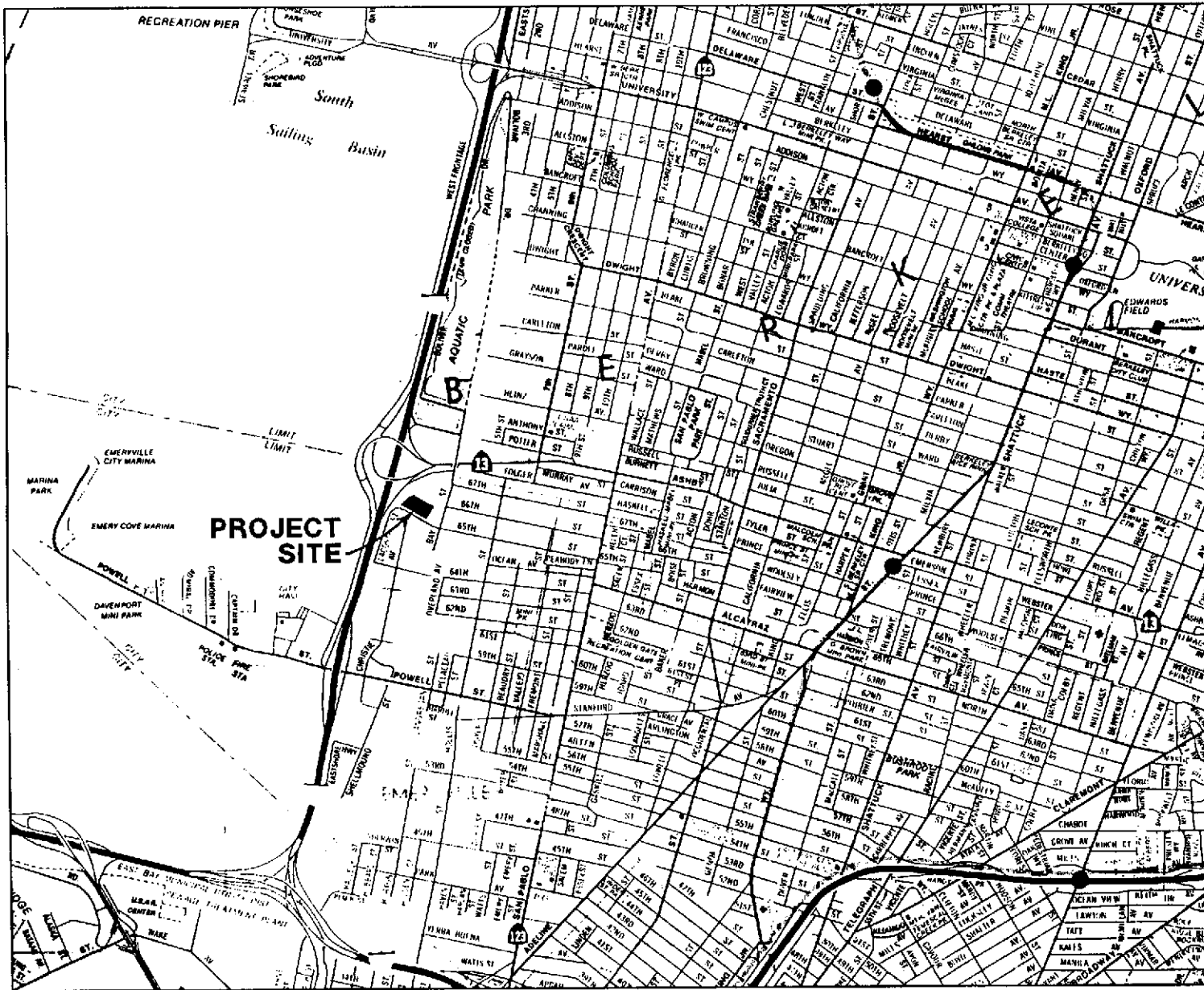
Well Number	Sample Date	Sampled by	TPH as Gasoline	TPH as Diesel	Benzene	Toluene	Ethyl-	Total	Purgeable	Lead
					MCL = 0.00	DAL = 0.1	Benzene MCL = 0.68	Xylenes MCL = 1.75	Halocarbons MCL = 0.0005	MCL = 0.005
MW-6	May-90	ES	NA	ND	ND	ND	ND	ND	ND	ND**
	Aug-90	ES	NA	ND	NA	NA	NA	NA	NA	ND**
	Nov-90	ES	1.2	1.4	0.0012	ND	ND	ND	0.0012	NA
	Mar-91	ES	ND	ND	ND	ND	ND	ND	NA	NA
	May-91	ES	ND	ND	ND	ND	ND	ND	NA	NA
	Aug-91	ES	ND	ND	ND	ND	ND	ND	NA	NA
	Jan-92	PES	<0.05	NA	<0.0003	<0.0003	<0.0003	<0.0003	NA	NA
	Feb-92	PES	<0.05	NA	<0.0003	<0.0003	<0.0003	<0.0003	NA	NA
MW-7	May-90	ES	NA	0.6	0.24	ND	ND	ND	0.24	ND**
	Aug-90	ES	ND	ND	0.081	0.0018	ND	ND	0.0844	ND**
	Nov-90	ES	ND	0.8	0.054	ND	ND	ND	0.054	NA
	Mar-91	ES	ND	ND	0.1	0.0036	ND	ND	NA	NA
	May-91	ES	ND	ND	0.12	0.0027	ND	ND	NA	NA
	Aug-91	ES	ND	ND	0.074	0.0033	ND	ND	NA	NA
	Jan-92	PES	0.27	NA	0.025	0.0005	<0.0003	0.0008	NA	NA
	Feb-92	PES	0.1***	NA	0.033	0.0007	<0.0003	0.0007	NA	NA
EW-1	May-90	ES	20	ND	7.5	4.5	1	6.3	0.068	ND**
	Aug-90	ES	NA	3.5	6	4.2	ND	4.6	0.016 *	ND**
	Nov-90	ES	47	3.1	6	3.4	1	4.7	NA	NA
	17-Dec-90	ES	NA	NA	11	7.9	2.2	10	NA	NA
	19-Dec-90	ES	NA	NA	3.7	2.5	ND	2.3	NA	NA
	21-Dec-90	ES	NA	NA	3.2	2.2	ND	1.7	NA	NA

Table 2. Summary of Analytical Results for Groundwater Samples Through February 1992
 Emery Bay Plaza
 1650 65th Street, Emeryville, California

Concentrations expressed in milligrams per liter (mg/l) - equivalent to parts per million (ppm)

Well Number	Sample Date	Sampled by	TPH as Gasoline	TPH as Diesel	Benzene	Toluene	Ethyl-Benzene	Total Xylenes	Purgeable Halocarbons	Lead
					MCL = 0.00	DAL = 0.1	MCL = 0.68	MCL = 1.75	MCL = 0.0005	MCL = 0.005
EW-1	27-Dec-90	ES	NA	NA	2.9	2.1	0.16	1.5	NA	NA
	4-Jan-91	ES	NA	NA	3.2	2.8	ND	ND	NA	NA
	11-Jan-91	ES	NA	NA	3	2.4	0.2	1.8	NA	NA
	6-Feb-91	ES	NA	NA	0.47	0.23	0.011	0.39	NA	NA
	13-Feb-91	ES	NA	NA	1.2	0.28	ND	0.36	NA	NA
	15-Mar-91	ES	NA	NA	0.13	0.085	0.006	0.17	NA	NA
	3-Jul-91	ES	NA	NA	1.3	0.95	0.22	1.4	NA	NA
	1-Aug-91	ES	NA	NA	0.22	0.19	0.013	0.27	NA	NA
	16-Aug-91	ES	NA	NA	0.17	0.16	0.013	0.19	NA	NA
	13-Nov-91	ES	NA	NA	3.1	0.27	0.04	0.22	NA	NA
	29-Jan-92	PES	2.7	NA	0.57	0.15	0.007	0.26	NA	NA
	3-Mar-92	PES	25	NA	3.6	2.6	0.53	2.6	NA	NA

NOTES: * = 1,2-Dichloroethane concentration (only 1,2-Dichloroethane detected).
 ** = Organic Lead
 *** = TPH quantified as gasoline but chromatogram pattern was not typical of gasoline.
 ES = Engineering-Science, Inc.
 PES = PES Environmental, Inc.
 NA = Not analyzed
 ND = Not detected above method detection limit.
 <0.0005 = Not detected above indicated method detection limit.
 MCL = California Maximum Contaminant level, current as of January 1991.
 DAL = Department of Health Services Action Levels, current as of January 1991.
 TPH = Total Petroleum Hydrocarbons



 **PES Environmental, Inc.**
Engineering & Environmental Services

Site Location Map
1650 65th Street
Emeryville, California

PLATE
1

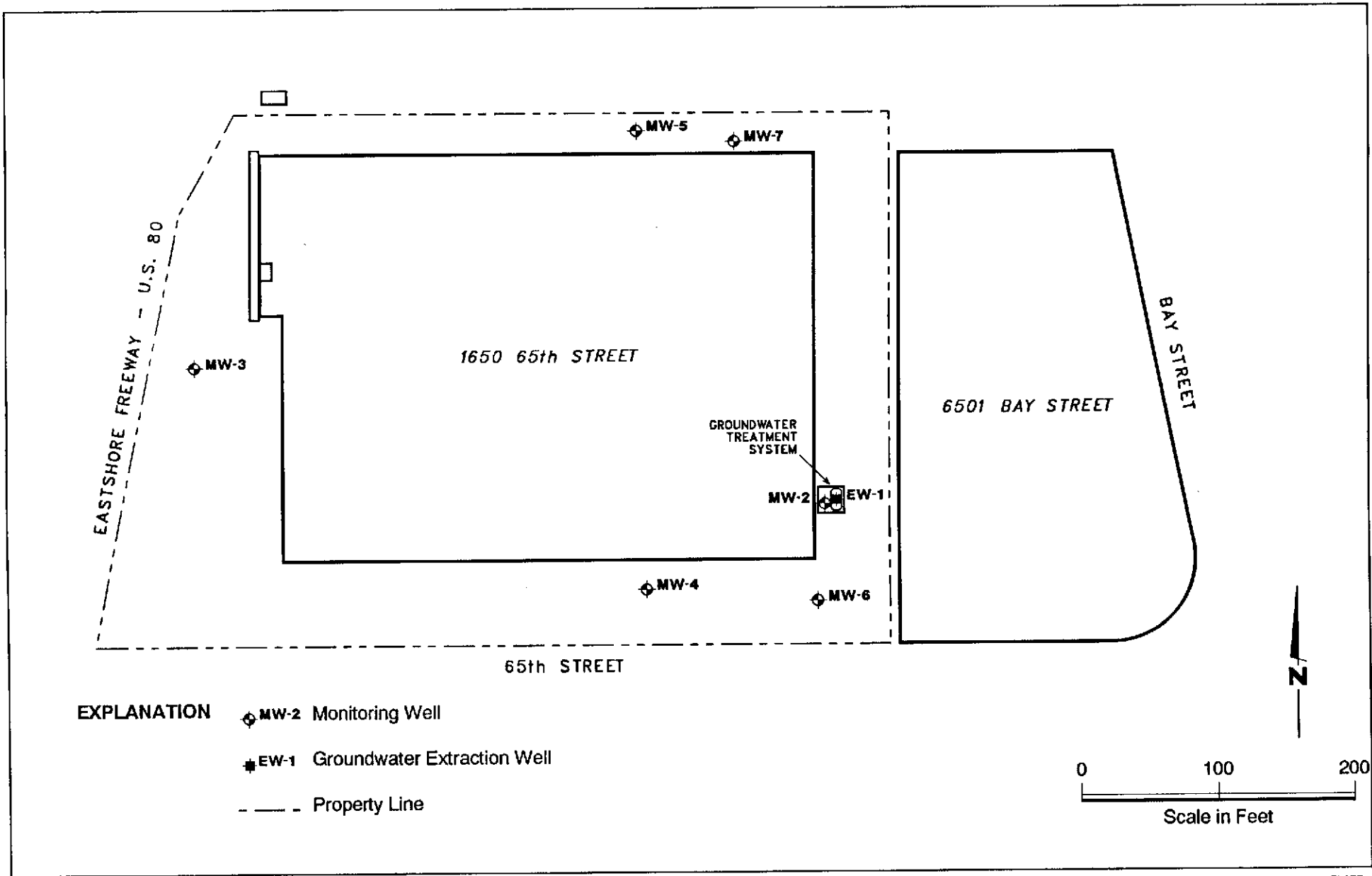
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JG

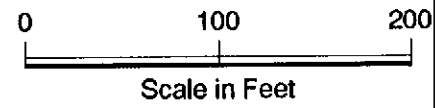
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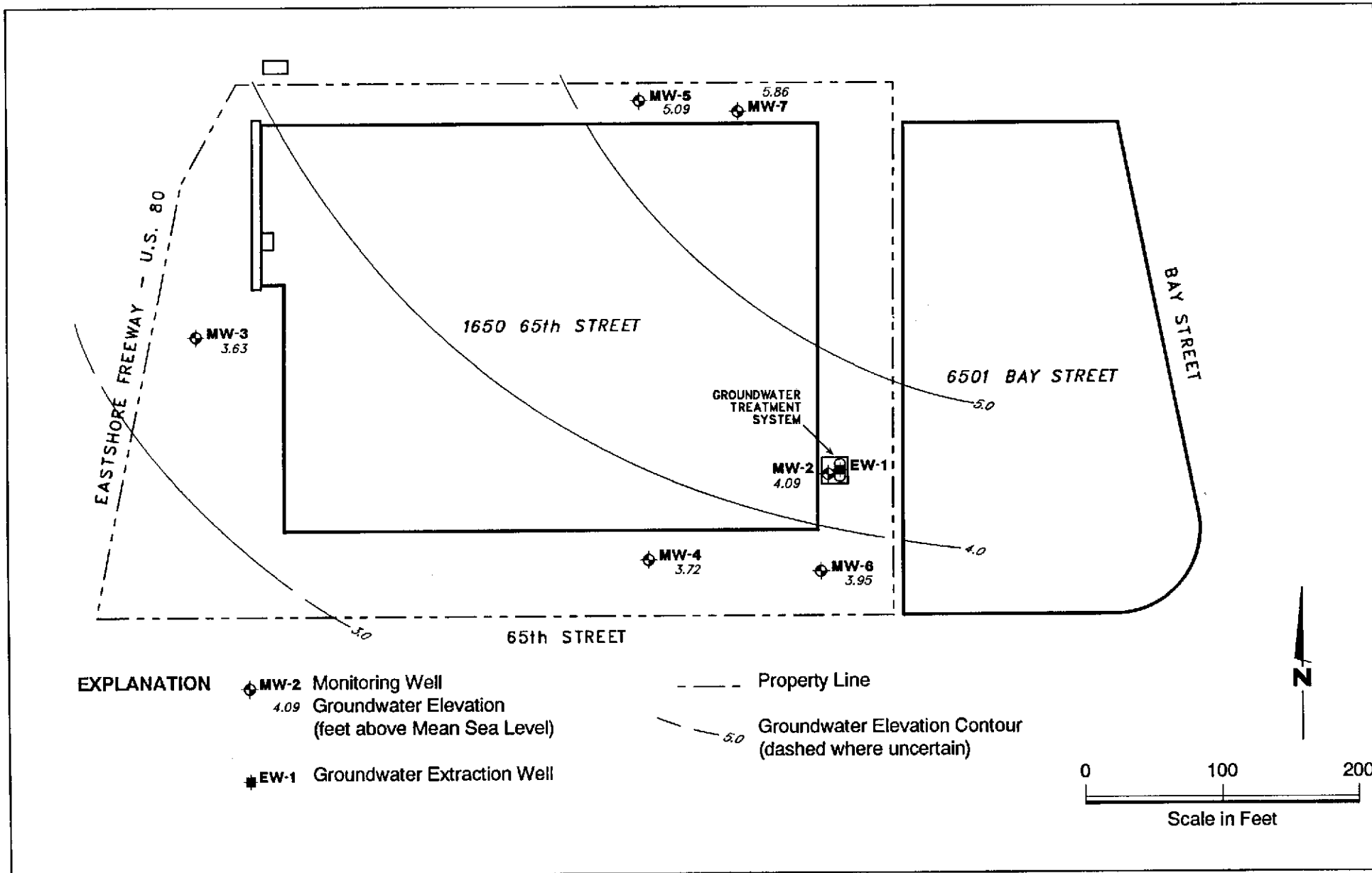
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- EXPLANATION**
- ◆ MW-2 Monitoring Well
 - EW-1 Groundwater Extraction Well
 - - - Property Line

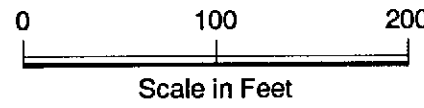


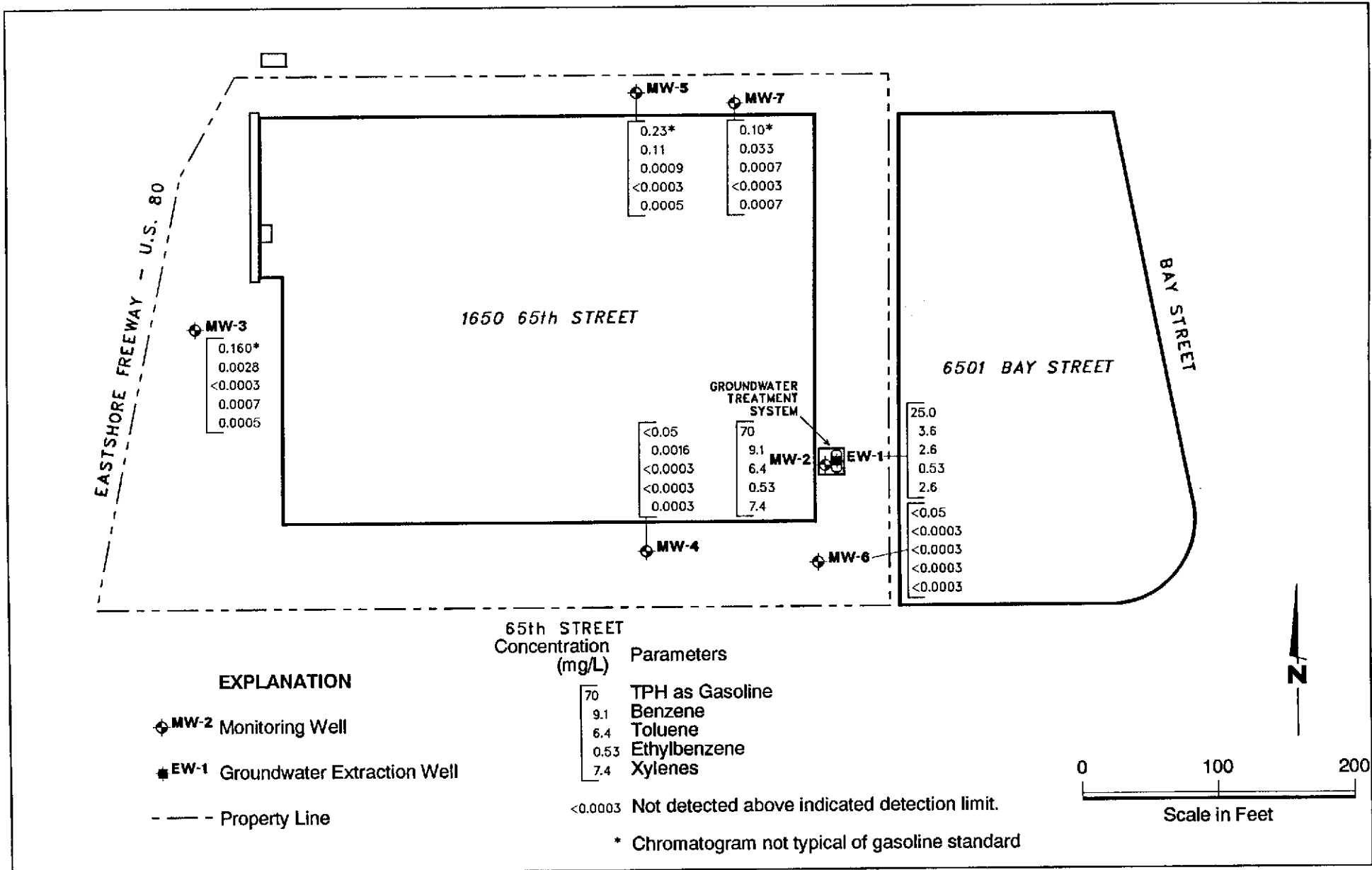


EXPLANATION

- ◆ MW-2 Monitoring Well
4.09 Groundwater Elevation
(feet above Mean Sea Level)
- ◆ MW-3 3.63
- ◆ MW-4 3.72
- ◆ MW-5 5.09
- ◆ MW-6 3.95
- ◆ MW-7 5.86
- EW-1 Groundwater Extraction Well

- Property Line
- - - 5.0 Groundwater Elevation Contour
(dashed where uncertain)







BLAINE TECH SERVICES INC.

985 TIMOTHY DRIVE
SAN JOSE, CA 95133
(408) 995-5535
FAX (408) 293-8773

March 5, 1992

PES Environmental, Inc.
P.O. Box 1833
Novato, CA 94947

Attn: Paul Lowman

SITE:
1650 65th Street
Emeryville, California

PES PROJECT NO.
M6003B

SAMPLING EVENT:
Evacuate and sample six wells

DATE:
February 28, 1992

GROUNDWATER SAMPLING REPORT 920228-A-1

Blaine Tech Services, Inc. performs specialized environmental sampling and documentation as an independent third party. In order to avoid compromising the objectivity necessary for the proper and disinterested performance of this work, Blaine Tech Services, Inc. does not participate in the interpretation of analytical results or become involved with the marketing or installation of remedial systems.

This report deals with the groundwater well sampling performed by our firm in response to your request. Data collected in the course of our work at the site is presented in the **TABLE OF WELL MONITORING DATA**. This data was collected during our inspection, well evacuation, and sample collection. Measurements include the total depth of the well and depth to water. Water surfaces were further inspected for the presence of immiscibles. A series of electrical conductivity, pH, and temperature readings were obtained during well evacuation and at the time of sample collection. Recharge performance can be evaluated by comparing the anticipated three, four, or five case volume evacuation gallonage with the volume which could actually be purged.

TABLE OF WELL MONITORING DATA

Well I.D.	MW-2			MW-3			MW-4			MW-5		
Date Sampled	02/28/92			02/28/92			02/28/92			02/28/92		
Well Diameter (in.)	2			4			4			4		
Total Well Depth (ft.)	26.66			18.26			15.94			18.0		
Depth To Water (ft.)	11.70			8.80			8.52			7.73		
Free Product (in.)	NONE			NONE			NONE			NONE		
Reason If Not Sampled	--			--			--			--		
1 Case Volume (gal.)	2.39			6.15			4.82			6.67		
Did Well Dewater?	NO			NO			NO			NO		
Gallons Actually Evacuated	7.5			18.50			15.0			20.25		
Purging Device	MIDDLEBURG			MIDDLEBURG			MIDDLEBURG			MIDDLEBURG		
Sampling Device	BAILER			BAILER			BAILER			BAILER		
Time	16:23	16:39	16:43	12:44	13:14	13:25	11:10	11:23	11:30	13:57	14:23	14:30
Temperature (Fahrenheit)	64.9	63.2	63.0	64.5	65.2	64.8	66.4	65.4	65.4	62.6	59.4	59.0
pH	6.9	7.4	7.6	7.4	7.5	7.5	6.7	6.6	6.7	7.9	7.6	7.5
Conductivity (micromhos/cm)	>10,000	>10,000	>10,000	5300	5600	5700	7400	8600	8800	3400	3100	3100
Turbidity	68.0	17.38	6.88	48.2	14.7	9.96	12.2	3.86	3.55	18.7	6.86	4.60
BTS Chain of Custody	920228-A-1			920228-A-1			920228-A-1			920228-A-1		
BTS Sample I.D.	MW-2			MW-3			MW-4			MW-5		
DHS HMTL Laboratory	SUPERIOR			SUPERIOR			SUPERIOR			SUPERIOR		
Analysis	TPH (GAS), BTEX			TPH (GAS), BTEX			TPH (GAS), BTEX			TPH (GAS), BTEX		

TABLE OF WELL MONITORING DATA

Well I.D.	MW-6	MW-7				
Date Sampled	02/28/92	02/28/92				
Well Diameter (in.)	4	4				
Total Well Depth (ft.)	18.78	18.80				
Depth To Water (ft.)	8.08	7.04				
Free Product (in.)	NONE	NONE				
Reason If Not Sampled	--	--				
1 Case Volume (gal.)	6.95	7.64				
Did Well Dewater?	NO	NO				
Gallons Actually Evacuated	21.0	23.0				
Purging Device	MIDDLEBURG	MIDDLEBURG				
Sampling Device	BAILER	BAILER				
Time	11:43	12:11	12:20	14:53	15:09	15:49
Temperature (Fahrenheit)	65.4	66.2	66.0	61.4	60.4	62.2
pH	6.6	6.6	6.6	7.8	7.7	7.6
Conductivity (micromhos/cm)	>10,000	>10,000	>10,000	1700	1700	1700
Turbidity	50.3	14.55	7.87	23.2	8.12	16.57
BTS Chain of Custody	920228-A-1	920228-A-1				
BTS Sample I.D.	MW-6	MW-7				
DHS HMTL Laboratory	SUPERIOR	SUPERIOR				
Analysis	TPH (GAS), BTEX	TPH (GAS), BTEX				

EQUIPMENT

Selection of Sampling Equipment

The determination of what apparatus is to be used on particular wells may be made by the property owner or the professional consultant directing the performance of the monitoring on the property owner's behalf. If no specific requirement is made known to us, our personnel will select equipment that will accomplish the work in the most efficient manner. Our personnel are equipped with a variety of sampling devices that include USGS/Middleburg pumps, down hole electric submersible pumps, air lift pumps, suction pumps, and bailers made of both Teflon and stainless steel.

Evacuation and Sampling Equipment Mechanics

When equipment is not selected by the client, the apparatus for well evacuation and sample collection is selected by our field personnel based on an evaluation of the field conditions. Four types of devices are commonly available for employment:

Bailers

High Volume Suction Pumps

Electric Submersible Pumps

USGS/Middleburg positive displacement sampling pumps

USGS/Middleburg pumps and bailers were selected for the collection of samples at this site.

USGS/Middleburg Positive Displacement Sampling Pumps: USGS/Middleburg positive displacement sampling pumps are EPA approved pumps appropriate for use in wells down to two inches in diameter and depths up to several hundred feet. The pump contains a flexible Teflon bladder which is alternately allowed to fill with well water and then collapsed. Actuation of the pump is accomplished with compressed air supplied by a single hose to one side of the Teflon membrane. Water on the other side of the membrane is squeezed out of the pump and up a Teflon conductor pipe to the surface. Evacuation and sampling are accomplished as a continuum. The rate of water removal is relatively slow and loss of volatiles almost non-existent. There is only positive pressure on the water being sampled and there is no impeller cavitation or suction. The pumps can be placed at any location within the well, can draw water from the very bottom of the well case, and are virtually immune to the erosive effects of silt or lack of water which destroy other types of pumps.

Disadvantages associated with Middleburg pumps include their high cost, low flow rate, temperamental operation, and cleaning requirements which are both elaborate and time consuming.

Bailers: A bailer, in its simplest form, is a hollow tube which has been fitted with a check valve at the lower end. The device can be lowered into a well by means of a cord. When the bailer enters the water, the check valve opens and liquid flows into the interior of the bailer. The bottom check valve prevents water from escaping when the bailer is drawn up out of the well.

Two types of bailers are used in groundwater wells at sites where fuel hydrocarbons are of concern. The first type of bailer is made of a clear material such as acrylic plastic and is used to obtain a sample of the surface and the near surface liquids in order to detect the presence of visible or measurable fuel hydrocarbon floating on the surface. The second type of bailer is made of Teflon or stainless steel and is used as an evacuation and/or sampling device.

Bailers are inexpensive and relatively easy to clean. Because they are manually operated, variations in operator technique may have a greater influence than would be found with more automated sampling equipment. Also where fuel is involved, the bailer may include near surface contaminants that are not representative of water deeper in the well.

STANDARD PRACTICES

Evacuation

There are few accepted groundwater sampling protocols that do not call for the evacuation of at least three case volumes of water prior to sample collection, and there are situations where up to ten case volumes of evacuation may be requested. Different professional consultants may specify different levels of evacuation prior to sampling or may request that specific parameters be used to determine when to collect the sample. Our personnel use several standard instruments to record the changes in parameters as the well is evacuated. These instruments are used regardless of whether or not a specific volumetric standard has been called for. As a result, the consultant will always be provided with a record of the pH, EC, and temperature changes that occurred during the evacuation process. Additional information obtained with different types of instruments (such as dissolved oxygen and turbidity meters) can also be collected if requested in advance.

Effluent Materials

Groundwater well sampling protocols call for the evacuation of a sufficient volume of water from the well to insure that the sample is collected from water that has been newly drawn into the well from the surrounding geologic formation. The evacuation of this purge water creates a volume of effluent water which must be contained. Blaine Tech Service, Inc. will place this water in appropriate containers of the client's choice or bring new DOT 17 E drums to the site which are appropriate for the containment of the effluent materials. The determination of how to properly dispose of the effluent water must usually await the results of laboratory analyses of the sample collected from the groundwater well.

If that sample does not establish whether or not the effluent water is contaminated, or if effluent from more than one source has been combined in the same container, it may be necessary to conduct additional analyses on the effluent material.

Observations and Measurements

Included in the scope of work are routine measurements and investigative procedures which are intended to determine if the wells are suitable for evacuation and sampling. These include measurement (from the top of the well case) of the total depth of the well; the depth to water, and the thickness of any free product zone (FPZ) encountered. The presence of a significant free product zone may interfere with efforts to collect a water sample that accurately reflects the condition of groundwater lying below the FPZ. This interference is caused by adhesion of petroleum to any device being lowered through the FPZ and the likelihood that minute globules of petroleum may break free of the sampling device and be included in the sample. Accordingly, evaluation of analytical results from wells containing any amount of free petroleum should take into account the possibility that positive results have been skewed higher by such an inclusion. The decision to sample or not sample such wells is left to the discretion of our field personnel at the site and the consultant who establishes sampling guidelines based on the need for current information on groundwater conditions at the site.

Sampling Methodology

Samples were obtained by standardized sampling procedures that follow an evacuation and sample collection protocol. The sampling methodology conforms with State and Regional Water Quality Control Board standards and specifically adheres to EPA requirements for apparatus, sample containers and sample handling as specified in publication SW 846.

Sample Containers

Sample material is collected in specially prepared containers appropriate to the type of analyses intended. Our firm uses new sample containers of the type specified by either EPA or the RWQCB. Often times analytical laboratories wish to supply the sample containers because checks performed on these bottles are often part of a comprehensive laboratory QC program. In cases where the laboratory does not supply sample containers our personnel collect water samples in containers that are appropriate to the type of analytical procedure that the sample is to receive. For example, 40 ml volatile organic analysis vials (VOAs) are used when analysis for gasoline and similar light volatile compounds is intended. These containers are prepared according to EPA SW 846 and will usually contain a small amount of preservative when the analysis is for TPH as gasoline or EPA 602. Vials intended for EPA 601 analysis and EPA 624 GCMS procedures are not preserved. The closure of volatile organic analysis water sample containers is accomplished with an open headed (syringe accessible) plastic screw cap brought down on top of a Teflon faced septum which is used to seal the sample without headspace.

Water samples intended for semivolatile and nonvolatile analysis such as total oil and grease (TOG) and diesel (TPH HBF) are collected and transported in properly prepared new glass liter bottles. Dark amber glass is used in the manufacture of these bottles to reduce any adverse effect on the sample by sunlight. Antimicrobial preservative may be

added to the sample liquid if a prolonged holding time is expected prior to analysis. Closure is accomplished with a heavy plastic screw cap.

Groundwater well samples intended for metals analysis are transported in new plastic bottles and preserved with nitric acid. Our personnel can field filter the sample liquid prior to placing it in the sample container if instructed to perform this procedure.

Sample Handling Procedures

Water samples are collected in any of several appropriate devices such as bailers, Coliwasas, Middleburg sampling pumps etc. which are described in detail only as warranted by their employment at a given site. Sample liquid is decanted into new sample containers in a manner which reduces the loss of volatile constituents and follows the applicable EPA procedures for handling volatile organic and semi-volatile compounds. Only two variations from the EPA methods are generally employed. First, preservative is added to the sample container prior to addition of the sample liquid. We first discovered this method in bottles prepared by Stoner Laboratories in 1982. It was subsequently adopted by many northern California laboratories and environmental consulting firms as a practical means of reducing the time that a liquid is allowed to aerate prior to closure of the sampling container. Second, because tests have shown that the preservative readily mixes with sample liquid, glass stirring rods are not used to agitate the sample/preservative mixture.

Groundwater samples that are to receive metals analyses can be filtered prior to being placed in the plastic sample bottles that contain the nitric acid preservative. The filtration process employs new glass containers which are discarded and laboratory quality disposable filtering containers which are also discarded. A frequently used filtering procedure employs a vacuum pump to draw sample material through a 0.45 micron filter. The 0.45 micron pore size is standard, but the amount of filter available varies with the type of package selected. Filters are selected on the basis of the relative turbidity of the water sample. Samples which are relatively clean can be efficiently filtered with relatively inexpensive filters while very turbid water will require a very large filter with a high tolerance for sediments. One of many such filters our firm uses are the Nalgene Type A filters in which an upper and lower receptacle chamber are affixed to the filter. Sample material is poured into the upper chamber and a vacuum pump attached to the lower chamber. Simple actuation of the vacuum pump induces the flow of water through the filter and into the lower chamber. The sample is then decanted into the laboratory container and the filter assembly discarded.

Following collection, samples are promptly placed in an ice chest containing prefrozen blocks of an inert ice substitute such as Blue Ice or Super Ice. The samples are maintained in either an ice chest or a refrigerator until delivered into the custody of the laboratory.

Sample Designations

All sample containers are identified with both a sampling event number and a discrete sample identification number. Please note that the sampling event number is the number that appears on our chain of custody. It is roughly equivalent to a job number, but applies only to work done on a particular day of the year rather than spanning several days as jobs and projects often do.

Chain of Custody

Samples are continuously maintained in an appropriate cooled container while in our custody and until delivered to the laboratory under our standard chain of custody. If the samples are taken charge of by a different party (such as another person from our office, a courier, etc.) prior to being delivered to the laboratory, appropriate release and acceptance records are made on the chain of custody (time, date, and signature of person releasing the samples followed by the time, date and signature of the person accepting custody of the samples).

Hazardous Materials Testing Laboratory

After completion of the field work, the sample containers were transported to and then stored in a refrigerator at the office of Blaine Tech Services, Inc. in San Jose, California. The samples were subsequently released into the custody of a courier for delivery to Superior Analytical Laboratory in San Francisco, California. Superior Analytical Laboratory is a California Department of Health Services certified Hazardous Materials Testing Laboratory and is listed as DOHS HMTL #220.

Personnel

All Blaine Tech Services, Inc. personnel receive 29 CFR 1910.120(e)(2) training as soon after being hired as is practical. In addition, many of our personnel have additional certifications that include specialized training in level B supplied air apparatus and the supervision of employees working on hazardous materials sites. Employees are not sent to a site unless we are confident they can adhere to any site safety provisions in force at the site and unless we know that they can follow the written provisions of an SSP and the verbal directions of an SSO.

In general, employees sent to a site to perform groundwater well sampling will assume an OSHA level D (wet) environment exists unless otherwise informed. The use of gloves and double glove protocols protects both our employees and the integrity of the samples being collected. Additional protective gear and procedures for higher OSHA levels of protection are available.

Decontamination

All apparatus is brought to the site in clean and serviceable condition. The equipment is decontaminated after each use and before leaving the site. Decontamination procedures include complete disassembly of the device to a point where a jet of steam cleaner water can be directed onto all the internal surfaces (this applies to the *inside* of the Teflon bladders of USGS/Middleburg pumps). Teflon conductor tubing is connected to the steam cleaner water outlet and water is run through the interior of the tubing for several minutes. The devices are then reassembled and actuated for a period of time as an additional measure. Blaine Tech Services, Inc. frequently modifies apparatus to allow complete disassembly and proper cleaning.

Please call if you have any questions.

for Richard C. Blaine
Richard C. Blaine

RCB/jmb

attachments: chain of custody

BLAINE

1370 TULLY ROAD., SUITE 505
SAN JOSE, CA 95122
(408) 895 5535

TECH SERVICES INC.

CONDUCT ANALYSIS TO DETECT

LAB Special DHS # _____
ALL ANALYSES MUST MEET SPECIFICATIONS AND DETECTION LIMITS SET BY CALIFORNIA DHS AND
 EPA
 LIA
 OTHER
 RWOCB REGION 11

CHAIN OF CUSTODY
 920228A1
 CLIENT PLS
 SITE 1650 65th St.
EMERYVILLE, CALIF.

C - COMPOSITE ALL CONTAINERS

CONDUCT ANALYSIS TO DETECT									
1	2	3	4	5	6	7	8	9	10

SAMPLE I.D.	MATRIX		CONTAINERS	ADD'L INFORMATION	STATUS	CONDITION	LAB SAMPLE #
	S - SOIL	W - H2O					
MU2	W	W	3				
MU3	W	W	3				
MU4	W	W	3				
MU5	W	W	3				
MU6	W	W	3				
MU7	W	W	3				

SAMPLING COMPLETED	DATE	TIME	SAMPLING PERFORMED BY	RESULTS NEEDED NO LATER THAN	
	2-28-92	16:30	<i>[Signature]</i>		
RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
<i>[Signature]</i>	2-28-92	16:40	BTS FK/DGE	2-28-92	16:40
RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
<i>[Signature]</i>	3-3-92	14:22	Chad M. [Signature]	3-3-92	14:22

SHIPPED VIA	DATE SENT	TIME SENT	COOLER #



Superior Precision Analytical, Inc.

1555 Burke, Unit 1 • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 54571
CLIENT: PES ENVIRONMENTAL, INC.
CLIENT JOB NO.: 920228A1

DATE RECEIVED: 03/03/92
DATE REPORTED: 03/05/92

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS by Modified EPA SW-846 Method 5030 and 8015

LAB #	Sample Identification	Concentration (ug/L) Gasoline Range
1	MW2	70000
2	MW3	160*
3	MW4	ND<50
4	MW5	230*
5	MW6	ND<50
6	MW7	100*

ug/L - parts per billion (ppb)

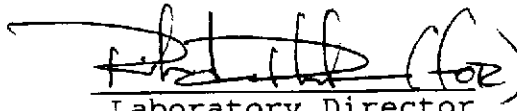
* - Gasoline range concentration. The pattern observed in the chromatogram was not typical of gasoline.

Minimum Detection Limit for Gasoline in Water: 50ug/L

QAQC Summary:

Daily Standard run at 2mg/L: %DIFF Gasoline = <15%
MS/MSD Average Recovery =103%: Duplicate RPD =0%

Richard Srna, Ph.D.


Laboratory Director



Superior Precision Analytical, Inc.

1555 Burke, Unit 1 • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 54571
CLIENT: PES ENVIRONMENTAL, INC.
CLIENT JOB NO.: 920228A1

DATE RECEIVED: 03/03/92
DATE REPORTED: 03/05/92

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

LAB #	Sample Identification	Concentration(ug/L)			
		Benzene	Toluene	Ethyl Benzene	Xylenes
1	MW2	9100	6400	530	7400
2	MW3	2.8	ND<0.3	0.7	0.5
3	MW4	1.6	ND<0.3	ND<0.3	0.3
4	MW5	110	0.9	ND<0.3	0.5
5	MW6	ND<0.3	ND<0.3	ND<0.3	ND<0.3
6	MW7	33	0.7	ND<0.3	0.7

ug/L - parts per billion (ppb)

Minimum Detection Limit in Water:0.3ug/L

QAQC Summary:

Daily Standard run at 20ug/L: %DIFF 8020 = <15%
MS/MSD Average Recovery =93% : Duplicate RPD =1.1%

Richard Srna, Ph.D.


Laboratory Director

ALL ANALYSES MUST MEET SPECIFICATIONS AND DETECTION LIMITS SET BY CALIFORNIA DHS AND

EPA RWQCB REGION []
 LIA
 OTHER

CHAIN OF CUSTODY
 970228A1
 CLIENT []
 SITE 1650 65th St.
 Emeryville, Calif.

C = COMPOSITE ALL CONTAINERS
 774 GAS BTX

SAMPLE I.D.	MATRIX		CONTAINERS	ADD'L INFORMATION	STATUS	CONDITION	LAB SAMPLE #
	S	W					
MW 2	W	W	3				
MW 3	W	W	3				
MW 4	W	W	3				
MW 5	W	W	3				
MW 6	W	W	3				
MW 7	W	W	3				

Please initial: KLL
 Samples Stored in ice. ✓
 Appropriate containers ✓
 Samples preserved. ✓
 VOA's without headspace. ✓
 Comments: _____

SAMPLING COMPLETED DATE 2-28-92 TIME 16:50 SAMPLING PERFORMED BY [Signature] RESULTS NEEDED NO LATER THAN

RELEASED BY [Signature] DATE 2-28-92 TIME 16:40 RECEIVED BY [Signature] DATE 2-28-92 TIME 16:40

RELEASED BY [Signature] DATE 3-5-92 TIME 14:22 RECEIVED BY [Signature] DATE 3-3-92 TIME 14:30

RELEASED BY [Signature] DATE [] TIME [] RECEIVED BY [Signature] DATE 3/3/92 TIME 4:10

SHIPPED VIA DATE SENT TIME SENT COOLER #



Superior Precision Analytical, Inc.

1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 54576
CLIENT: PES ENVIRONMENTAL, INC.
CLIENT JOB NO.: 131.01.001

DATE RECEIVED: 03/04/92
DATE REPORTED: 03/06/92

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 5030 and 8015

LAB #	Sample Identification	Concentration (ug/L) Gasoline Range
1	920631	ND<50
2	92063A	25000
3	92063B	ND<50

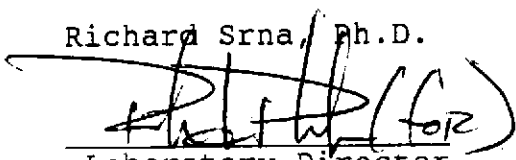
ug/L - parts per billion (ppb)

Minimum Detection Limit for Gasoline in Water: 50ug/L

QAQC Summary:

Daily Standard run at 2mg/L: %DIFF Gasoline = <15%
MS/MSD Average Recovery = 103%: Duplicate RPD = 0.2%

Richard Srna, Ph.D.


Laboratory Director

RECEIVED MAR 11 1992



Superior Precision Analytical, Inc.

1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

C E R T I F I C A T E O F A N A L Y S I S

LABORATORY NO.: 54576
CLIENT: PES ENVIRONMENTAL, INC.
CLIENT JOB NO.: 131.01.001

DATE RECEIVED: 03/04/92
DATE REPORTED: 03/06/92

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

LAB #	Sample Identification	Concentration(ug/L)			
		Benzene	Toluene	Ethyl Benzene	Xylenes
1	920631	ND<0.3	ND<0.3	ND<0.3	ND<0.3
2	92063A	3600	2600	530	2600
3	92063B	ND<0.3	ND<0.3	ND<0.3	ND<0.3

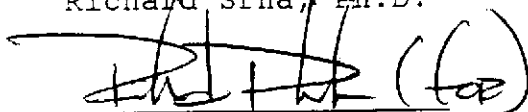
ug/L - parts per billion (ppb)

Minimum Detection Limit in Water:0.3ug/L

QAQC Summary:

Daily Standard run at 20ug/L: %DIFF 8020 = <15%
MS/MSD Average Recovery = 93% : Duplicate RPD = 1.1%

Richard Srna, Ph.D.


Laboratory Director

SAMPLERS: PAUL LOHMAN (PES)

JOB NUMBER: 131.01.001
 NAME/LOCATION: P.O. PARTNERS EMERYVILLE
 PROJECT MANAGER: ROBERT CREPS

RECORDER: *Paul Lohman*
 (Signature Required)

ANALYSIS REQUESTED										
EPA 601/6010										
EPA 602/6020	X									
EPA 624/6240	X									
EPA 625/6270	X									
BTEX										
TPH (GASOLINE)										
TPH (DIESEL)										
TOG (5520 C&F)										
Priority Pollutant Metals										

DATE				SAMPLE NUMBER OR LAB NUMBER			SOURCE CODE	MATRIX				# CONTAINERS & PRESERV.					DEPTH IN FEET	COL MTD CD	QA CODE
YR	MO	DY	TIME	YR	WK	SEQ		Water	Sediment	Soil	Oil	Unpres.	H ₂ SO ₄	HNO ₃	Filtered	HCl			
92	03	03		92	06	31	23	X							3				
92	03	03		92	06	3A	23	X							3				
92	03	03		92	06	3B	23	X							3				

NOTES

Please initial: *CSJ*

Samples Stored in ice: *Yes*

Appropriate containers: *Yes*

Samples preserved: *Yes*

VOA's fill out headspace: *Yes*

Comments:

CHAIN OF CUSTODY RECORD						
RELINQUISHED BY: (Signature)		RECEIVED BY: (Signature)		DATE	TIME	
<i>Paul Lohman</i>		<i>Casey Ham</i>		3-49-	10:41	
RELINQUISHED BY: (Signature)		RECEIVED BY: (Signature)		DATE	TIME	
<i>Casey Ham</i>						
RELINQUISHED BY: (Signature)		RECEIVED BY: (Signature)		DATE	TIME	
DISPATCHED BY: (Signature)		DATE	TIME	RECEIVED FOR LAB BY: (Signature)	DATE	TIME
				<i>Casey Ham</i>	3/1/92	2:10pm
METHOD OF SHIPMENT:						

Laboratory Copy
White

Project Office Copy
Yellow

Field or Office Copy
Pink