PES Environmental, Inc.
Engineering & Environmental Services

March 23, 1992

131.01.003

Alameda County Department of Environmental Health
Hazardous Materials Program
80 Swan Way, Room 200
Oakland, California 94621
Attention: Mr. Dennis Byrne

GROUNDWATER MONITORING REPORT
JANUARY 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 January, 1992, quarterly groundwater monitoring conducted at Emery Bay Plaza at 1650 65th Street in Emeryville, California (Plate 1). PES has been retained by P.O. Partners, on behalf of Emery Bay Plaza, to conduct groundwater monitoring at the site. PES is also providing 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) provide an ongoing evaluation 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. The monitoring is performed in accordance with 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 from the system are to the sanitary sewer under the authority of an East Bay Municipal Utility District wastewater discharge permit (Permit No. 502-45131). The present sampling is the ninth consecutive quarterly sampling event since groundwater monitoring was initiated, and the first to be conducted by PES.

P.O. Box 1833 • 100 Medical Plaza • Novato, CA 94948 • (415) 898-3531 • FAX (415) 898-2780

GROUNDWATER ELEVATIONS

Water-level Measurement Procedures

Prior to sampling on January 29, 1992, 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). This data and an historical summary of groundwater elevations for wells at the site are presented in Table 1, with the exception of data from the previous sampling event, which was unavailable at the time this report was prepared. A groundwater elevation map constructed from the January 29, 1992, data is presented on Plate 3.

Water levels increased slightly in Wells MW-2 and MW-7 and fell slightly in the other 4 monitoring wells since May, 1991. Because of equipment malfunctioning, the groundwater extraction system was not operating at the time of sampling. Based on measured water levels on January 29, 1992, groundwater flow direction at the site was calculated to be toward the southwest, as shown on Plate 3, with an approximate gradient of 0.01 foot per foot. This is consistent with the historical groundwater flow direction and gradient.

GROUNDWATER SAMPLING AND ANALYTICAL TESTING

Sampling Procedures

Groundwater samples were collected on January 29, 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 for the presence of floating free-phase product. A minimum of three well volumes were evacuated prior to sampling using a teflon bladder pump. During pumping, the discharge water was evaluated for pH, temperature, electrical conductivity and turbidity. Groundwater samples were collected with a clean teflon bailer and then decanted into clean 40-milliliter glass vials with teflon-lined caps.

A sample was also collected from Extraction 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.

Samples were immediately labeled to designate sample number, time and date collected and analysis requested, then stored in a chilled, thermally-insulated cooler for transport to the analytical laboratory. The information collected during 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. a State-certified laboratory located in San Francisco, California. Samples were analyzed for total petroleum hydrocarbons (TPH), quantified as gasoline, 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 are presented in Table 2. Table 2 also presents historical monitoring results for the previous sampling events. For comparison, relevant federal and state standards are also listed. The distribution of hydrocarbons in groundwater at the site for the January 29, 1992 sampling event is graphically presented on Plate 4. Laboratory reports and chain of custody records are presented in Appendix B

Samples from five of the 7 wells contained detectable levels of TPH. BTEX was detected in all wells except MW-6. The highest levels of dissolved hydrocarbons (TPH and BTEX) were found in Well MW-2, located within the backfill of the soil excavation at the former on-site UST. This is consistent with historical monitoring data.

SUMMARY

Groundwater elevations have increased slightly since the August 1991 sampling event. The groundwater flow direction continues to be toward the southwest.

MW-2, the well nearest the former tank location, shows increased levels of TPH gas, benzene, and toluene. MW-7 and EW-1 show increased levels of TPH gas and xylene, and decreased levels of BTE. The increased concentrations of hydrocarbons in MW-2 and EW-1 are likely due to the approximately two months of inactivity of the extraction system. Resumption of groundwater extraction is likely to result in a decrease in the concentration of dissolved hydrocarbons in a relatively short period of time. The extraction system was repaired and groundwater extraction was resumed on March 9, 1992. The small increase in concentration of hydrocarbons in MW-7 may be due to migration from an upgradient source.

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.

Yours very truly,

PES ENVIRONMENTAL, INC.

Andrew A. Briefer, P.E.
Senior Engineer

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 January 29, 1992
Plate 4	Dissolved Hydrocarbons in Groundwater on January 29, 1992
Appendix A	Groundwater Sampling Report
Appendix B	Analytical Laboratory Reports

cc: Mr. Thomas Gram - P.O. Partners
Ms. Lynn Tolin - Emery Bay Plaza

13101002.w51

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

Well Number	Date	Measured by	Top of Casing (feet MSL)	Depth to Water (feet)	Groundwater Elevations (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**
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**
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**
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**

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

Well Number	Date	Measured by	Top of Casing (feet MSL)	Depth to Water (feet)	Groundwater Elevations (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**
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**

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 January 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 = 0.001	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
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

Table 2. Summary of Analytical Results for Groundwater Samples Through January 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 MCL = 0.001	Toluene DAL = 0.1	Ethyl-Benzene MCL = 0.68	Total Xylenes MCL = 1.75	Purgeable Halocarbons MCL = 0.0005	Lead 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
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

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

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

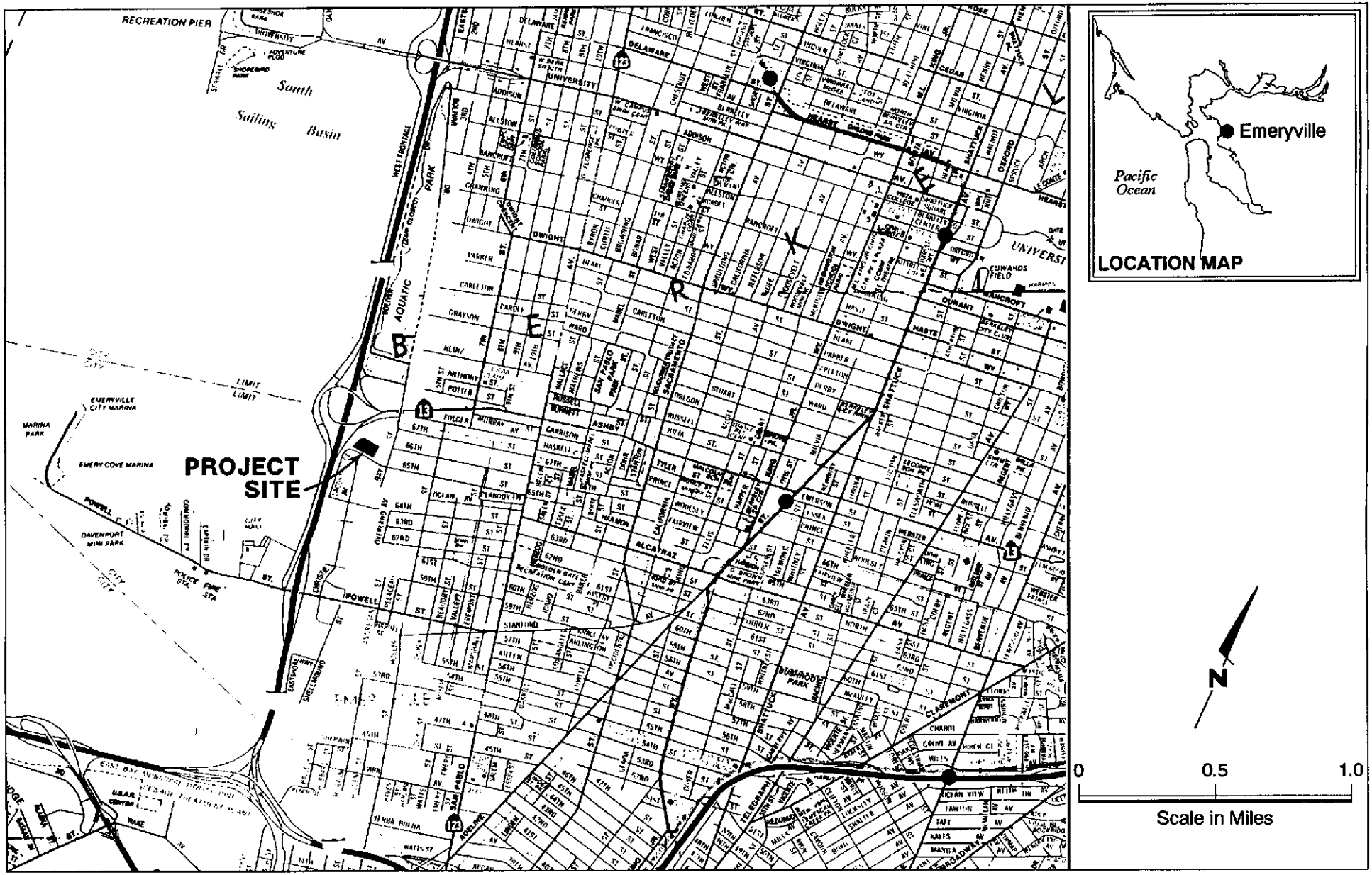
Well Number	Sample Date	Sampled by	TPH as Gasoline	TPH as Diesel	Benzene MCL = 0.001	Toluene DAL = 0.1	Ethyl-Benzene MCL = 0.68	Total Xylenes MCL = 1.75	Purgeable Halocarbons MCL = 0.0005	Lead MCL = 0.005
MW-6	May-90	ES	NA	ND	ND	ND	ND	ND	ND	ND**
	Aug-90	ES	NA	ND	NA	NA	NA	NA	NA	ND**
	Nov-90	ES	1.2	1.4	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
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
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
	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

Table 2. **Summary of Analytical Results for Groundwater Samples Through January 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 = 0.001	DAL = 0.1	MCL = 0.68	MCL = 1.75	MCL = 0.0005	MCL = 0.005
	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

NOTES:
* = 1,2-Dichlorethane concentration (only 1,2-Dichloroethane detected).
** = Organic Lead
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

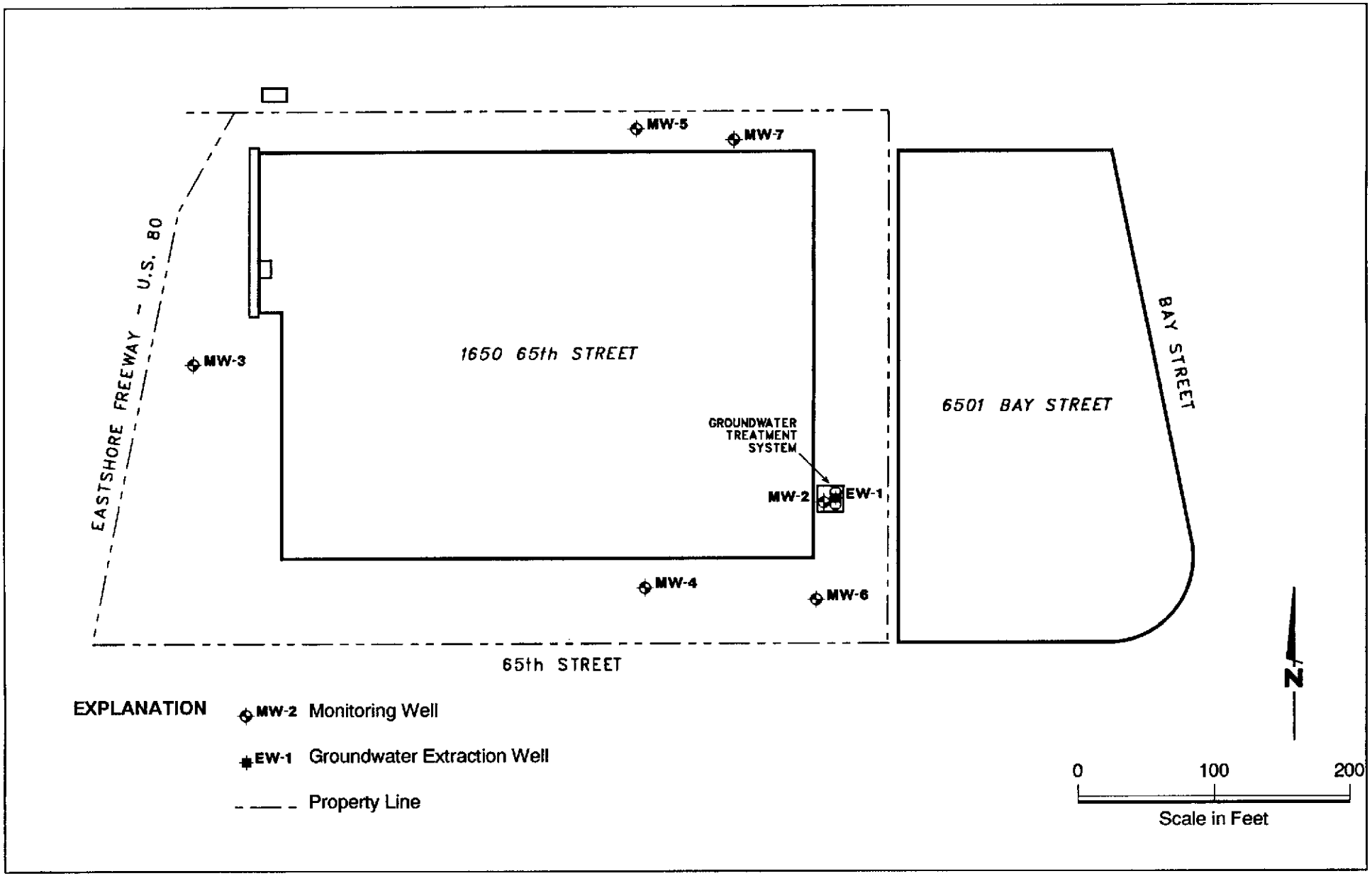


PES Environmental, Inc.
Engineering & Environmental Services

Site Location Map
1650 65th Street
Emeryville, California

PLATE
1

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
131.01.003	RSC	2/92		

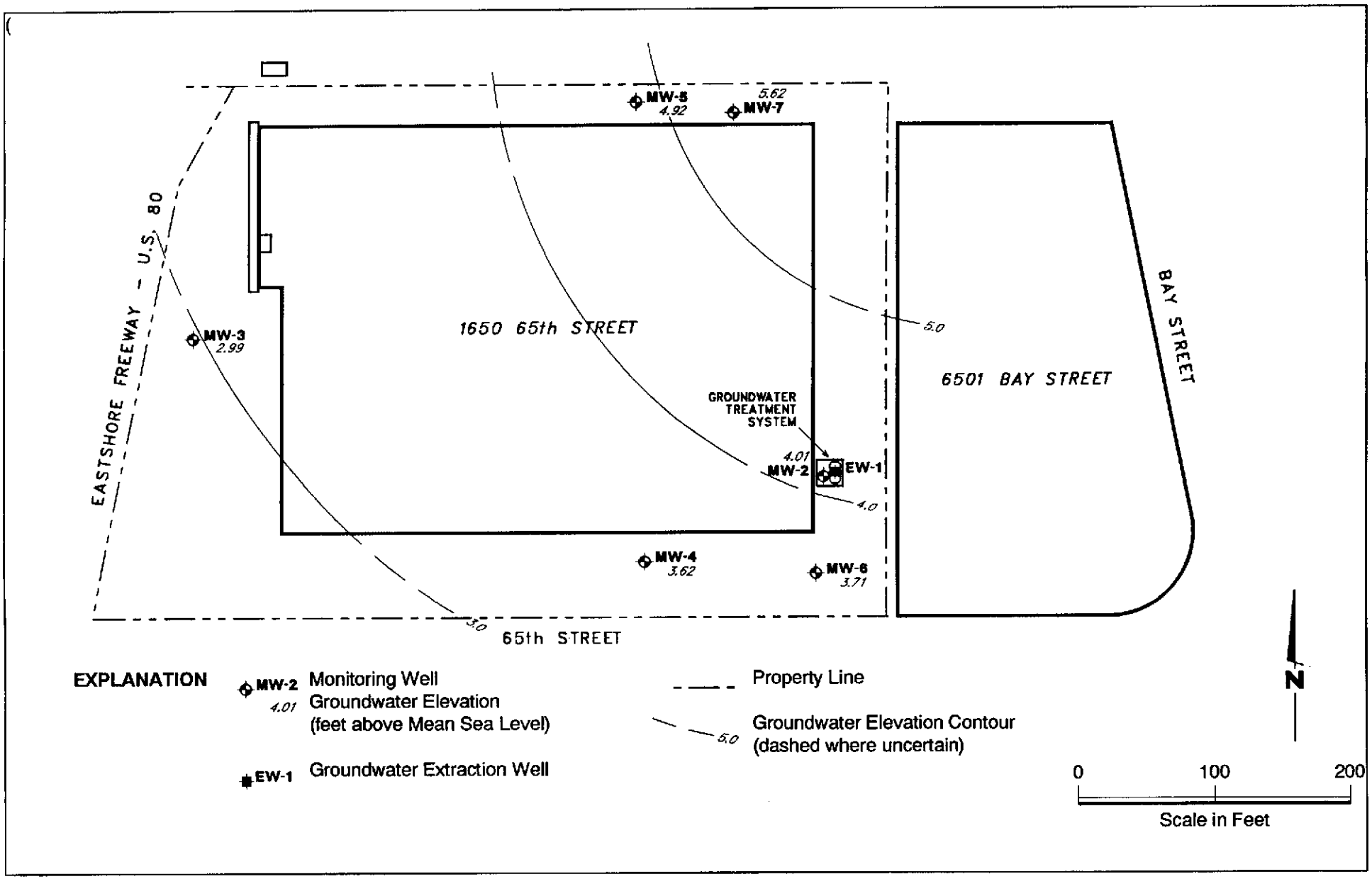


PES Environmental, Inc.
Engineering & Environmental Services

Well Location Map
1650 65th Street
Emeryville, California

PLATE
2

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
131.01.003	RSC	2/92		

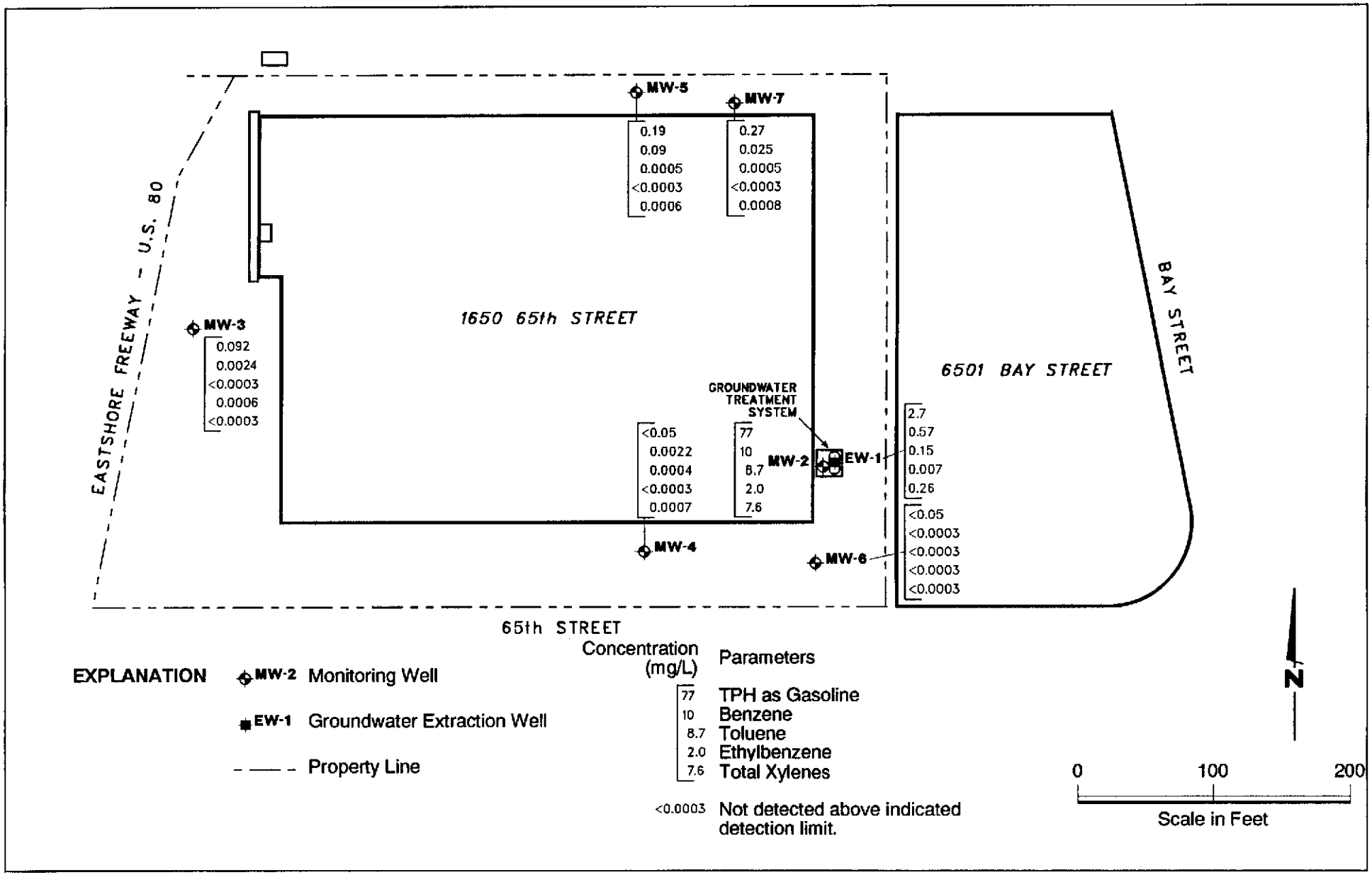


PES Environmental, Inc.
Engineering & Environmental Services

Groundwater Elevation Contours on January 29, 1992
1650 65th Street
Emeryville, California

PLATE
3

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
131.01.003	RSC	2/92		



PES Environmental, Inc.
Engineering & Environmental Services

Dissolved Hydrocarbons in Groundwater on January 29, 1992
1650 65th Street
Emeryville, California

PLATE
4

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
131.01.003		2/92		

BLAINE
TECH SERVICES INC.

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

February 3, 1992

RECEIVED FEB 19 1992

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

Attn: Andrew Briefer

SITE:
1650 65th Street
Emeryville, California

PES PROJECT NO.
M6003B

SAMPLING EVENT:
Evacuate and sample six wells

DATE:
January 29, 1992

GROUNDWATER SAMPLING REPORT 920129-Z-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	01/29/92			01/29/92			01/29/92			01/29/92	
Well Diameter (in.)	2			4			4			4	
Total Well Depth (ft.)	26.66			18.26			15.94			18.0	
Depth To Water (ft.)	11.78			9.44			8.62			7.90	
Free Product (in.)	NONE			NONE			NONE			NONE	
Reason If Not Sampled	--			--			--			--	
1 Case Volume (gal.)	2.38			5.73			4.76			6.66	
Did Well Dewater?	NO			NO			NO			NO	
Gallons Actually Evacuated	8.0			18.25			15.0			20.0	
Purging Device	MIDDLEBURG			MIDDLEBURG			MIDDLEBURG			MIDDLEBURG	
Sampling Device	BAILER			BAILER			BAILER			BAILER	
Time	16:02	16:07	16:11	09:13	09:22	09:34	10:20	10:30	10:40	14:44	15:02	15:18
Temperature (Fahrenheit)	63.7	62.1	63.7	63.7	63.7	64.1	65.7	65.3	66.3	60.8	60.0	59.7
pH	7.3	7.0	7.0	7.1	7.8	6.8	7.6	7.2	7.2	7.0	7.2	7.0
Conductivity (micromhos/cm)	7600	7400	7400	6200	6600	6600	22000	21000	18000	9200	8200	7800
Turbidity	37.6	18.5	17.6	6.5	4.3	8.0	9.1	5.3	2.3	21.9	17.6	16.3
BTS Chain of Custody	920129-Z-1			920129-Z-1			920129-Z-1			920129-Z-1	
BTS Sample I.D.	MW-2			MW-3			MW-4			MW-5	
DHS HMTL Laboratory	SUPERIOR			SUPERIOR			SUPERIOR			SUPERIOR	
Analysis	EPA 8015/8020			EPA 8015/8020			EPA 8015/8020			EPA 8015/8020	

TABLE OF WELL MONITORING DATA

Well I.D.	MW-6			MW-7		
Date Sampled	01/29/92			01/29/92		
Well Diameter (in.)	4			4		
Total Well Depth (ft.)	18.78			18.80		
Depth To Water (ft.)	8.32			7.28		
Free Product (in.)	NONE			NONE		
Reason If Not Sampled	--			--		
1 Case Volume (gal.)	6.8			7.49		
Did Well Dewater?	NO			NO		
Gallons Actually Evacuated	20.5			22.5		
Purging Device	MIDDLEBURG			MIDDLEBURG		
Sampling Device	BAILER			BAILER		
Time	11:26	11:38	11:56	13:27	13:39	13:58
Temperature (Fahrenheit)	64.4	65.6	66.1	59.9	60.7	60.9
pH	7.3	7.5	7.2	6.7	7.0	7.0
Conductivity (micromhos/cm)	16000	17000	19000	12000	10000	9000
Turbidity	72.8	39.1	19.2	10.1	9.6	13.1
BTS Chain of Custody	920129-Z-1			920129-Z-1		
BTS Sample I.D.	MW-6			MW-7		
DHS HMTL Laboratory	SUPERIOR			SUPERIOR		
Analysis	EPA 8015/8020			EPA 8015/8020		

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 than 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 delivered 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 Sigrid Blaine
Richard C. Blaine

RCB/lpn

attachments: chain of custody

BLAINE TECH SERVICES INC.

1370 TULLY ROAD., SUITE 505
SAN JOSE, CA 95122
(408) 995 5535

CHAIN OF CUSTODY 9101292-1

CLIENT PES

SITE 1650 65th ST
Emeryville CA

C = COMPOSITE ALL CONTAINERS

CONDUCT ANALYSIS TO DETECT

LAB Superior DHS #

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

☐ EPA
☐ LIA
☐ OTHER
☑ RWQCB REGION 2

SPECIAL INSTRUCTIONS

SAMPLE I.D.	MATRIX S = SOIL W = H2O	CONTAINERS TOTAL		8015/8020	ADD'L INFORMATION	STATUS	CONDITION	LAB SAMPLE #
MW-2	W	3	VOA's	✓		HOLD		
MW-3	↓	↓	↓	✓		↓		
MW-4				✓				
MW-5				✓				
MW-6				✓				
MW-7				✓				

SAMPLING COMPLETED	DATE	TIME
	1-24-92	17:15

SAMPLING PERFORMED BY Scott Jaroch

RESULTS NEEDED NO LATER THAN

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
Scott Jaroch to BTS Fridge	1-29-92	18:30	BTS REFER	1-29-92	1830
RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
	1-30-92	1150	C Bashaw	1-30-92	1150
RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME

SHIPPED VIA	DATE SENT	TIME SENT	COOLER #	

[redacted] & [redacted]

SAMPLERS: PAUL LOHMAN (PES)

JOB NUMBER: 131018

NAME/LOCATION: P.O. PARTNERS EMERYVILLE

PROJECT MANAGER: ROBERT CREPS

RECORDER:

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_2SO_4	HNO_3	Filtered	HCl	NaHSO4			
92	01	29	0900	92	04	00A	23	X								3				
92	01	29	0935	92	04	001	23	X									3			
92	01	29	0915	92	04	00B	23	X									1			
92	01	29	0915	92	04	00B	23	X								1				
92	01	29	1235	92	04	00B	23	X								1				

ANALYSIS REQUESTED

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	BTEX	TPH (GASOLINE)	TPH (DIESEL)	TOG (5520 C&F)	Priority Pollutant Metals	8015 TPHG
	X								X
	X								
	X								
	X								
	X								

NOTES

Place
On
Hold

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) Paul Lohman

RECEIVED BY: (Signature) Scott Jamroz — DATE 1-29-92 TIME 1300

RELINQUISHED BY: (Signature) SJ TO BTS REPEL

RECEIVED BY: (Signature) BTS REPEL — DATE 1-29-92 TIME BTS

RELINQUISHED BY: (Signature) SJ BTS

RECEIVED BY: (Signature) P Mahan — DATE 1/30/92 TIME 1150

DISPATCHED BY: (Signature) — DATE — TIME

RECEIVED FOR LAB BY (Signature) — DATE — TIME

METHOD OF SHIPMENT:

Laboratory Copy White | Project Office Copy Yellow | Field Office Copy Pink

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.: 54492
CLIENT: PES ENVIRONMENTAL,INC.
CLIENT JOB NO.: 131.02.001

DATE RECEIVED: 01/31/92
DATE REPORTED: 02/04/92

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

LAB #	Sample Identification	Concentration (ug/L) Gasoline Range
1	920400A	2700

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 = 91%: Duplicate RPD = 2.2%

Richard Srna, Ph.D.
(for)
Laboratory Director

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.: 54492
CLIENT: PES ENVIRONMENTAL,INC.
CLIENT JOB NO.: 131.02.001

DATE RECEIVED: 01/31/92
DATE REPORTED: 02/04/92

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	920400A	570	150	7.0	260

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 = 90% : Duplicate RPD =2.1%

Richard Srna, Ph.D.
Laboratory Director

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.: 54492
CLIENT: PES ENVIRONMENTAL, INC.
CLIENT JOB NO.: 131.02.001

DATE RECEIVED: 01/31/92
DATE REPORTED: 02/04/92

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
2	9204001	ND<0.3	ND<0.3	ND<0.3	ND<0.3
3	920400B	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 =90%: Duplicate RPD = 2.1%

Comments:

Richard Srna, Ph.D.
(for)
Laboratory Director

Engineering & Environmental Services

(898 3531)

SAMPLERS: PAUL LOHMAN (PES)

JOB NUMBER: 13101B (131.02.001)

NAME/LOCATION: P.O. PARTNERS EMERYVILLE

PROJECT MANAGER: ROBERT CREPS ANDY BRUCER

RECORDER:

(Signature Require.)

DATE YR	MO	DY	TIME	SAMPLE NUMBER OR LAB NUMBER YR	WK	SEQ	SOURCE CODE	MATRIX Water	Sedim't	Soil	Oil	# CONTAINERS & PRESERV. Unpres.	H_2SO_4	HNO_3	Filtered	HCl	NaHSO4	DEPTH IN FEET	COL MTD CD	QA CODE
9 2	0 1	2 9	0 9 0 0	9 2	0 4	0 0 A	2 3	X								3				
9 2	0 1	2 9	0 9 3 5	9 2	0 4	0 0 1	2 3	X									3			
9 2	0 1	2 9	0 9 1 5	9 2	0 4	0 0 B *	2 3	X									1			
9 2	0 1	2 9	0 9 1 5	9 2	0 4	0 0 B	2 3	X								1				
9 2	0 1	2 9	1 2 3 5	9 2	0 4	0 0 B	2 3	X								1				

ANALYSIS REQUESTED

EPA 601/8010	EPA 602/8020 BTEX only	EPA 624/8240	EPA 625/8270	BTEX	TPH (GASOLINE)	TPH (DIESEL)	TOG (5520 C&F)	Priority Pollutant Metals	8015 TPHG
	X								X
	X								
	X								
	X								
	X								

one sample per Andrew Brucer 1/31/92

Please initial: dkq

Samples Stored in ice: Yes

Appropriate containers: Yes

Samples preserved: Yes

VOA's without headspace: * has headspace

Comments:

NOTES

Place on Hold — Ron Proul / Andy Brucer

CHAIN OF CUSTODY RECORD

		DATE	TIME
RELINQUISHED BY: (Signature) Paul Lohman	RECEIVED BY: (Signature) Scott Hamond	1-29-92	13:00
RELINQUISHED BY: (Signature) SZ TO BTS REP	RECEIVED BY: (Signature) BTS REP	1-29-92	BTS
RELINQUISHED BY: (Signature) BTS	RECEIVED BY: (Signature)	1/30/92	1150
DISPATCHED BY: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE 1-30-92	TIME 1440

METHOD OF SHIPMENT:

Laboratory Copy White — Project Office Copy Yellow — Field or Office Copy Pink

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.: 54491
CLIENT: PES ENVIRONMENTAL,INC.
CLIENT JOB NO.: 131.03.001

DATE RECEIVED: 01/31/92
DATE REPORTED: 02/04/92

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

LAB #	Sample Identification	Concentration (ug/L) Gasoline Range
1	MW-2	77000
2	MW-3	92
3	MW-4	ND<50
4	MW-5	190
5	MW-6	ND<50
6	MW-7	270

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 = 91%: Duplicate RPD = 2.2%

Richard Srna, Ph.D.

Laboratory Director

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.: 54491
CLIENT: PES ENVIRONMENTAL,INC.
CLIENT JOB NO.: 131.03.001

DATE RECEIVED: 01/31/92
DATE REPORTED: 02/04/92

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	MW-2	10000	8700	2000	7600
2	MW-3	2.4	ND<0.3	0.6	ND<0.3
3	MW-4	2.2	0.4	ND<0.3	0.7
4	MW-5	90	0.5	ND<0.3	0.6
5	MW-6	ND<0.3	ND<0.3	ND<0.3	ND<0.3
6	MW-7	25	0.5	ND<0.3	0.8

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 =90% : Duplicate RPD = 2.1%

Richard Srna, Ph.D.

Laboratory Director

BLAINE
TECH SERVICES INC.

1370 TULLY ROAD., SUITE 505
SAN JOSE, CA 95122
(408) 995 5535

CHAIN OF CUSTODY 9101292-1 131.03.001

CLIENT PES

SITE 1650 65th ST
Emeryville CA

LAB Superior 52491 DHS #

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

- ☐ EPA
- ☐ LIA
- ☐ OTHER
- ☑ RWQCB REGION 2

SPECIAL INSTRUCTIONS

CONDUCT ANALYSIS TO DETECT

C = COMPOSITE ALL CONTAINERS

SAMPLE I.D.	MATRIX S = SOIL W = H2O	CONTAINERS TOTAL		8015 / 8020	ADD'L INFORMATION	STATUS	CONDITION	LAB SAMPLE #
MW-2	W	3	VOA's	✓		HOLD Remove		
MW-3 *				✓		Ran		
MW-4				✓		HOLD		
MW-5 *				✓		By phone		
MW-6 *				✓		1/31/92		
MW-7*				✓		JBy		

Please initial: BA
Samples Stored in ice. Yes
Appropriate containers. Yes
Samples preserved. Unknown
VOA's without headspace. * has small bubble
Comments:

SAMPLING COMPLETED	DATE	TIME
	1-24-92	14:15

SAMPLING PERFORMED BY Scott Javoch

RESULTS NEEDED NO LATER THAN

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
Scott Javoch to BTS Fridge	1-29-92	18:30	BTS REFER	1-27-92	183
	1-30 92	1150	Bashaw	1-30-92	1150
	1-30-92	1438	Peter B. Aaron	1-30-92	1440

SHIPPED VIA	DATE SENT	TIME SENT	COOLER #