PES Environmental, Inc.
Engineering & Environmental Services

November 30, 1994

131.0200.001

Ms. Lynn Tolin
Christie Avenue Partners - J.S.
5800 Shellmound, Suite 210
Emeryville, California 94608

QUARTERLY GROUNDWATER MONITORING REPORT
OCTOBER 1994 SAMPLING EVENT
EMERY BAY MARKETPLACE
EMERYVILLE, CALIFORNIA

Dear Ms. Tolin:

This letter report presents data collected by PES Environmental, Inc. (PES) during the October 1994 quarterly groundwater monitoring conducted at the Emery Bay Marketplace site, located in Emeryville, California (Plate 1). PES has been retained by Christie Avenue Partners - J.S. to conduct quarterly groundwater monitoring at the subject site. The current groundwater monitoring program consists of measuring product thickness, if any, and depth to groundwater in 17 onsite and off-site monitoring wells on a quarterly basis, and purging and sampling six of the monitoring wells (Wells W-7, W-13, W-14, W-19, W-20 and W-24). Plate 2 shows the location of monitoring wells at the site.

The purpose of the groundwater monitoring program at this site is to: (1) evaluate the presence of hydrocarbons in groundwater; (2) monitor potential migration of dissolved-phase hydrocarbons; and (3) monitor seasonal water level variations at the subject property. The monitoring is performed in accordance with Alameda County Department of Environmental Health (ACDEH) requirements and the approved work plan for this site entitled Work Plan for Groundwater Monitoring and Free Product Removal at the Emery Bay Marketplace, Emeryville, California, dated July 6, 1990.

BACKGROUND

Beginning in the early 1980's environmental activities at this site have involved removal of underground fuel storage tanks (USTs) and hydrocarbon contaminated soils, performing soil borings, and installing groundwater monitoring wells. As a result of these activities, fuel oil found in onsite soils and groundwater was attributed to leaking USTs and/or piping associated with an asphalt refinery formerly located at the site. Additionally, free floating product was observed in onsite groundwater monitoring wells.

Twenty-four monitoring wells have been installed at this site during the course of prior environmental investigations. Seven of these wells have been abandoned and 17 onsite and off-site wells currently remain. McLaren Hart began quarterly groundwater monitoring activities at the subject site in July 1990. The present sampling is the sixth since PES began performing quarterly groundwater monitoring in July 1993.

GROUNDWATER ELEVATIONS

Water-level Measurement Procedures

Prior to sampling on October 4 and 6, 1994, groundwater levels in the monitoring wells were measured to a precision of 0.01 foot using an electronic water-level indicator/interface probe. 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. The presence of free-phase product was evaluated and, if present, was measured to a precision of 0.01 foot using the interface probe.

Results

Two of the 17 wells scheduled for water level measurements were inaccessible during quarterly monitoring activities and therefore measurements were not obtained for these wells. Wells W-4 and W-16 were inaccessible due to grading related to construction activities along the adjacent railroad property. Well W-20 was inaccessible on October 4 due to the presence of construction equipment parked over the well, and therefore measurements were collected from this well on October 6. Water levels for the remaining 14 wells were measured on October 4. These levels were then 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 and product levels for wells at the site is presented in Table 1. Appendix A contains a report summarizing the water level measurement procedures.

Water levels have fluctuated slightly since the July 8, 1994 sampling event. Water levels in Wells W-14 and W-21 have increased slightly, while water levels in all other measured wells have decreased or remained approximately the same. Measurements collected in W-17 indicated a water level decrease of approximately 1.4 feet. Based on historical water level measurements in W-17 and current water levels in adjacent wells. It is considered likely that the water level in W-17 an anomaly; therefore, it is not used in water-level contouring for this event. Based on measured water levels on October 4, 1993, groundwater at the site flows in a southwesterly direction with an approximate gradient of 0.005 to 0.1. These measurements show no significant changes from historical groundwater flow direction and gradient.

Free-phase floating product layers 1.34 and 0.03 feet thick were found to be present in Wells W-5 and W-19, respectively. The free-phase product layer has decreased in Well W-5 and remained approximately the same in W-19 since the July 1994 monitoring event. No free-phase product or sheen was found in the remaining wells.

GROUNDWATER SAMPLING AND ANALYTICAL TESTING

Sampling Protocol

Groundwater samples were collected on October 4 and 6, 1994 by Blaine Tech Services, Inc. (Blaine Tech) and Lowney Associates (Lowney). Monitoring Wells W-7, W-13, W-14, W-19, and W-24 were sampled on October 4; W-20 was inaccessible on October 4 due to the presence of construction equipment parked over the well, and therefore sampling was performed on October 6. Blaine Tech collected samples from W-7, W-19, W-20, and W-24. Wells W-13 and W-14 were sampled by Lowney and the samples transferred to Blaine Tech. A minimum of three well volumes were purged prior to sampling using a clean teflon bailer. Purge water was contained and collected in a 55-gallon drum to be stored onsite prior to obtaining analytical results and subsequent disposal. During purging activities, 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.

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 chemical analysis. The information collected during groundwater sampling activities and the chain of custody record is included in a groundwater sampling report prepared by Blaine Tech and presented in Appendix A.

Analytical Program

All groundwater samples collected during this quarterly monitoring event were analyzed by American Environmental Network (AEN), a State-certified laboratory located in Pleasant Hill, California. Samples were analyzed for total petroleum hydrocarbons quantified as diesel (TPH-diesel) and as motor oil (TPH-oil) by EPA Test Method 8015 (modified).

Analytical Results

Sample analytical results from the recent groundwater monitoring event indicate that concentrations of TPH-oil and TPH-diesel have increased or remained approximately the same since the prior sampling event. Two of the six wells sampled were found to contain detectable concentrations of TPH-oil, ranging from 11 milligrams per liter (mg/L) in W-19 to 76 mg/L in W-7. TPH-diesel was detected in Wells W-7, W-13, W-14, W-19, and W-24 at concentrations ranging from 0.3 mg/L in W-13 to 20 mg/L in W-7.

Analytical results, including historical monitoring data for the previous sampling events are presented in Table 2. The laboratory report and chain of custody records are provided in Appendix B. The distribution of hydrocarbons in groundwater at the site on October 4 and 6, 1994 is presented on Plate 4.

SUMMARY

Groundwater elevations have fluctuated slightly, and groundwater gradient has remained approximately the same since the previous quarterly monitoring event. Consistent with historical monitoring results, free-phase product was found on the groundwater in Well W-5 and Well W-19. Reported concentrations of TPH-oil and TPH-diesel have increased or remained approximately the same since the prior monitoring event. Low concentrations of TPH-diesel were reported in samples collected from W-13 and W-14 where no detectable concentrations were previously reported. It is PES' opinion that the increased concentrations are a result of changing analytical laboratories earlier this year, and corresponding variations in the TPH analysis and quantification procedures, and do not reflect a significant change in environmental conditions.

Yours very truly,

PES ENVIRONMENTAL, INC.

Mary E. Williams
Senior Environmental Scientist

Andrew A. Briefer, P. E.
Associate Engineer

Attachments:	Table 1	Summary of Groundwater Elevations
	Table 2	Summary of Petroleum Hydrocarbon Analytical Results for Groundwater Samples
	Plate 1	Site Location Map
	Plate 2	Well Location Map
	Plate 3	Groundwater Elevation Contours on October 4, 1994
	Plate 4	Dissolved Hydrocarbons in Groundwater on October 4 and 6, 1994
	Appendix A	Water Level and Groundwater Sampling Reports
	Appendix B	Analytical Laboratory Reports

Table 1. Summary of Groundwater Elevations Through October 1994

Emery Bay Marketplace
Emeryville, California

Well Number	Date	Measured by	Top of Casing (feet MSL)	Depth to Water (feet)	Potentiometric Surface Elevations (feet MSL)	Product Thickness (feet)
W-1	07-Aug-81	WCC	11.47	4.30	6.20 (2)	
	10-Sep-81	WCC		4.40	6.10 (2)	
	06-May-87	WCC		6.00	6.08 (2)	
	20-Aug-89	MH		5.60	5.87	
	11-Oct-89	MH		5.63	5.84	
	22-Feb-90	MH		4.92	6.55	
	28-Feb-90	MH		5.02	6.45	
	09-Apr-90	MH		5.44	6.03	
	07-Jun-90	MH		5.37	6.10	
	25-Jul-90	MH		5.26	6.21	
	03-Oct-90	MH		5.43	6.04	
	03-Jan-91	MH		5.69	5.78	
	03-Apr-91	MH		4.74	6.73	
	25-Oct-91	MH		5.22	6.25	
	15-Jan-92	MH		4.88	6.59	
	23-Apr-92	MH		4.98	6.49	
	21-Jul-92	MH		5.16	6.31	
	22-Oct-92	MH		5.79	5.68	
	26-Jan-93	MH		4.82	6.65	
	29-Apr-93	MH		6.01	5.46	
	22-Jul-93	PES		6.05	5.42	
	07-Oct-93	PES		6.15	5.32	
	06-Jan-94	PES		5.50	5.97	
	05-Apr-94	PES		5.87	5.60	
	08-Jul-94	PES		5.86	5.61	
	04-Oct-94	**PES**		**5.94**	**5.53**	
W-4	07-Aug-81	WCC	9.96	4.30	6.20 (2)	
	10-Sep-81	WCC		4.40	6.10 (2)	
	18-Jan-82	WCC		2.50	8.00 (2)	
	27-Mar-85	WCC		NA	8.65	
	20-Aug-89	MH		3.95	6.01	
	11-Oct-89	MH		3.87	6.09	
	22-Feb-90	MH		2.00	7.96	
	28-Feb-90	MH		2.39	7.57	
	09-Apr-90	MH		3.17	6.79	
	07-Jun-90	MH		2.73	7.23	
	25-Jul-90	MH		3.71	6.25	
	03-Oct-90	MH		4.18	5.78	
	03-Jan-91	MH		3.64	6.32	
	03-Apr-91	MH		1.45	8.51	
	25-Oct-91	MH		4.29	5.67	

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Well Number	Date	Measured by	Top of Casing (feet MSL)	Depth to Water (feet)	Potentiometric Surface Elevations (feet MSL)	Product Thickness (feet)
W-4	15-Jan-92	MH		2.56	7.40	
Cont	23-Apr-92	MH		2.80	7.16	
	21-Jul-92	MH		4.03	5.93	
	22-Oct-92	MH		4.50	5.46	
	26-Jan-93	MH		1.52	8.44	
	29-Apr-93	MH		3.02	6.94	
	22-Jul-93	PES		3.86	6.10	
	07-Oct-93	PES		NM	NM	
	06-Jan-94	PES		NM	NM	
	05-Apr-94	PES		NM	NM	
	08-Jul-94	PES		NM	NM	
	4-Oct-94	**PES**		**NM**	**NM**	
W-5	07-Aug-81	WCC	11.41	4.70	7.50 (2)	NA
	10-Sep-81	WCC		4.90	7.30 (2)	NA
	18-Jan-82	WCC		2.50	9.60 (2)	NA
	27-Mar-85	WCC		NA	9.28	NA
	11-Oct-89	MH		4.43	7.58	0.71
	22-Feb-90	MH		3.80	8.36	0.88
	28-Feb-90	MH		4.43	8.38	1.65
	09-Apr-90	MH		4.73	8.23	1.82
	07-Jun-90	MH		4.30	8.64	1.80
	25-Jul-90	MH		5.10	8.11	2.12
	03-Oct-90	MH		4.90	7.45	1.11
	03-Jan-91	MH		4.77	7.36	0.85
	03-Apr-91	MH		2.42	9.02	0.03
	25-Oct-91	MH		5.47	6.94	1.18
	15-Jan-92	MH		3.21	8.88	0.80
	23-Apr-92	MH		3.13	8.28	1.41
	21-Jul-92	MH		3.55	9.14	1.50
	22-Oct-92	MH		4.28	8.36	1.45
	26-Jan-93	MH		3.28	9.18	1.24
	29-Apr-93	MH		2.60	8.81	NP
	22-Jul-93	PES		5.78	7.48	2.18
	07-Oct-93	PES		4.46	7.35	0.48
	06-Jan-94	PES		5.38	7.02	1.17
	05-Apr-94	PES		4.62	7.86	1.26
	08-Jul-94	PES		4.95	7.79	1.57
	04-Oct-94	**PES**		**5.20**	**7.35**	**1.34**
W-7	06-May-87	WCC	9.05	3.00	6.88 (2)	
	20-Aug-89	MH		3.59	5.46	
	11-Oct-89	MH		3.08	5.97	

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Well Number	Date	Measured by	Top of Casing (feet MSL)	Depth to Water (feet)	Potentiometric Surface Elevations (feet MSL)	Product Thickness (feet)
W-7	22-Feb-90	MH		1.75	7.30	
Cont	28-Feb-90	MH		1.31	7.74	
	09-Apr-90	MH		2.42	6.63	
	07-Jun-90	MH		1.21	7.84	
	25-Jul-90	MH		2.76	6.29	
	03-Oct-90	MH		3.22	5.83	
	03-Jan-91	MH		3.17	5.88	
	03-Apr-91	MH		1.18	7.87	
	25-Oct-91	MH		3.47	5.59	
	15-Jan-92	MH		3.88	5.17	
	23-Apr-92	MH		3.20	5.85	
	21-Jul-92	MH		3.65	5.40	
	22-Oct-92	MH		4.58	4.77	
	26-Jan-93	MH		1.12	7.93	
	29-Apr-93	MH		2.90	6.15	
	22-Jul-93	PES		4.26	4.79	
	07-Oct-93	PES		5.48	3.57	
	06-Jan-94	PES		5.10	3.95	
	05-Apr-94	PES		5.94	3.11	
	08-Jul-94	PES		5.74	3.31	
	04-Oct-94	**PES**		**5.83**	**3.22**	
W-8	06-May-87	WCC	10.43	5.50	6.88 (2)	
	20-Aug-89	MH		3.59	6.84	
	22-Feb-90	MH		1.50	8.93	
	28-Feb-90	MH		1.78	8.65	
	09-Apr-90	MH		3.12	7.31	
	07-Jun-90	MH		2.90	7.53	
	27-Jul-90	MH		3.33	7.10	
	03-Oct-90	MH		3.65	6.78	
	03-Jan-91	MH		3.46	6.97	
	03-Apr-91	MH		1.47	8.96	
	25-Oct-91	MH		3.54	6.89	
	15-Jan-92	MH		2.98	7.45	
	24-Apr-92	MH		3.01	7.42	
	21-Jul-92	MH		3.41	7.02	
	22-Oct-92	MH		4.23	6.20	
	26-Jan-93	MH		NM	NM	
	29-Apr-93	MH		2.29	8.14	
	22-Jul-93	PES		3.17	7.26	
	07-Oct-93	PES		NM	NM	

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Well Number	Date	Measured by	Top of Casing (feet MSL)	Depth to Water (feet)	Potentiometric Surface Elevations (feet MSL)	Product Thickness (feet)
W-8	06-Jan-94	PES		2.69	7.74	
Cont	05-Apr-94	PES		2.78	7.65	
	08-Jul-94	PES		3.26	7.17	
	04-Oct-94	**PES**		**3.62**	**6.81**	
W-13	20-Aug-89	MH	8.15	4.64	3.51	
	11-Oct-89	MH		4.60	3.55	
	22-Feb-90	MH		3.85	4.30	
	28-Feb-90	MH		4.18	3.97	
	09-Apr-90	MH		4.31	3.84	
	07-Jun-90	MH		3.93	4.22	
	25-Jul-90	MH		4.40	3.75	
	03-Oct-90	MH		4.67	3.48	
	03-Jan-91	MH		4.43	3.72	
	03-Apr-91	MH		3.64	4.51	
	25-Oct-91	MH		4.54	3.72	
	15-Jan-92	MH		3.82	4.33	
	23-Apr-92	MH		4.12	4.03	
	21-Jul-92	MH		4.44	3.71	
	22-Oct-92	MH		4.42	3.73	
	26-Jan-93	MH		3.10	5.05	
	29-Apr-93	MH		4.04	4.11	
	22-Jul-93	PES		4.30	3.85	
	07-Oct-93	PES		4.32	3.83	
	06-Jan-94	PES		4.07	4.08	
	05-Apr-94	PES		4.20	3.95	
	08-Jul-94	PES		3.94	4.21	
	04-Oct-94	**PES**		**4.37**	**3.78**	
W-14	20-Aug-89	MH	7.97	5.02	2.95	
	22-Feb-90	MH		4.19	3.78	
	28-Feb-90	MH		4.46	3.51	
	09-Apr-90	MH		4.36	3.61	
	07-Jun-90	MH		5.29	2.68	
	25-Jul-90	MH		4.83	3.14	
	03-Oct-90	MH		5.09	2.88	
	03-Jan-91	MH		4.32	3.65	
	03-Apr-91	MH		4.31	3.66	
	25-Oct-91	MH		4.41	3.56	
	15-Jan-92	MH		4.18	3.79	
	23-Apr-92	MH		4.93	3.04	
	21-Jul-92	MH		4.57	3.40	
	22-Oct-92	MH		5.28	2.69	

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W-14	26-Jan-93	MH		3.94	4.03	
Cont	29-Apr-93	MH		4.59	3.38	
	22-Jul-93	PES		5.30	2.67	
	07-Oct-93	PES		5.18	2.79	
	06-Jan-94	PES		5.09	2.88	
	05-Apr-94	PES		5.39	2.58	
	08-Jul-94	PES		5.37	2.60	
	04-Oct-94	**PES**		**4.97**	**3.00**	
W-15	20-Aug-89	MH	11.53	3.43	8.10	
	11-Oct-89	MH		4.26	7.27	
	22-Feb-90	MH		2.58	8.95	
	28-Feb-90	MH		2.53	9.00	
	09-Apr-90	MH		2.48	9.05	
	07-Jun-90	MH		4.54	6.99	
	25-Jul-90	MH		4.00	7.53	
	03-Oct-90	MH		3.46	8.07	
	03-Jan-91	MH		2.97	8.56	
	03-Apr-91	MH		3.05	8.48	
	25-Oct-91	MH		2.88	8.65	
	15-Jan-92	MH		3.54	7.99	
	23-Apr-92	MH		2.78	8.75	
	21-Jul-92	MH		2.67	8.86	
	22-Oct-92	MH		2.65	8.88	
	26-Jan-93	MH		2.47	9.06	
	29-Apr-93	MH		2.56	8.97	
	29-Apr-93	PES		3.38	8.15	
	07-Oct-93	PES		3.88	7.65	
	06-Jan-94	PES		3.03	8.50	
	05-Apr-94	PES		3.03	8.50	
	08-Jul-94	PES		2.89	8.64	
	04-Oct-94	**PES**		**2.90**	**8.63**	
W-16	11-Oct-89	MH	10.94	4.81	6.19	0.07
	22-Feb-90	MH		3.92	7.02	NP
	28-Feb-90	MH		3.88	7.06	NP
	09-Apr-90	MH		7.81	3.13	NP
	07-Jun-90	MH		6.19	4.75	NP
	27-Jul-90	MH		4.44	6.50	NP
	03-Oct-90	MH		4.38	6.58	0.02
	03-Jan-91	MH		4.67	6.29	0.02
	03-Apr-91	MH		3.50	7.46	0.02
	25-Oct-91	MH		4.64	6.30	NP

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Well Number	Date	Measured by	Top of Casing (feet MSL)	Depth to Water (feet)	Potentiometric Surface Elevations (feet MSL)	Product Thickness (feet)
W-16	15-Jan-92	MH		4.11	6.83	NP
Cont	23-Apr-92	MH		3.89	7.05	NP
	21-Jul-92	MH		4.28	6.66	NP
	22-Oct-92	MH		NM	NM	NM
	26-Jan-93	MH		2.47	8.47	NP
	22-Jul-93	PES		NM	NM	NM
	07-Oct-93	PES		NM	NM	NM
	06-Jan-94	PES		NM	NM	NM
	05-Apr-94	PES		NM	NM	NM
	08-Jul-94	PES		NM	NM	NM
	04-Oct-94	**PES**		**NM**	**NM**	**NM**
W-17	11-Oct-89	MH	12.14	9.12	3.02	
	22-Feb-90	MH		5.42	6.72	
	28-Feb-90	MH		5.35	6.79	
	09-Apr-90	MH		5.72	6.42	
	07-Jun-90	MH		NM	NM	
	26-Jul-90	MH		5.59	6.55	
	03-Oct-90	MH		5.72	6.42	
	03-Jan-91	MH		6.28	5.86	
	03-Apr-91	MH		4.69	7.45	
	25-Oct-91	MH		6.00	6.14	
	15-Jan-92	MH		5.57	6.57	
	23-Apr-92	MH		5.17	6.97	
	21-Jul-92	MH		5.54	6.60	
	22-Oct-92	MH		6.10	6.04	
	26-Jan-93	MH		4.45	7.69	
	29-Apr-93	MH		5.25	6.89	
	22-Jul-93	PES		NM	NM	
	07-Oct-93	PES		NM	NM	
	06-Jan-94	PES		5.88	6.26	
	05-Apr-94	PES		5.28	6.86	
	08-Jul-94	PES		5.35	6.79	
	04-Oct-94	**PES**		**6.77**	**5.37**	
W-18	11-Oct-89	MH	11.34	5.52	5.82	
	22-Feb-90	MH		4.42	6.92	
	28-Feb-90	MH		4.77	6.57	
	09-Apr-90	MH		5.24	6.10	
	07-Jun-90	MH		4.28	7.06	
	25-Jul-90	MH		4.98	6.36	
	03-Oct-90	MH		5.44	5.90	
	03-Jan-91	MH		5.84	5.50	

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Well Number	Date	Measured by	Top of Casing (feet MSL)	Depth to Water (feet)	Potentiometric Surface Elevations (feet MSL)	Product Thickness (feet)
W-18 Cont	03-Apr-91	MH		4.94	6.40	
	25-Oct-91	MH		5.55	5.79	
	15-Jan-92	MH		5.24	6.10	
	23-Apr-92	MH		4.81	6.53	
	21-Jul-92	MH		5.01	6.33	
	22-Oct-92	MH		5.55	5.79	
	26-Jan-93	MH		4.72	6.62	
	29-Apr-93	MH		4.68	6.66	
	22-Jul-93	PES		5.07	6.27	
	07-Oct-93	PES		5.48	5.86	
	06-Jan-94	PES		5.49	5.85	
	05-Apr-94	PES		5.25	6.09	
	08-Jul-94	PES		4.98	6.36	
	04-Oct-94	**PES**		**5.28**	**6.06**	
W-19	09-Apr-90	MH	10.27	5.11	5.16	
	07-Jun-90	MH		4.77	5.50	
	25-Jul-90	MH		4.93	5.34	
	03-Oct-90	MH		4.95	5.32	
	03-Jan-91	MH		5.95	4.32	
	03-Apr-91	MH		5.39	4.88	
	25-Oct-91	MH		5.47	4.80	
	15-Jan-92	MH		5.18	5.09	
	23-Apr-92	MH		5.34	4.93	
	21-Jul-92	MH		5.08	5.19	
	22-Oct-92	MH		5.31	4.96	
	26-Jan-93	MH		4.82	5.45	
	29-Apr-93	MH		5.09	5.18	
	22-Jul-93	PES		5.04	5.24	0.01
	07-Oct-93	PES		5.09	5.18	NP
	06-Jan-94	PES		5.13	5.14	NP
	05-Apr-94	PES		4.92	5.35	NP
	08-Jul-94	PES		5.01	5.26	
	04-Oct-94	**PES**		**5.03**	**5.27**	**0.03**
W-20	09-Apr-90	MH	6.82	4.08	2.74	
	07-Jun-90	MH		3.79	3.03	
	25-Jul-90	MH		4.00	2.82	
	03-Oct-90	MH		4.03	2.79	
	03-Jan-91	MH		4.12	2.70	
	03-Apr-91	MH		3.84	2.98	
	25-Oct-91	MH		4.07	2.75	
	15-Jan-92	MH		3.75	3.07	

Table 1. Summary of Groundwater Elevations Through October 1994

Emery Bay Marketplace
Emeryville, California

Well Number	Date	Measured by	Top of Casing (feet MSL)	Depth to Water (feet)	Potentiometric Surface Elevations (feet MSL)	Product Thickness (feet)
W-20 Cont	23-Apr-92	MH		4.08	2.74	
	21-Jul-92	MH		4.02	2.80	
	22-Oct-92	MH		4.07	2.75	
	26-Jan-93	MH		3.30	3.52	
	29-Apr-93	MH		4.00	2.82	
	22-Jul-93	PES		3.84	2.98	
	07-Oct-93	PES		3.79	3.03	
	06-Jan-94	PES		3.84	2.98	
	05-Apr-94	PES		3.90	2.92	
	08-Jul-94	PES		3.63	3.19	
	06-Oct-94	**PES**		**3.76**	**3.06**	
W-21	09-Apr-90	MH	9.48	5.21	4.27	
	07-Jun-90	MH		4.84	4.64	
	25-Jul-90	MH		5.05	4.43	
	03-Oct-90	MH		5.18	4.30	
	03-Jan-91	MH		5.47	4.01	
	03-Apr-91	MH		4.80	4.68	
	25-Oct-91	MH		5.04	4.44	
	15-Jan-92	MH		4.95	4.53	
	23-Apr-92	MH		5.17	4.31	
	21-Jul-92	MH		5.07	4.41	
	22-Oct-92	MH		5.28	4.20	
	26-Jan-93	MH		4.46	5.02	
	29-Apr-93	MH		5.39	4.09	
	22-Jul-93	PES		5.32	4.16	
	07-Oct-93	PES		5.38	4.10	
	06-Jan-94	PES		5.30	4.18	
	05-Apr-94	PES		5.18	4.30	
	08-Jul-94	PES		5.18	4.30	
	04-Oct-94	**PES**		**5.08**	**4.40**	
W-22	09-Apr-90	MH	11.67	7.50	4.17	
	07-Jun-90	MH		7.36	4.31	
	25-Jul-90	MH		7.49	4.18	
	03-Oct-90	MH		7.68	3.99	
	03-Jan-91	MH		7.88	3.79	
	03-Apr-91	MH		7.64	4.03	
	25-Oct-91	MH		6.69	4.98	
	15-Jan-92	MH		7.61	4.06	
	23-Apr-92	MH		7.21	4.46	
	21-Jul-92	MH		7.69	3.98	
	22-Oct-92	MH		7.82	3.85	

Table 1. Summary of Groundwater Elevations Through October 1994

Emery Bay Marketplace
Emeryville, California

Well Number	Date	Measured by	Top of Casing (feet MSL)	Depth to Water (feet)	Potentiometric Surface Elevations (feet MSL)	Product Thickness (feet)
W-22	26-Jan-93	MH		7.40	4.27	
Cont	29-Apr-93	MH		7.71	3.96	
	22-Jul-93	PES		7.76	3.91	
	07-Oct-93	PES		7.35	4.32	
	06-Jan-94	PES		7.04	4.63	
	05-Apr-94	PES		NM	NM	
	08-Jul-94	PES		6.43	5.24	
	04-Oct-94	**PES**		**6.66**	**5.01**	
W-23	09-Apr-90	MH	9.16	1.51	7.65	
	07-Jun-90	MH		1.78	7.38	
	27-Jul-90	MH		2.63	6.53	
	03-Oct-90	MH		3.20	5.96	
	03-Jan-91	MH		2.36	6.80	
	03-Apr-91	MH		0.60	8.56	
	25-Oct-91	MH		2.36	6.80	
	15-Jan-92	MH		1.62	7.54	
	23-Apr-92	MH		1.18	7.98	
	21-Jul-92	MH		2.17	6.99	
	22-Oct-92	MH		2.76	6.40	
	26-Jan-93	MH		0.39	8.77	
	29-Apr-93	MH		0.97	8.19	
	22-Jul-93	PES		1.87	7.29	
	07-Oct-93	PES		2.86	6.30	
	06-Jan-94	PES		1.88	7.28	
	05-Apr-94	PES		1.30	7.86	
	08-Jul-94	PES		1.77	7.39	
	04-Oct-94	**PES**		**2.39**	**6.77**	
W-24	07-Jun-90	MH	8.72	4.75	3.97	
	25-Jul-90	MH		5.02	3.70	
	03-Oct-90	MH		5.00	3.72	
	03-Jan-91	MH		5.25	3.47	
	03-Apr-91	MH		4.56	4.16	
	25-Oct-91	MH		5.09	3.63	
	15-Jan-92	MH		4.82	3.90	
	23-Apr-92	MH		4.94	3.78	
	21-Jul-92	MH		5.00	3.72	
	22-Oct-92	MH		5.13	3.59	
	26-Jan-93	MH		3.38	5.34	
	29-Apr-93	MH		4.98	3.74	
	22-Jul-93	PES		5.02	3.70	
	07-Oct-93	PES		4.46	4.26	

Table 1. Summary of Groundwater Elevations Through October 1994

Emery Bay Marketplace
Emeryville, California

Well Number	Date	Measured by	Top of Casing (feet MSL)	Depth to Water (feet)	Potentiometric Surface Elevations (feet MSL)	Product Thickness (feet)
W-24	06-Jan-94	PES		4.83	3.89	
Cont	05-Apr-94	PES		4.85	3.87	
	08-Jul-94	PES		4.54	4.18	
	04-Oct-94	PES		4.69	4.03	

NOTES:

(1) Well W-1 is located on the Nielson property.

(2) Groundwater elevation taken from earlier reports does not agree with calculated elevation using current top of casing elevation.

feet MSL = Feet above Mean Sea Level.

NA = Data not available.

NM = Not measured.

NP = Product not present or insufficient amount present to perform measurements.

WCC = Woodward Clyde Consultants

MH = McLaren Hart

PES = PES Environmental, Inc.

Table 2. Summary of Petroleum Hydrocarbon Analytical Results for Groundwater Samples Through October 1994

Emery Bay Marketplace
Emeryville, California

Concentrations expressed in milligrams per liter [mg/L] - equivalent to parts per million [ppm]

Well Number	Sample Date	Sampled by	TPH as Diesel	TPH as Motor Oil
W-1	14-Apr-87	WCC	NA	<5
	28-Feb-90	MH	<0.5	NA
	11-Apr-90	MH	<0.1	0.57
W-4	01-Mar-90	MH	<0.5	NA
	10-Apr-90	MH	<0.1	<0.25
W-5	27-Sep-89	MH	20	NA
	25-Oct-91	MH	NA	NA
W-7	26-Sep-89	MH	1.1	NA
	28-Feb-90	MH	<0.5	NA
	11-Apr-90	MH	5.6	7.5
	30-Jul-90	MH	2.6	2.0
	04-Oct-90	MH	5.0	6.0
	04-Jan-91	MH	4.0	12
	03-Apr-91	MH	<1.0	3.2
	25-Oct-91	MH	1.4 (3)	2.3
	16-Jan-92	MH	1.6	3.6
	24-Apr-92	MH	3.3	4.9
	23-Jul-92	MH	2.6	4.0
	23-Oct-92	MH	3.8	4.2
	27-Jan-93	MH	<0.5	8.0 (1)
	29-Apr-93	MH	1.6	1.7(1)
	22-Jul-93	PES	1.50	1.50
	07-Oct-93	PES	2.90	2.90
	06-Jan-94	PES	<0.05	0.11
	05-Apr-94	PES	2.90	1.70
	08-Jul-94	PES	8.4	38
	04-Oct-94	**PES**	**20**	**76**
W-8	17-Apr-87	WCC	10(2)	NA
	26-Sep-89	MH	7.1	NA
	01-Mar-90	MH	4.5	NA
	18-Apr-90	MH	5.3	NA
W-13	28-Feb-90	MH	<0.5	NA
	12-Apr-90	MH	<0.5	NA
	27-Jul-90	MH	<0.5	<1
	04-Oct-90	MH	<0.5	<1

Table 2. Summary of Petroleum Hydrocarbon Analytical Results for Groundwater Samples Through October 1994

Emery Bay Marketplace
Emeryville, California

Concentrations expressed in milligrams per liter [mg/L] - equivalent to parts per million [ppm]

Well Number	Sample Date	Sampled by	TPH as Diesel	TPH as Motor Oil
W-13 Cont	03-Jan-91	MH	<0.5	<1
	04-Apr-91	MH	<0.5	<1
	25-Oct-91	MH	<0.5	<1
	16-Jan-92	MH	<0.5	<0.5
	24-Apr-92	MH	<0.5	<0.5
	22-Jul-92	MH	<0.5	<0.5
	23-Oct-92	MH	<0.5	<0.5
	27-Jan-93	MH	<0.05	0.11(1)
	29-Apr-93	MH	<0.5	0.12(1)
	22-Jul-93	PES	<0.05	0.25
	07-Oct-93	PES	<0.05	0.35
	06-Jan-94	PES	<0.05	<0.10
	05-Apr-94	PES	<0.05	<0.10
	08-Jul-94	PES	<0.05	0.5
	04-Oct-94	**PES**	**0.3**	**<0.2**
W-14	28-Feb-90	MH	<0.5	NA
	11-Apr-90	MH	<0.1	<0.25
	30-Jul-90	MH	<0.6	<1
	04-Oct-90	MH	<0.5	<1
	04-Jan-91	MH	<0.5	<1
	04-Apr-91	MH	<0.5	<1
	25-Oct-91	MH	<0.5	<1
	16-Jan-92	MH	<0.5	<0.5
	24-Apr-92	MH	<0.5	<0.5
	22-Jul-92	MH	<0.5	<0.5
	23-Oct-92	MH	<0.5	<0.5
	27-Jan-93	MH	<0.05	0.13
	29-Apr-93	MH	<0.05	0.15
	22-Jul-93	PES	<0.05	0.16
	07-Oct-93	PES	<0.05	0.34
	06-Jan-94	PES	<0.05	0.15
	05-Apr-94	PES	<0.05	<0.10
	08-Jul-94	PES	<0.05	0.3
	04-Oct-94	**PES**	**0.4**	**<0.2**
W-15	25-Sep-89	MH	1.2	NA
	13-Apr-90	MH	1.5	NA

Table 2. Summary of Petroleum Hydrocarbon Analytical Results for Groundwater Samples Through October 1994

Emery Bay Marketplace
Emeryville, California

Concentrations expressed in milligrams per liter [mg/L] - equivalent to parts per million [ppm]

Well Number	Sample Date	Sampled by	TPH as Diesel	TPH as Motor Oil
W-16	27-Sep-89	MH	4.7	NA
	28-Feb-90	MH	22	NA
	13-Apr-90	MH	9.0	NA
W-17	25-Sep-89	MH	0.7	NA
	13-Apr-90	MH	1.6	NA
W-18	26-Sep-89	MH	3.1	NA
	13-Apr-90	MH	5.1	NA
W-19	12-Apr-90	MH	1.1	NA
	16-Apr-90	MH	<0.5	NA
	27-Jul-90	MH	<1	8.0
	03-Oct-90	MH	<0.5	3.0
	03-Jan-91	MH	<0.5	<1
	03-Apr-91	MH	<2.5	8.4
	25-Oct-91	MH	<0.5	34
	17-Jan-92	MH	<10.0	29
	23-Apr-92	MH	<2.0	7.1
	23-Jul-92	MH	<0.1	7.3
	22-Oct-92	MH	<10	28
	26-Jan-93	MH	0.79	35
	29-Apr-93	MH	<0.05	8.2
	22-Jul-93	PES	<0.50	20.00
	07-Oct-93	PES	0.45	2.00
	06-Jan-94	PES	0.50	7.10
	05-Apr-94	PES	<0.20	2.70
	08-Jul-94	PES	3.4	2.5
	04-Oct-94	**PES**	**13**	**11**
W-20	12-Apr-90	MH	<0.5	NA
	16-Apr-90	MH	<0.5	NA
	30-Jul-90	MH	<0.5	<1
	03-Oct-90	MH	<0.5	<1
	04-Jan-91	MH	<0.5	<1
	04-Apr-91	MH	<0.5	2.3
	25-Oct-91	MH	<0.5	<1
	17-Jan-92	MH	<0.5	<0.5
	24-Apr-92	MH	<0.5	<0.5
	22-Jul-92	MH	<0.5	<0.5
	22-Oct-92	MH	<0.5	<0.5
	27-Jan-93	MH	<0.10	0.42 (1)

Table 2. Summary of Petroleum Hydrocarbon Analytical Results for Groundwater Samples Through October 1994

Emery Bay Marketplace
Emeryville, California

Concentrations expressed in milligrams per liter [mg/L] - equivalent to parts per million [ppm]

Well Number	Sample Date	Sampled by	TPH as Diesel	TPH as Motor Oil
W-20 Cont	29-Apr-93	MH	<0.05	0.38(1)
	22-Jul-93	PES	<0.05	1.90
	07-Oct-93	PES	<0.05	0.12
	06-Jan-94	PES	<0.05	0.17
	05-Apr-94	PES	<0.05	<0.10
	08-Jul-94	PES	<0.05	<0.20
	06-Oct-94	**PES**	**<0.05**	**<0.2**
W-21	12-Apr-90	MH	1.4	NA
	18-Apr-90	MH	1.7	NA
W-22	12-Apr-90	MH	<0.5	NA
	18-Apr-90	MH	<0.5	NA
W-23	12-Apr-90	MH	2.9	NA
	18-Apr-90	MH	3.6	NA
W-24	07-Jun-90	MH	<0.5	NA
	27-Jul-90	MH	<0.5	<1
	03-Oct-90	MH	<0.5	<1
	03-Jan-91	MH	<0.5	<1
	03-Apr-91	MH	<0.5	1.1
	25-Oct-91	MH	<0.5	<1
	17-Jan-92	MH	<0.5	<0.5
	24-Apr-92	MH	<0.5	<0.5
	23-Jul-92	MH	<0.5	<0.5
	22-Oct-92	MH	<0.5	<0.5
	26-Jan-93	MH	<0.05	0.20 (1)
	29-Apr-93	MH	<0.05	0.14 (1)
	22-Jul-93	PES	<0.05	0.42
	07-Oct-93	PES	<0.05	0.45
	06-Jan-94	PES	<0.05	<0.10
	05-Apr-94	PES	<0.05	<0.10
	08-Jul-94	PES	0.06	<0.20
	04-Oct-94	**PES**	**0.5**	**<0.2**

Table 2. Summary of Petroleum Hydrocarbon Analytical Results for Groundwater Samples Through October 1994

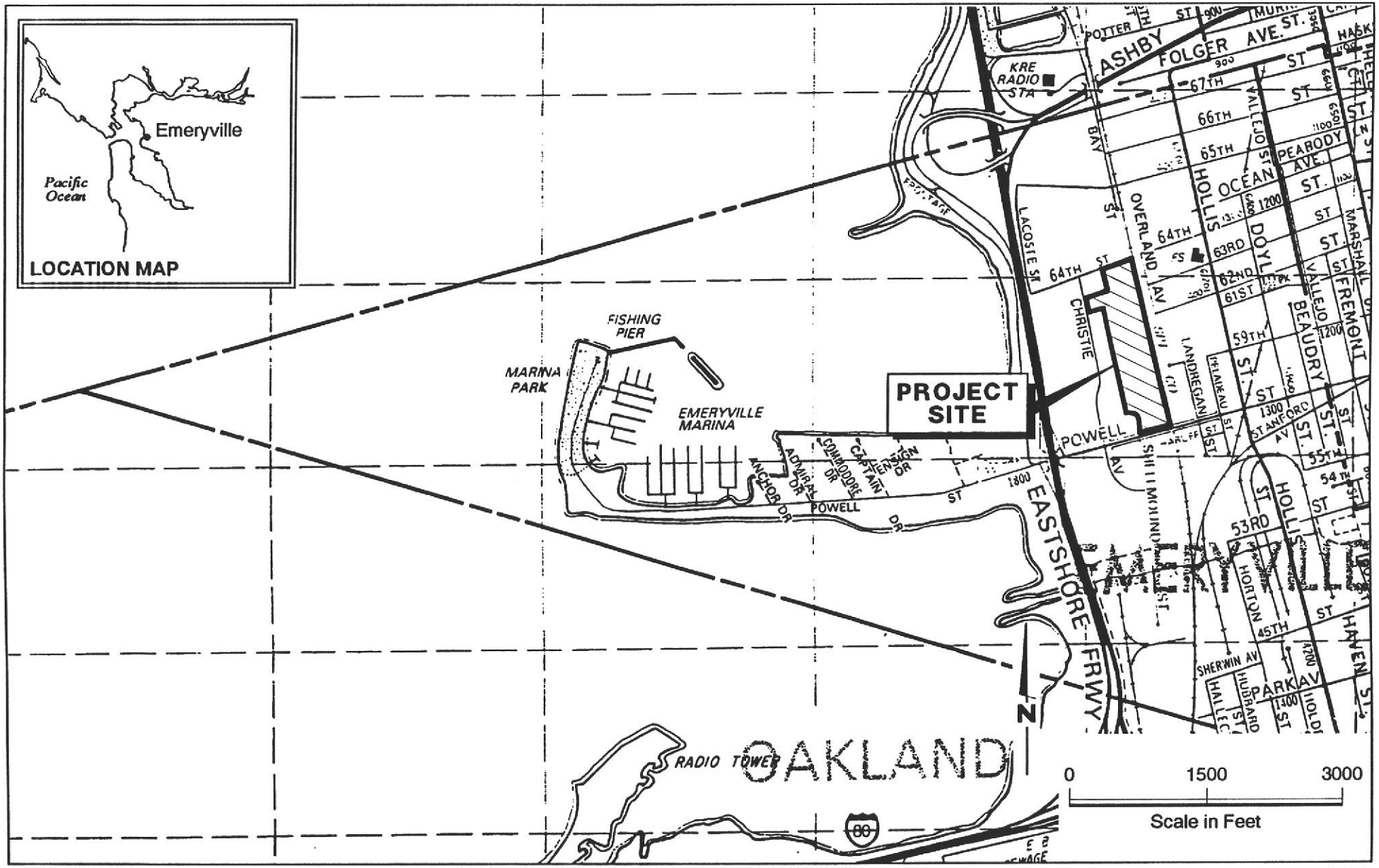
Emery Bay Marketplace
Emeryville, California

Concentrations expressed in milligrams per liter [mg/L] - equivalent to parts per million [ppm]

Well Number	Sample Date	Sampled by	TPH as Diesel	TPH as Motor Oil

Notes:

(1) = TPH quantified as motor oil although chromatogram pattern not typical of motor oil.
(2) = Semiquantified results include gasoline, diesel, and some oil and grease in Well W-8.
(3) = TPH quantified as diesel although chromatograph pattern not typical of diesel.
< 0.5 = Not detected above indicated detection limit.
TPH = Total petroleum hydrocarbons
NA = Not Analyzed
WCC = Woodward Clyde Consultants
MH = McLaren Hart
PES = PES Environmental, Inc.

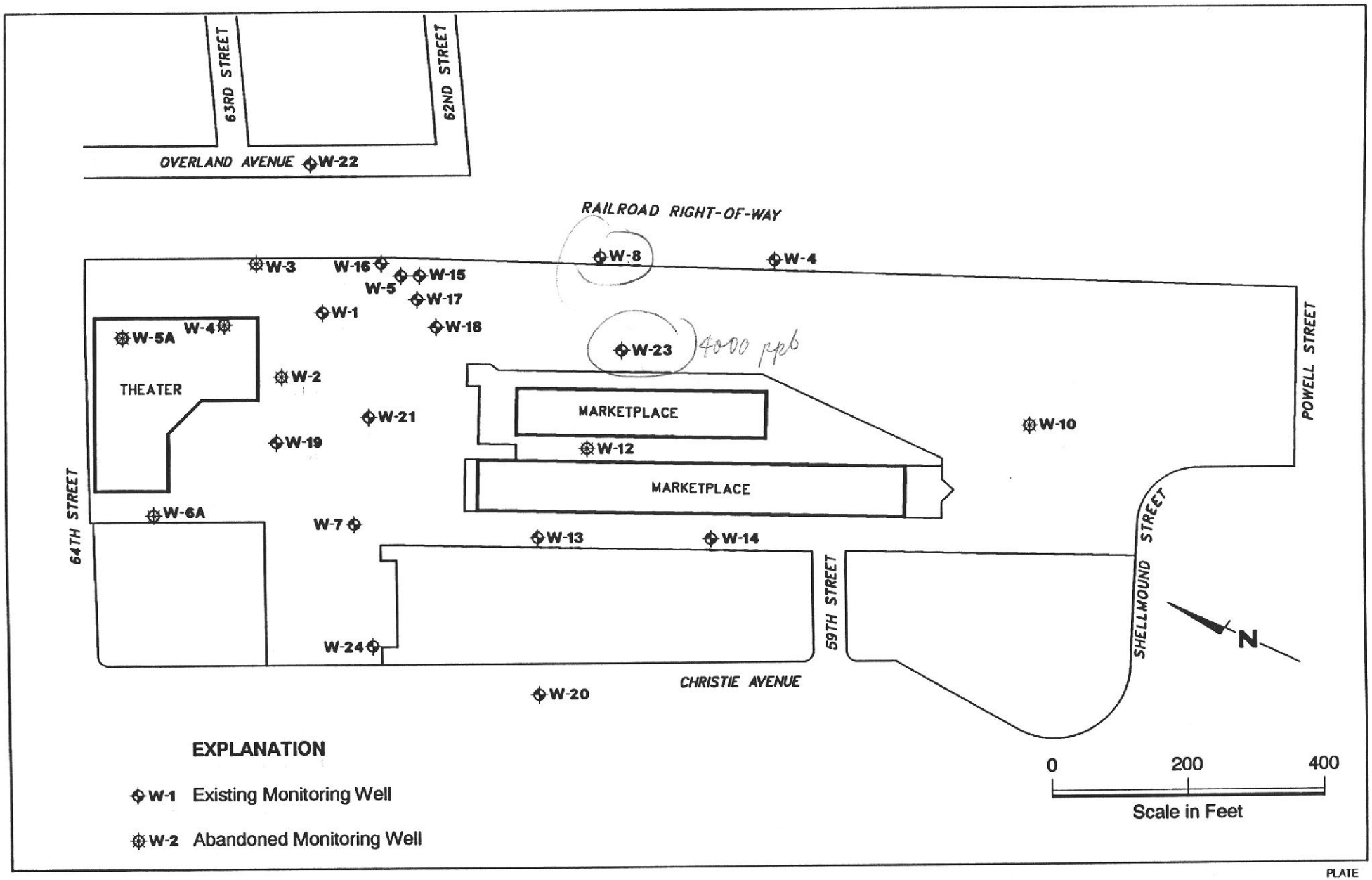


PES Environmental, Inc.
Engineering & Environmental Services

Site Location Map
Emery Bay Marketplace
Emeryville, California

PLATE
1

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
131.0200.001	MW	11/94		



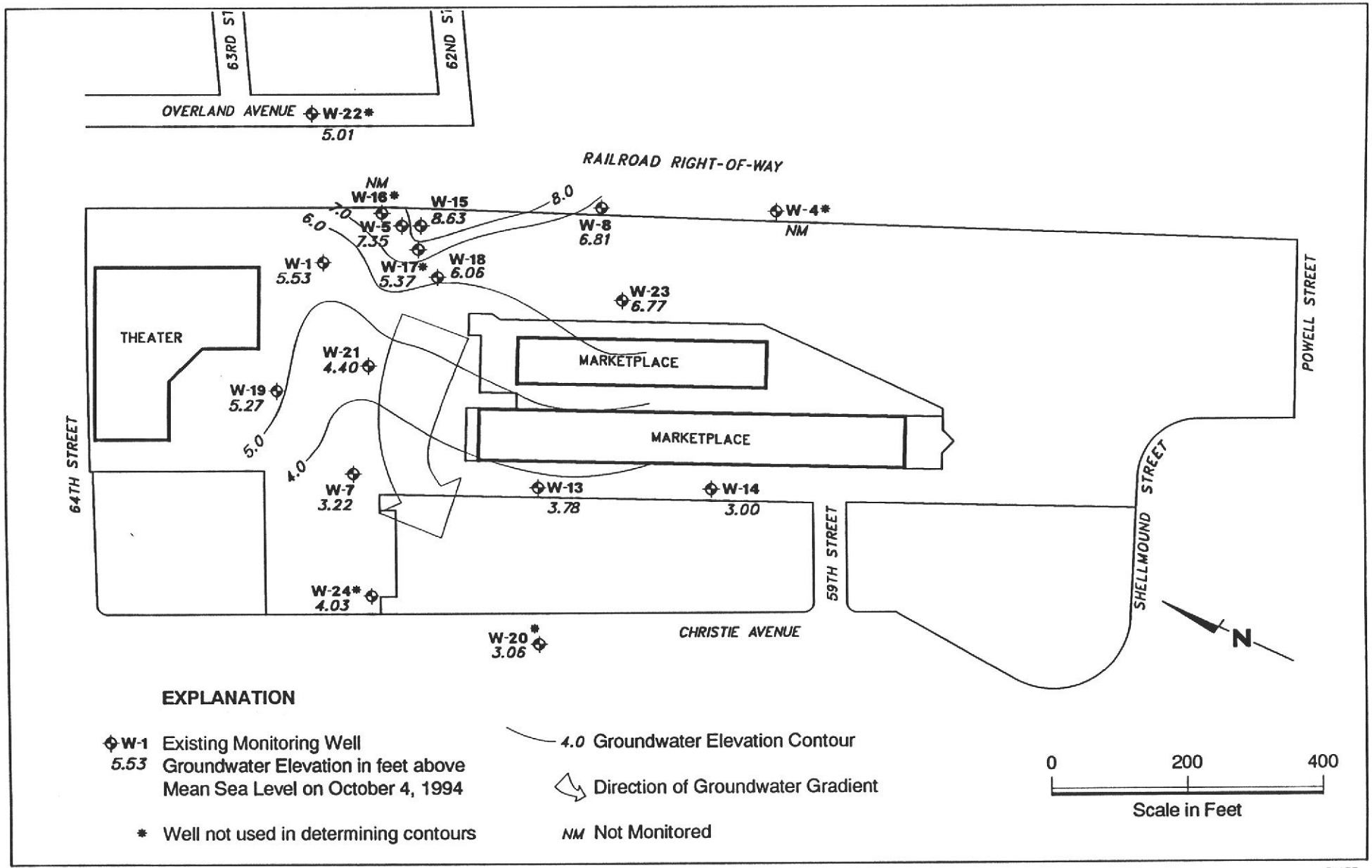
PLATE

PES Environmental, Inc.
Engineering & Environmental Services

Well Location Map
Emery Bay Marketplace
Emeryville, California

2

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
131.0200.001	MW	11/94		



EXPLANATION

- W-1 / 5.53 — Existing Monitoring Well; Groundwater Elevation in feet above Mean Sea Level on October 4, 1994
- * — Well not used in determining contours
- 4.0 — Groundwater Elevation Contour
- Direction of Groundwater Gradient
- NM — Not Monitored

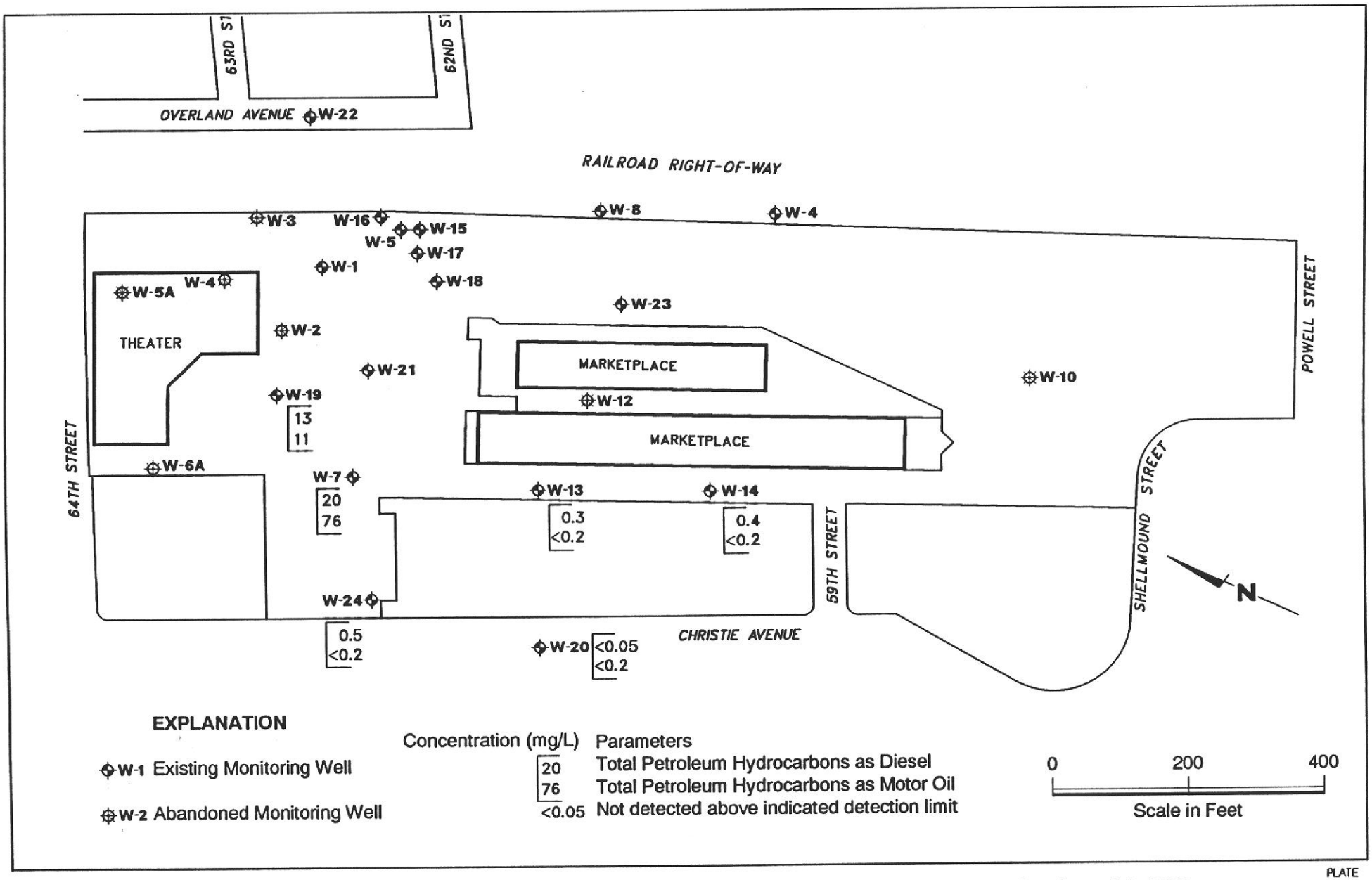
PLATE

3

PES Environmental, Inc.
Engineering & Environmental Services

Groundwater Elevation Contours on October 4, 1994
Emery Bay Marketplace
Emeryville, California

JOB NUMBER	REVIEWED BY	DATE
131.0200.001	mw	11/94



PLATE

4

PES Environmental, Inc.
Engineering & Environmental Services

Dissolved Hydrocarbons in Groundwater on October 4 & 6, 1994
Emery Bay Marketplace
Emeryville, California

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
131.0200.001	MW	11/94		

APPENDIX A

WATER LEVEL AND GROUNDWATER SAMPLING REPORTS

BLAINE
TECH SERVICES INC.

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

October 12, 1994

PES Environmental, Inc.
1682 Novato Blvd.
Suite 100
Novato, CA 94947

Attn: Mary Williams

SITE:
Emery Bay Market Place
Christie Street
Emeryville, California

SAMPLING EVENT:
Evacuate and sample four wells

DATE:
October 4 and 6, 1994

GROUNDWATER SAMPLING REPORT 941004-J-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.	W-7	W-19	W-20	W-24
Date Sampled	10/04/94	10/04/94	10/06/94	10/04/94
Well Diameter (in.)	2	2	2	2
Total Well Depth (ft.)	12.48	13.54	16.87	11.55
Depth To Water (ft.)	5.83	5.03	3.76	4.69
Free Product (ft.)	NONE	YES *	NONE	NONE
Reason If Not Sampled	--	--	--	--
1 Case Volume (gal.)	1.0	1.36	2.0	1.0
Did Well Dewater?	YES @ 2.0 gals.	--	NO	NO
Gallons Actually Evacuated	2.0	--	6.0	3.0
Purging Device	BAILER	BAILER	BAILER	BAILER
Sampling Device	BAILER	--	BAILER	BAILER
Time	15:19 15:21	16:40	11:08 11:13 11:18	13:49 13:53 13:56
Temperature (Fahrenheit)	67.0 66.6	66.0	61.2 60.8 60.6	65.0 64.2 64.4
pH	7.2 7.0	6.8	7.8 7.8 8.0	7.8 7.6 7.6
Conductivity (micromhos/cm)	3500 4200	3000	1100 1200 1200	2800 2800 2600
Nephelometric Turbidity Units	>200 >200	>200	>200 >200 >200	>200 >200 >200
BTS Chain of Custody	941004-J-1	941004-J-1	941004-J-1	941004-J-1
BTS Sample I.D.	W-7	W-19	W-20	W-24
DHS HMTL Laboratory Analysis	AEN TPH (DIESEL), TPH (MOTOR OIL)	AEN TPH (DIESEL), TPH (MOTOR OIL)	AEN TPH (DIESEL), TPH (MOTOR OIL)	AEN TPH (DIESEL), TPH (MOTOR OIL)

* Free product was bailed, 4 gallons of water and free product was removed.

Note: Personnel from Lowney Associates collected samples from W-13 and W-14 and turned the samples over to Blaine Tech personnel.

EQUIPMENT

Selection of Sampling Equipment

The determination of what apparatus is to be used on particular wells may be made by the property owner, but is usually made by the professional consultant directing the performance of the monitoring on the property owner's behalf. When no specific requirement is made, 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.

Bailers were selected for the collection of samples at this site.

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 hydrocarbons are involved, the bailer may include near surface contaminants that are not representative of water deeper in the well.

STANDARD PRACTICES

Evacuation

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 protocol used on these

wells called for a volumetric removal of three case volumes with stabilization of standard water parameters. There are situations where up to ten case volumes of evacuation may be removed, especially when attempting to stabilize turbidity in undeveloped wells. 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

The evacuation of purge water creates a volume of effluent water which, in most cases, must be contained. Blaine Tech Services, 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.

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 and the T.E.G.D. which is published separately.

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 new 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.

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 several 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 contain

er and the filter assembly discarded. Cartridge type flow-through filters are more expensive but can be fitted directly to the discharge line of most sampling pumps (USGS/Middleburg pumps) and electric submersible pumps.

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 the person releasing the samples followed by the time, date and signature of the person accepting custody of the samples).

Hazardous Materials Testing Laboratory

The samples obtained at this site were delivered to American Environmental Network in Pleasant Hill, California. AEN is certified by the California Department of Health Services as a Hazardous Materials Testing Laboratory and is listed as DOHS HMTL #1172.

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. Blaine Tech Services, Inc. frequently modifies apparatus to allow complete disassembly and proper cleaning.

Please call if we can be of any further assistance.

Richard C. Blaine

RCB/lp

attachments: chain of custody

BLAINE TECH SERVICES INC.

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

CHAIN OF CUSTODY 94100431

CLIENT PES Environmental

SITE Emery Bay Marketplace
Christie Street
Emeryville, CA.

C = COMPOSITE ALL CONTAINERS

CONDUCT ANALYSIS TO DETECT

LAB AEN DHS #

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

☐ EPA ☐ RWQCB REGION _____
☐ LIA
☐ OTHER

SPECIAL INSTRUCTIONS
Invoice + Report to PES
Attn: Mary Williams
PES Proj # 131.0201.00
cc report to BTS

SAMPLE I.D.	TIME	DATE	C	MATRIX (S = SOIL, W = H2O)	CONTAINERS TOTAL		TPH d, mO	ADD'L INFORMATION	STATUS	CONDITION	LAB SAMPLE #
W-7	16:00	10/4		W	2	glass	X				
W-13	11:15	"		"	"	"	"				
W-14		"		"	"	"	"				
W-19	16:40	"		"	"	"	"				
W-24	14:00	"		"	"	"	"				

SAMPLING COMPLETED DATE 10/04/94 TIME 16:40

SAMPLING PERFORMED BY JEAN GATINEAU

RESULTS NEEDED NO LATER THAN As Contracted

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
Jean Gatineau	10/5/94	1040	[signature]	10-5-94	10:40

SHIPPED VIA	DATE SENT	TIME SENT	COOLER #	

PAGE 2

BLAINE TECH SERVICES INC

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

CHAIN OF CUSTODY 941004J1

CLIENT PES @ EMERY BAY

SITE CHRISTIE ST.
EMERYVILLE CA.

C = COMPOSITE ALL CONTAINERS

CONDUCT ANALYSIS TO DETECT

LAB A.E.N. DHS #

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

☐ EPA ☐ RWQCB REGION ____
☐ LIA
☐ OTHER

SPECIAL INSTRUCTIONS

SAMPLE I.D.	DATE	TIME	MATRIX S = SOIL W = H2O	CONTAINERS TOTAL	CONTAINERS UN.PR. / LIT	8015 TPH-DIESEL	M.O.	ADD'L INFORMATION	STATUS	CONDITION	LAB SAMPLE #
W-20	10/06/94	11:25	W	2	X	X	X				

SAMPLING COMPLETED DATE 10/06/94 TIME 11:25

SAMPLING PERFORMED BY JEAN GATINEAU

RESULTS NEEDED NO LATER THAN

RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
Jean Gatineau	10/10/94	1050	[signature] (AEN)	10/10/94	10:50
RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME
RELEASED BY	DATE	TIME	RECEIVED BY	DATE	TIME

SHIPPED VIA	DATE SENT	TIME SENT	COOLER #	

BLAINE
TECH SERVICES INC.

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

October 12, 1994

PES Environmental
1682 Novato Blvd., Suite 100
Novato, CA 94947

Attention: Mary Williams

SITE:
Emery Bay Market Place
Christie Street
Emeryville, California

PROJECT:
Water Levels

DATE:
October 4, 1994

Water Levels Report 941004-J-1.WL

Personnel from our office was present at the site on Tuesday, October 4, 1994, to obtain water levels and conduct a sheen and odor check. Please note that we are reporting only the water levels, not elevations.

Well designation	Well diameter	Depth to water	Well depth	Sheen/Odor	Measured to: Top of Pipe or Grade
W-1	2"	5.94′	10.55′	None	Pipe
W-4	Inaccessible				
W-5	2"	5.20′	--	Free Product*	Pipe
W-7	2"	5.83′	12.48′	None	Pipe
W-8	2"	3.62′	11.78′	None	Pipe
W-13	2"	4.37′	10.04′	None	Pipe
W-14	2"	4.97′	9.91′	None	Pipe
W-15	2"	2.90′	20.20′	None	Pipe
W-16	Inaccessible				
W-17	2"	6.77′	24.84′	None	Pipe
W-18	2"	5.28′	20.04′	None	Pipe
W-19	2"	5.03	--	Free Product**	Pipe
W-20	2"	3.76′	16.87′	None	Pipe

* A free product zone measuring 1.34′ stood on water column.
Depth to immiscible liquid from the top of well case measured 3.86′.

** A free product zone measuring 0.03′ stood on water column.
Depth to immicsible liquid from the top of well case measured 5.0′.

Well designation	Well diameter	Depth to water	Well depth	Sheen/Odor	Measured to: Top of Pipe or Grade
W-21	2"	5.08′	12.38′	None	Pipe
W-22	2"	6.66′	15.05′	None	Pipe
W-23	2"	2.39′	8.90′	None	Pipe
W-24	2"	4.69′	11.55′	None	Pipe

Richard C. Blaine

RCB/lp

1-TSA 9410105

BLAINE TECH SERVICES INC

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

CHAIN OF CUSTODY 9410045J

CLIENT PES @ EMERY BAY

SITE CHRISTIE ST.
EMERYVILLE CA.

LAB A.E.N. DHS #

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

☐ EPA ☐ RWQCB REGION ____
☐ LIA
☐ OTHER

SPECIAL INSTRUCTIONS

C = COMPOSITE ALL CONTAINERS

SAMPLE I.D.	DATE	TIME	MATRIX S = SOIL W = H2O	CONTAINERS TOTAL	CONTAINERS UN.PR. 1 LIT	CONDUCT ANALYSIS TO DETECT: 8015 TPH-DIESEL	M.O.	ADD'L INFORMATION	STATUS	CONDITION	LAB SAMPLE #
W-20	10/06/94	11:25	W	2	X	X	X				01AB

SAMPLING COMPLETED DATE 10/06/94 TIME 11:25

SAMPLING PERFORMED BY JEAN GATINEAU

RESULTS NEEDED NO LATER THAN

RELEASED BY: Jean Gatineau	DATE 10/10/94	TIME 1050	RECEIVED BY: (AEN)	DATE 10/10/94	TIME 10:50
RELEASED BY:	DATE 10/10/94	TIME 11:50	RECEIVED BY: Gina Gillespie	DATE 10-10-94	TIME 1150
RELEASED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME

SHIPPED VIA	DATE SENT	TIME SENT	COOLER #	

APPENDIX B

ANALYTICAL LABORATORY REPORTS

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172 AIHA Accreditation: 11134

PES ENVIRONMENTAL, INC.
1682 NOVATO BLVD.
SUITE 100
NOVATO, CA 94947

ATTN: MARY WILLIAMS
CLIENT PROJ. ID: 131.0201.001
CLIENT PROJ. NAME: EMERY BAY MAR.
C.O.C. NUMBER: 941004J1

REPORT DATE: 10/22/94

DATE(S) SAMPLED: 10/04/94

DATE RECEIVED: 10/05/94

AEN WORK ORDER: 9410044

PROJECT SUMMARY:

On October 5, 1994, this laboratory received 5 water sample(s).

Client requested sample(s) be analyzed for organic parameters. Results of analysis are summarized on the following page(s).

Please see quality control report for a summary of QC data pertaining to this project.

If you have any questions, please contact Client Services at (510) 930-9090.

Larry Klein
Laboratory Director

cc: Jean Gatineau (Blaine Tech)

PES ENVIRONMENTAL, INC.

SAMPLE ID: W-7
AEN LAB NO: 9410044-01
AEN WORK ORDER: 9410044
CLIENT PROJ. ID: 131.0201.001

DATE SAMPLED: 10/04/94
DATE RECEIVED: 10/05/94
REPORT DATE: 10/22/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/11/94
TPH as Diesel	GC-FID	20 *	0.5	mg/L	10/12/94
TPH as Oil	GC-FID	76 *	2	mg/L	10/12/94

Reporting limits elevated due to high levels of target compounds. Sample run at dilution.

ND = Not detected at or above the reporting limit
* = Value above reporting limit

PES ENVIRONMENTAL, INC.

SAMPLE ID: W-13
AEN LAB NO: 9410044-02
AEN WORK ORDER: 9410044
CLIENT PROJ. ID: 131.0201.001

DATE SAMPLED: 10/04/94
DATE RECEIVED: 10/05/94
REPORT DATE: 10/22/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/11/94
TPH as Diesel	GC-FID	0.3 *	0.05	mg/L	10/11/94
TPH as Oil	GC-FID	ND	0.2	mg/L	10/11/94

ND = Not detected at or above the reporting limit
* = Value above reporting limit

PES ENVIRONMENTAL, INC.

SAMPLE ID: W-14
AEN LAB NO: 9410044-03
AEN WORK ORDER: 9410044
CLIENT PROJ. ID: 131.0201.001

DATE SAMPLED: 10/04/94
DATE RECEIVED: 10/05/94
REPORT DATE: 10/22/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/11/94
TPH as Diesel	GC-FID	0.4 *	0.05	mg/L	10/11/94
TPH as Oil	GC-FID	ND	0.2	mg/L	10/11/94

ND = Not detected at or above the reporting limit
* = Value above reporting limit

PES ENVIRONMENTAL, INC.

SAMPLE ID: W-19
AEN LAB NO: 9410044-04
AEN WORK ORDER: 9410044
CLIENT PROJ. ID: 131.0201.001

DATE SAMPLED: 10/04/94
DATE RECEIVED: 10/05/94
REPORT DATE: 10/22/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/11/94
TPH as Diesel	GC-FID	13 *	0.3	mg/L	10/12/94
TPH as Oil	GC-FID	11 *	1	mg/L	10/12/94

Reporting limits elevated due to high levels of target compounds. Sample run at dilution.

ND = Not detected at or above the reporting limit
* = Value above reporting limit

PES ENVIRONMENTAL, INC.

SAMPLE ID: W-24
AEN LAB NO: 9410044-05
AEN WORK ORDER: 9410044
CLIENT PROJ. ID: 131.0201.001

DATE SAMPLED: 10/04/94
DATE RECEIVED: 10/05/94
REPORT DATE: 10/22/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/11/94
TPH as Diesel	GC-FID	0.5 *	0.05	mg/L	10/11/94
TPH as Oil	GC-FID	ND	0.2	mg/L	10/11/94

ND = Not detected at or above the reporting limit
* = Value above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9410044

CLIENT PROJECT ID: 131.0201.001

Quality Control and Project Summary

Surrogate recovery for 9410044-04 was outside of established quality control limits due to matrix interference.

All other laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

AEN JOB NO: 9410044
DATE EXTRACTED: 10/11/94
INSTRUMENT: C
MATRIX: WATER

Surrogate Standard Recovery Summary
Method: EPA 3510 GCFID

Date Analyzed	Client Id.	Lab Id.	Percent Recovery n-Pentacosane
10/12/94	W-7	01	96
10/11/94	W-13	02	90
10/11/94	W-14	03	87
10/12/94	W-19	04	128 #
10/11/94	W-24	05	90

#: Outside of QC limits due to matrix interference.

Current QC Limits

Surrogate	Percent Recovery
n-Pentacosane	30-120

QUALITY CONTROL DATA

AEN JOB NO: 9410044
DATE EXTRACTED: 10/06/94
DATE ANALYZED: 10/08/94
SAMPLE SPIKED: DI WATER
INSTRUMENT: C
MATRIX: WATER

Method Spike Recovery Summary
Method: EPA 3510 GCFID

Analyte	Spike Added (mg/L)	Average Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
Diesel	1.55	91	2	65-103	12

Daily method blanks for all associated analytical runs showed no contamination over the reporting limit.

*** END OF REPORT ***

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172 AIHA Accreditation: 11134

PES ENVIRONMENTAL, INC.
1682 NOVATO BLVD.
SUITE 100
NOVATO, CA 94947

ATTN: MARY WILLIAMS
CLIENT PROJ. ID: 941004J1
CLIENT PROJ. NAME: CHRISTIE ST.

REPORT DATE: 10/24/94

DATE(S) SAMPLED: 10/06/94

DATE RECEIVED: 10/10/94

AEN WORK ORDER: 9410102

PROJECT SUMMARY:

On October 10, 1994, this laboratory received 1 water sample(s).

Client requested sample(s) be analyzed for organic parameters. Results of analysis are summarized on the following page(s).

Please see quality control report for a summary of QC data pertaining to this project.

If you have any questions, please contact Client Services at (510) 930-9090.

Larry Klein
Laboratory Director

PES ENVIRONMENTAL, INC.

SAMPLE ID: W-20
AEN LAB NO: 9410102-01
AEN WORK ORDER: 9410102
CLIENT PROJ. ID: 941004J1

DATE SAMPLED: 10/06/94
DATE RECEIVED: 10/10/94
REPORT DATE: 10/24/94

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	10/14/94
TPH as Diesel	GC-FID	ND	0.05	mg/L	10/19/94
TPH as Oil	GC-FID	ND	0.2	mg/L	10/19/94

ND = Not detected at or above the reporting limit
* = Value above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9410102

CLIENT PROJECT ID: 941004J1

Quality Control and Project Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

METHOD: EPA 3510 GCFID

AEN JOB NO: 9410102
DATE EXTRACTED: 10/14/94
INSTRUMENT: C
MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery n-Pentacosane
10/19/94	W-20	01	85
QC Limits:			30-120

DATE EXTRACTED: 10/13/94
DATE ANALYZED: 10/19/94
SAMPLE SPIKED: DI WATER
INSTRUMENT: C

Method Spike Recovery Summary

Analyte	Spike Added (mg/L)	Average Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
Diesel	1.55	102	6	65-103	12

Daily method blanks for all associated analytical runs showed no contamination over the reporting limit.

*** END OF REPORT ***