

Harding Lawson Associates

A Report Prepared for

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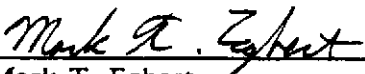
**REPORT OF GROUNDWATER MONITORING
MARCH 1992
CHINATOWN REDEVELOPMENT PROJECT AREA
OAKLAND, CALIFORNIA**

HLA Job No. 9382,040.02

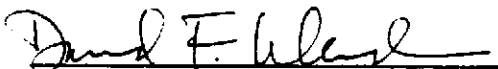
Submitted to:

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1.0 INTRODUCTION

This report presents the results of quarterly groundwater monitoring in the Chinatown Redevelopment Project Area (Project Area) of Oakland, California (Plate 1), for March 1992. Dewatering activities at the Pacific Renaissance Plaza (PRP) site were completed on July 1, 1991. Quarterly groundwater monitoring was recommended through June 1992 in Harding Lawson Associates' report titled *Groundwater Monitoring and Dewatering Effluent Treatment System Operation and Monitoring, April through July 1991 (HLA, 1991)*.

Groundwater monitoring in March 1992 consisted of sampling four monitoring wells and measuring water levels in 11 wells. Groundwater flow directions were evaluated in the vicinity of the PRP site; the presence and distribution of gasoline and gasoline constituents also were evaluated in groundwater at the PRP site.

2.0 QUARTERLY GROUNDWATER MONITORING

Water levels were measured in 11 wells and groundwater samples were collected from Monitoring Wells MW-7, MW-18, and MW-19, and MW-23 on March 27, 1992. Samples were taken to monitor hydraulic conditions in the Project Area and to monitor groundwater chemistry in the 4 wells. A field blank was also poured and kept with the groundwater samples.

Standard HLA decontamination protocol was followed prior to sampling. HLA employees performing field work were trained in safety procedures and used Level D personal protective equipment.

At least three well volumes were purged from the wells prior to sampling; the purge water was collected in 55-gallon drums onsite. Groundwater samples were collected with a stainless steel bailer. After being decanted into 40-milliliter sample bottles, samples were labeled and stored on ice until delivery under chain of custody to Pace Laboratories, Inc. (PACE), of Novato, California, for chemical analysis. The groundwater samples collected from Wells MW-7 and MW-19 were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA Test Method 8020 and for total petroleum hydrocarbons (TPH) as gasoline using EPA Test Method 8015. The groundwater samples collected from Wells MW-18 and MW-23 and the field blank sample were analyzed using EPA Test Method 8020.

3.0 RESULTS

3.1 Groundwater Elevations and Potentiometric Contours

Depths to groundwater and calculated water levels for March 1992 are presented in Table 1; potentiometric contours interpreted from the water-level data are shown on Plate 1. The data indicate groundwater flow is to the northwest in the northwestern portions of the Project Area and generally west to south in the southern portions of the Project Area. Water level elevations along Webster Street at Wells MW-3 and MW-19 are higher than at Well MW-22, indicating an easterly component of flow in this area.

Potentiometric data are not interpreted in the area bounded by 9th, 11th, Franklin, and Webster streets, the area occupied by the PRP and East Bay Municipal Utility District buildings.

Water levels increased in all 11 wells between December 20, 1991 and March 27, 1992, with increases ranging from 0.51 foot at MW-21 to 2.29 feet at MW-3.

3.2 Analytical Results - Groundwater Monitoring Wells

Results of chemical analyses of the groundwater samples collected on March 27, 1992, are presented in Table 2 along with historical groundwater chemistry data for BTEX and TPH as gasoline for all monitoring wells. Laboratory reports for groundwater samples are presented in the Appendix.

BTEX compounds were detected in groundwater samples from Monitoring Wells MW-7, MW-19, and MW-23. BTEX compounds detected at MW-19 have decreased since December 1991 and are lower than concentrations measured before PRP dewatering activities began in November 1990. Except for a trace of toluene on June 6, 1991, BTEX compounds had not been previously detected in samples from Well MW-23. In the sample from Monitoring Well MW-7, benzene, ethylbenzene, and xylenes were

detected at concentrations similar to pre-dewatering concentrations. Benzene was the only BTEX compound detected in the sample from Well MW-18. BTEX compounds were not detected in the field blank sample.

In the sample from Monitoring Well MW-19, TPH as gasoline was detected in March 1992 at a concentration of 3.6 mg/l, lower than the concentration of 9.6 mg/l measured in December 1991. TPH as gasoline was detected in Well MW-7 at a concentration of 0.11 mg/l, which is lower than the concentration of 0.32 mg/l measured in December 1991.

4.0 DISCUSSION AND RECOMMENDATIONS

Results of analysis of water samples collected in March 1992 indicate that concentrations of petroleum hydrocarbons and BTEX compounds at MW-19 are lower than the December 1991 concentrations and generally lower than the pre-dewatering concentrations for those constituents. In addition, the chemical concentrations at MW-7 are similar to pre-dewatering concentrations and appear to originate from an upgradient chemical source associated with the two underground storage tanks removed in December 1991 from near the corner of 10th and Franklin Streets. This is suggested by the absence of BTEX constituents during dewatering when flow directions at MW-7 were generally south to east (*HLA, 1991*). Except for toluene, BTEX compounds had not been detected previously at MW-23.

On the basis of water levels measured in March 1988 (*HLA, 1989*), before the initiation of dewatering activities in the Project Area, HLA estimated groundwater flow to be generally to the west. The March 1992 measurements, the third round of water-level data collected since dewatering activities ceased, continue to show some influence of the buildings constructed in the Project Area. The potentiometric contours show the effect of the PRP building and shoring system as barriers to groundwater flow. These barriers may affect upgradient (east side) water levels and may account, in part, for the relatively greater increases in water levels observed at Wells MW-3 and MW-19 than at other wells. In addition, the apparent change in groundwater flow direction on the east side of the Project Area, compared to westerly preconstruction flow directions, suggests the possible presence of a recharge source in this area. Possible explanations for this pattern include exfiltration from storm drains during storm events or a leaking water main. The pattern of potentiometric contours interpreted from the March water-level measurements indicates that the effects of dewatering are no longer evident.

In the vicinity of Well MW-19, groundwater flow is estimated to be west to south. At MW-7, the flow direction is estimated to be generally to the west.

The next quarterly groundwater monitoring round is scheduled for June 1992. Water levels will be measured in Monitoring Wells MW-2, MW-3, MW-6, MW-7, MW-8, and MW-18 through MW-23. Samples from Monitoring Wells MW-18 and MW-23 will be analyzed for BTEX, and samples from MW-7 and MW-19 will be analyzed for TPH as gasoline and BTEX. In addition, a duplicate sample will be collected from MW-23 to assess the accuracy of laboratory results. Results will be presented in a report to be submitted to the Regional Water Quality Control Board.

5.0 REFERENCES

Harding Lawson Associates, 1989. *A-Aquifer Monitoring Report, Chinatown Redevelopment Project Area, Oakland, California.* January 31.

_____, 1991. *Groundwater Monitoring and Dewatering Effluent Treatment System, Operation and Monitoring, April through July 1991, Chinatown Redevelopment Project Area, Oakland, California.* August 16.

Table 1. WATER-LEVEL ELEVATIONS - AUGUST 1990 THROUGH MARCH 1992

Well No.	MW-2		MW-3		MW-6		MW-7		MW-8		MW-12	
	GROUND SURFACE	TOP OF CASING	GROUND SURFACE	TOP OF CASING	GROUND SURFACE	TOP OF CASING	GROUND SURFACE	TOP OF CASING	GROUND SURFACE	TOP OF CASING	GROUND SURFACE	TOP OF CASING
	40.05	39.55	39.02	38.35	39.95	39.59	39.35	39.10	40.63	40.47	37.70	37.00
DATE	Depth to Water	Elevation	Depth to Water	Elevation	Depth to Water	Elevation	Depth to Water	Elevation	Depth to Water	Elevation	Depth to Water	Elevation
3-Aug-90	25.59	13.98	25.33	13.02	25.37	14.22	25.38	13.72	27.02	13.45	21.15	15.85
27-Aug-90	-	-	-	-	-	-	-	-	-	-	-	-
12-Sep-90	-	-	-	-	-	-	-	-	-	-	24.08	12.92
13-Sep-90	-	-	-	-	-	-	25.15	13.95	-	-	-	-
14-Nov-90	25.38	14.17	23.91	14.44	25.25	14.34	24.97	14.13	26.72	13.75	23.37	13.63
3-Dec-90	26.12	13.43	24.69	13.66	25.44	14.15	27.66	11.44	27.28	13.19	25.45	11.55
11-Jan-91	28.60	10.95	28.97	9.38	27.50	12.09	29.82	9.28	29.04	11.43	*	*
11-Feb-91	32.39	7.16	32.37	5.98	29.43	10.16	32.35	6.75	30.88	9.59	*	*
8-Mar-91	33.57	5.98	32.29	6.06	30.41	9.18	32.04	7.06	31.98	8.49	*	*
12-Apr-91	32.67	6.88	31.89	6.46	30.25	9.34	31.37	7.73	32.01	8.46	*	*
10-May-91	31.90	7.65	31.29	7.06	29.94	9.65	30.94	8.16	31.66	8.81	*	*
6-Jun-91	32.56	6.99	30.94	7.41	30.27	9.32	31.06	8.04	31.94	8.53	*	*
19-Sep-91	26.94	12.61	25.28	13.07	26.58	13.01	26.96	12.14	28.65	11.82	*	*
20-Dec-91	25.94	13.61	24.23	14.12	25.74	13.85	25.83	13.27	27.47	13.00	*	*
27-Mar-92	24.05	15.50	21.94	16.41	23.92	15.67	24.01	15.09	25.64	14.83	*	*

NOTES:

Elevations are in feet above mean sea level (MSL).

Depth to water measured in feet from top of casing.

- * Well MW-12 was damaged during excavation and construction activities and can no longer be monitored.

Table 1. WATER-LEVEL ELEVATIONS - AUGUST 1990 THROUGH MARCH 1992

Well No.	MW-18		MW-19		MW-20		MW-21		MW-22		MW-23	
	GROUND SURFACE	TOP OF CASING	GROUND SURFACE	TOP OF CASING	GROUND SURFACE	TOP OF CASING	GROUND SURFACE	TOP OF CASING	GROUND SURFACE	TOP OF CASING	GROUND SURFACE	TOP OF CASING
	36.52	35.88	37.15	36.62	38.32	37.86	38.67	38.08	37.70	37.34	34.68	34.23
DATE	Depth to Water	Elevation	Depth to Water	Elevation	Depth to Water	Elevation	Depth to Water	Elevation	Depth to Water	Elevation	Depth to Water	Elevation
3-Aug-90	24.41	11.47	25.32	11.30	25.01	12.85	27.60	10.48	-	-	-	-
27-Aug-90	-	-	-	-	-	-	27.52	10.56	22.93	14.41	22.45	11.78
12-Sep-90	-	-	-	-	24.06	13.80	27.38	10.70	-	-	-	-
13-Sep-90	24.33	11.55	22.44	14.18	-	-	-	-	22.78	14.56	21.27	12.96
14-Nov-90	24.13	11.75	21.97	14.65	24.47	13.39	27.32	10.76	22.65	14.69	21.80	12.43
3-Dec-90	24.81	11.07	22.16	14.46	26.29	11.57	27.39	10.69	22.78	14.56	22.00	12.23
11-Jan-91	25.90	9.98	25.33	11.29	28.38	9.48	28.03	10.05	24.98	12.36	22.51	11.72
11-Feb-91	26.40	9.48	26.55	10.07	29.55	8.31	28.08	10.00	26.05	11.29	22.69	11.54
8-Mar-91	26.44	9.44	26.56	10.06	29.95	7.91	28.33	9.75	26.63	10.71	22.77	11.46
12-Apr-91	26.31	9.57	25.92	10.70	29.62	8.24	28.52	9.56	26.22	11.12	22.36	11.87
10-May-91	25.48	10.40	24.90	11.72	29.01	8.85	28.34	9.74	25.84	11.50	22.14	12.09
6-Jun-91	25.61	10.27	24.75	11.87	29.06	8.80	28.21	9.87	25.69	11.65	22.17	12.06
19-Sep-91	25.23	10.65	23.12	13.50	26.46	11.40	27.81	10.27	23.73	13.61	22.35	11.88
20-Dec-91	24.81	11.07	22.37	14.25	25.56	12.30	27.33	10.75	23.11	14.23	22.46	11.77
27-Mar-92	23.70	12.18	20.42	16.20	23.95	13.91	26.82	11.26	21.62	15.72	21.05	13.18

NOTES:

Elevations are in feet above mean sea level (MSL).

Depth to water measured in feet from top of casing.

Table 2. RESULTS OF ORGANIC CHEMICAL ANALYSES OF GROUNDWATER SAMPLES FROM MONITORING WELLS

Purgeable Aromatics (EPA Method 8020) Petroleum Hydrocarbons (EPA Method 8015)						
WELL	DATE	BENZENE	TOLUENE	ETHYL BENZENE	XYLENES TOTAL	TPH AS GASOLINE
LOD	(mg/l)	0.0005/0.0002 *	0.0005/0.0002 *	0.0005/0.0002 *	0.0005/0.0002 *	0.25/0.05 **
MW-3	10-Mar-88	ND	ND	ND	ND	ND
	18-Mar-88	ND	ND	ND	ND	ND
	25-Mar-88	ND	ND	ND	ND	ND
	1-Apr-88	0.7	0.4	ND	1.2	ND
	15-Apr-88	ND	ND	ND	ND	ND
	28-Apr-88 @	ND/ND (0.4)	ND/ND (0.4)	ND/ND (0.4)	ND/ND (0.4)	ND/ND
	11-May-88	ND	ND	ND	ND	ND
	27-May-88	ND	ND	ND	ND	ND
	18-Jun-88	ND	ND	ND	ND	ND
	27-Jul-88	ND	ND	ND	ND	ND
	26-Aug-88	ND	ND	ND	ND	ND
	30-Sep-88	ND	ND	ND	ND	ND
	2-Nov-88	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND
	2-Dec-88	ND	ND	ND	ND	ND
	4-Jan-89	ND	ND	ND	ND	ND
	3-Feb-89	ND	0.0009	ND	ND	ND
	3-Dec-90	ND	0.0002 †	ND	ND	ND
8-Mar-91	ND	ND	ND	ND	ND	
6-Jun-91	ND	ND	ND	ND a	NT	
MW-7	4-Apr-89	ND	0.0007	0.0010	0.0012	ND
	3-May-89	ND	0.0012	0.0018	0.0048	0.27
	6-Jun-89	0.0010	0.001	0.0022	0.0011	0.40
	7-Jul-89	0.0002	0.001	0.00034	0.0059	0.56
	2-Aug-89	ND	0.0015	0.0054	0.0059	0.70
	7-Sep-89	ND	ND	ND	0.0015	0.59
	5-Oct-89	ND	0.0011	0.0006	0.0013	0.73
	2-Nov-89	0.0002	0.001	0.0055	0.0036	0.83
	6-Dec-89	0.0006	0.0087	0.0059	0.0036	0.32
	3-Jan-90	0.0007	0.0007	0.0006	0.0013	0.18
	1-Feb-90	ND	0.0009	ND	0.0003	ND
	28-Feb-90	ND	0.0006	0.0004	0.0052	0.09
	11-Apr-90	ND	0.0007	0.0033	0.0029	0.13
	18-May-90	ND	0.0008	0.0014	0.0008	0.43
	13-Sep-90	ND	0.0019	ND	ND	NT
	3-Dec-90	0.0002	0.0024	0.0019	0.0012	0.32
	11-Feb-91	ND	ND	ND	ND	ND
	8-Mar-91	ND	ND	ND	ND	ND
	6-Jun-91	ND	ND	ND	ND a	ND
20-Dec-91	0.0002	ND	0.0029	0.0078	0.32	
27-Mar-92	0.0006	ND b	0.0010	0.0020	0.11	
MW-12	15-Feb-89	ND	ND	ND	ND	ND
	3-Mar-89	NT	NT	NT	NT	ND
	5-Apr-89	0.0014	0.0023	ND	0.0054	ND
	2-May-89	0.026	0.0033	ND	0.0063	0.10
	7-Jun-89	0.034	0.0037	ND	0.012	0.18
	6-Jul-89	0.029	0.0025	ND	0.0059	0.12
	2-Aug-89	0.023	0.002	ND	0.005	ND
	7-Sep-89 @	0.051/0.059	0.0016/0.0022	ND/ND	0.0049/0.0058	ND/ND
	5-Oct-89 @	0.037/0.040	0.0032/0.0031	ND/ND	0.0086/0.0094	ND/ND
	2-Nov-89	0.0056	0.0011	ND	0.0019	0.071
	6-Dec-89	0.0062	0.0012	ND	0.0017	0.06
	3-Jan-90	0.0086	0.0010	ND	0.0012	0.09
	1-Feb-90 @	0.0018/0.0024	0.0010/0.0004	ND/ND	0.0005/0.0004	ND/ND
	1-Mar-90	0.0016	0.0014	ND	0.0003	ND
	11-Apr-90	0.0066	0.0174	0.0015	0.0116	0.147
	18-May-90	ND	0.0009	ND	ND	ND
12-Sep-90	ND	ND	ND	0.0002	NT	
3-Dec-90	0.0006	0.0002 †	ND	0.0002 †	ND	

Table 2. RESULTS OF ORGANIC CHEMICAL ANALYSES OF GROUNDWATER SAMPLES FROM MONITORING WELLS

Purgeable Aromatics (EPA Method 8020) Petroleum Hydrocarbons (EPA Method 8015)						
WELL	DATE	BENZENE	TOLUENE	ETHYL BENZENE	XYLENES, TOTAL	TPH AS GASOLINE
LOD	(mg/l)	0.0005/0.0002 *	0.0005/0.0002 *	0.0005/0.0002 *	0.0005/0.0002 *	0.25/0.05 **
MW-18	15-Feb-89	ND	ND	ND	ND	ND
	3-Mar-89	NT	NT	NT	NT	ND
	5-Apr-89	ND	ND	ND	ND	ND
	2-May-89	ND	ND	ND	ND	ND
	7-Jun-89	ND	ND	ND	ND	ND
	6-Jul-89	ND	ND	ND	ND	ND
	2-Aug-89	ND	ND	ND	ND	ND
	6-Sep-89	ND	ND	ND	ND	ND
	5-Oct-89	ND	ND	ND	ND	ND
	1-Nov-89	ND	ND	ND	ND	ND
	6-Dec-89	ND	0.0009	ND	0.0013	ND
	2-Jan-90	0.016	0.0080	0.0014	0.0098	0.10
	1-Feb-90	ND	ND	ND	ND	ND
	1-Mar-90	0.0003	ND	ND	0.0002	ND
	11-Apr-90	0.0004	0.0006	0.0005	0.0003	ND
	18-May-90	ND	ND	ND	ND	ND
	13-Sep-90	0.0027	ND	ND	ND	NT
	4-Dec-90	0.0029	0.0002 †	ND	0.0003	†
	8-Mar-91	0.0009	0.0003	ND	ND	ND
	6-Jun-91	ND	ND	ND	ND a	NT
19-Sep-91	ND b	ND b	ND b	ND b	ND	
20-Dec-91	0.0004	ND	ND b	ND b	NT	
27-Mar-92	0.0016	ND b	ND b	ND b	NT	
MW-19	15-Dec-89	5.0	0.30	0.078	0.61	12
	3-Jan-90	3.0	0.48	0.12	1.1	13
	1-Feb-90	1.1	0.022	LT 0.0040	0.032	1.9
	1-Mar-90	4.2	0.92	0.24	0.82	9.2
	11-Apr-90	3.8	1.1	0.82	0.34	10
	18-May-90	5.8	0.75	0.70	0.78	11
	13-Sep-90	1.4	1.2	0.35	1.6	NT
	4-Dec-90	2.1	1.5	0.42	1.6	12
	11-Feb-91	0.45	0.12	0.086	0.21	2.7
	8-Mar-91	0.52	0.057	0.020	0.083	1.4
	10-May-91	0.32	0.088	0.055	0.160	1.8
	6-Jun-91 ⊕	0.38/0.46	0.027/0.038	0.023/0.030	0.092/0.15	3.4/NT
	19-Sep-91	0.21	0.023	0.094	0.15	3.5
	20-Dec-91	1.0	0.24	0.5	1.2	9.8
27-Mar-92	0.34	0.13	0.12	0.34	3.6	
MW-20	15-Dec-89	ND	ND	ND	ND	ND
	3-Jan-90	0.0004	0.0004	ND	0.0008	ND
	1-Feb-90	ND	0.0014	ND	0.0005	ND
	28-Feb-90	ND	ND	ND	0.0005	ND
	11-Apr-90	0.0028	0.0110	0.0011	0.0066	ND
	18-May-90	ND	ND	ND	ND	ND
	12-Sep-90	ND	ND	ND	ND	NT
	3-Dec-90	ND	0.0002 †	ND	ND	ND
	8-Mar-91	ND	ND	ND	ND	ND
6-Jun-91	ND	ND	ND	ND a	NT	
MW-21	27-Aug-90	ND	ND	ND	ND	NT
	12-Sep-90	ND	ND	ND	ND	NT
	3-Dec-90	ND	0.0005 †	ND	0.0011	†
	8-Mar-91	ND	ND	ND	ND	ND
	6-Jun-91	ND	ND	ND	ND a	NT

Table 2. RESULTS OF ORGANIC CHEMICAL ANALYSES OF GROUNDWATER SAMPLES FROM MONITORING WELLS

Purgeable Aromatics (EPA Method 8020)
Petroleum Hydrocarbons (EPA Method 8015)

WELL	DATE	BENZENE	TOLUENE	ETHYL BENZENE	XYLENES TOTAL	TPH AS GASOLINE
LOD	(mg/l)	0.0005/0.0002 *	0.0005/0.0002 *	0.0005/0.0002 *	0.0005/0.0002 *	0.25/0.05 **
MW-22	27-Aug-90	ND	ND	ND	ND	NT
	13-Sep-90	ND	ND	ND	ND	NT
	4-Dec-90	ND	0.0002 †	ND	0.0002 †	ND
	8-Mar-91	ND	ND	ND	ND	ND
	6-Jun-91	ND	ND	ND	ND a	NT
MW-23	27-Aug-90	ND	ND	ND	ND	NT
	13-Sep-90	ND	ND	ND	ND	NT
	4-Dec-90	ND	0.0002 †	ND	ND	ND
	8-Mar-91	ND	ND	ND	ND	ND
	6-Jun-91	ND	0.0004	ND	ND a	NT
	20-Dec-91	ND	ND	ND b	ND b	NT
	27-Mar-92	0.0056	0.0064	0.0016	0.0082	NT
BLANK	5-Apr-89	0.5	ND	ND	ND	ND
	1-May-89	ND	ND	ND	ND	ND
	6-Jun-89 @	ND/ND	ND/ND	ND/ND	ND/ND	ND/ND
	1-Aug-89	ND	ND	ND	ND	ND
	2-Aug-89	ND	ND	ND	ND	ND
	3-Aug-89	ND	ND	ND	ND	ND
	6-Sep-89	ND	ND	ND	ND	ND
	7-Sep-89	ND	ND	ND	ND	ND
	4-Oct-89	ND	ND	ND	ND	ND
	2-Nov-89	ND	ND	ND	ND	ND
	5-Dec-89	ND	ND	ND	ND	ND
	3-Jan-90	ND	0.0006	ND	0.0017	ND
	13-Sep-90	ND	ND	ND	ND	NT
	11-Feb-91	ND	ND	ND	ND	NT
	8-Mar-91	ND	ND	ND	ND	ND
	19-Sep-91	ND b	ND b	ND b	ND b	ND
	20-Dec-91	ND	ND	ND b	ND b	NT
	27-Mar-92	ND b	ND b	ND b	ND b	NT

NOTES:

Results reported in milligrams per liter (mg/l); equivalent to parts per million.

Analyses performed by PACE Laboratories, Inc., Novato, California.

Specific limits of detection for compounds detected in March 1992 groundwater samples are presented in the appendix of this report.

LOD: Limit of Detection.

ND: Not detected at or above LOD.

NT: Not tested.

(0.4): Numbers in parentheses are limits of detection.

* : LOD Changed to 0.0002 on 01-May-89, unless otherwise noted.

** : LOD Changed to 0.05 on 01-May-89, unless otherwise noted.

† : PACE laboratory reported toluene and total xylenes in the method blanks analyzed along with the samples.

@ : Two values indicate results of duplicate analyses.

L.T: Less than the concentration indicated.

a: Method detection limit is 0.0004 mg/l.

b: Method detection limit is 0.0005 mg/l.

APPENDIX
RESULTS OF LABORATORY ANALYSIS OF
GROUNDWATER SAMPLES FROM MONITORING WELLS

April 10, 1992

APR 92 9:04

Mr. David Leland
Harding Lawson Associates
200 Rush Landing Road
Novato, CA 94945

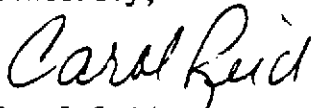
RE: PACE Project No. 420327.502
Client Reference: 09382,039.02

Dear Mr. Leland:

Enclosed is the report of laboratory analyses for samples received
March 27, 1992.

If you have any questions concerning this report, please feel free
to contact us.

Sincerely,



Carol Reid
Project Manager

Enclosures

REPORT OF LABORATORY ANALYSIS

Mr. David Leland
 Page 5

April 10, 1992
 PACE Project Number: 42032750

Client Reference: 09382,039.02

PACE Sample Number:
 Date Collected:
 Date Received:
 Client Sample ID:
 Parameter

70 0061300 *Well*
 03/27/92 *MW-7*
 03/27/92
 92032705

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
------------------	--------------	------------	----------------------

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):			-	04/07/92
Purgeable Fuels, as Gasoline (EPA 8015)	ug/L	50	110	04/07/92
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	04/07/92
Benzene	ug/L	0.5	0.6	04/07/92
Toluene	ug/L	0.5	ND	04/07/92
Ethylbenzene	ug/L	0.5	1.0	04/07/92
Xylenes, Total	ug/L	0.5	2.0	04/07/92

MDL Method Detection Limit
 ND Not detected at or above the MDL.

These data have been reviewed and are approved for release.

Mark A. Valentini

Mark A. Valentini, Ph.D.
 Regional Director

Mr. David Leland
 Page 3

April 10, 1992
 PACE Project Number: 42032750

Client Reference: 09382,039.02

PACE Sample Number:
 Date Collected:
 Date Received:
 Client Sample ID:
 Parameter

70 0061288 *Well*
 03/27/92 *MW-18*
 03/27/92
 92032703

Units MDL DATE ANALYZED

ORGANIC ANALYSIS

PURGEABLE AROMATIC COMPOUNDS, EPA 8020

Parameter	Units	MDL	MDL	DATE ANALYZED
Benzene	ug/L	0.5	1.6	04/08/92
Toluene	ug/L	0.5	ND	04/08/92
Ethylbenzene	ug/L	0.5	ND	04/08/92
Xylenes, Total	ug/L	0.5	ND	04/08/92

MDL Method Detection Limit
 ND Not detected at or above the MDL.



REPORT OF LABORATORY ANALYSIS

Harding Lawson Associates
200 Rush Landing Road
Novato, CA 94945

April 10, 1992
PACE Project Number: 42032750

Attn: Mr. David Leland

Client Reference: 09382,039.02

PACE Sample Number:

Date Collected:

Date Received:

Client Sample ID:

Parameter

70 0061261

03/27/92

03/27/92

92032701

*Well
MW-19*

Units

MDL

DATE ANALYZED

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):

Purgeable Fuels, as Gasoline (EPA 8015)

PURGEABLE AROMATICS (BTXE BY EPA 8020):

Benzene

Toluene

Ethylbenzene

Xylenes, Total

ug/L

ug/L

ug/L

ug/L

ug/L

ug/L

500

5.0

5.0

5.0

5.0

5.0

-

3600

-

340

130

120

340

04/08/92

04/08/92

04/08/92

04/08/92

04/08/92

04/08/92

04/08/92

04/08/92

MDL Method Detection Limit

Mr. David Leland
 Page 2

April 10, 1992
 PACE Project Number: 42032750

Client Reference: 09382,039.02

PACE Sample Number:
 Date Collected:
 Date Received:
 Client Sample ID:
 Parameter

70 0061270 *Well*
 03/27/92 *MW-23*
 03/27/92
 92032702

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
------------------	--------------	------------	------------	----------------------

ORGANIC ANALYSIS

PURGEABLE AROMATIC COMPOUNDS, EPA 8020

Benzene	ug/L	0.5	5.6	04/07/92
Toluene	ug/L	0.5	6.4	04/07/92
Ethylbenzene	ug/L	0.5	1.6	04/07/92
Xylenes, Total	ug/L	0.5	8.2	04/07/92

MDL Method Detection Limit

Mr. David Leland
 Page 4

April 10, 1992
 PACE Project Number: 42032750

Client Reference: 09382,039.02

PACE Sample Number:
 Date Collected:
 Date Received:
 Client Sample ID:
 Parameter

70 0061296
 03/27/92
 03/27/92
 92032704

Field
Blank

Units MDL DATE ANALYZED

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):				-	04/07/92
PURGEABLE AROMATICS (BTXE BY EPA 8020):				-	04/07/92
Benzene	ug/L	0.5	ND		04/07/92
Toluene	ug/L	0.5	ND		04/07/92
Ethylbenzene	ug/L	0.5	ND		04/07/92
Xylenes, Total	ug/L	0.5	ND		04/07/92

MDL Method Detection Limit
 ND Not detected at or above the MDL.

REPORT OF LABORATORY ANALYSIS

Mr. David Leland
 Page 6

QUALITY CONTROL DATA

April 10, 1992
 PACE Project Number: 420327502

Client Reference: 09382,039.02

TPH GASOLINE/BTEX
 Batch: 70 11351
 Samples: 70 0061270, 70 0061300

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015)	ug/L	50	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-
Benzene	ug/L	0.5	ND
Toluene	ug/L	0.5	ND
Ethylbenzene	ug/L	0.5	ND
Xylenes, Total	ug/L	0.5	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015)	ug/L	50	354	109%	110%	0%
Benzene	ug/L	0.5	40.0	110%	106%	3%
Toluene	ug/L	0.5	40.0	110%	105%	4%
Ethylbenzene	ug/L	0.5	40.0	110%	106%	3%
Xylenes, Total	ug/L	0.5	80.0	110%	106%	3%

MDL Method Detection Limit
 RPD Relative Percent Difference

Mr. David Leland
Page 7

QUALITY CONTROL DATA

April 10, 1992
PACE Project Number: 420327502

Client Reference: 09382,039.02

TPH GASOLINE/BTEX
Batch: 70 11352
Samples: 70 0061296

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015)	ug/L	50	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-
Benzene	ug/L	0.5	ND
Toluene	ug/L	0.5	ND
Ethylbenzene	ug/L	0.5	ND
Xylenes, Total	ug/L	0.5	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015)	ug/L	50	349	109%	109%	0%
Benzene	ug/L	0.5	40.0	97%	100%	3%
Toluene	ug/L	0.5	40.0	97%	101%	4%
Ethylbenzene	ug/L	0.5	40.0	98%	100%	2%
Xylenes, Total	ug/L	0.5	80.0	97%	100%	3%

MDL Method Detection Limit
RPD Relative Percent Difference

Mr. David Leland
 Page 8

QUALITY CONTROL DATA

April 10, 1992
 PACE Project Number: 420327502

Client Reference: 09382,039.02

TPH GASOLINE/BTEX
 Batch: 70 11392
 Samples: 70 0061261, 70 0061288

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015)	ug/L	50	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-
Benzene	ug/L	0.5	ND
Toluene	ug/L	0.5	ND
Ethylbenzene	ug/L	0.5	ND
Xylenes, Total	ug/L	0.5	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference	Dupl		
			Value	Recv	Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015)	ug/L	50	354	108%	105%	2%
Benzene	ug/L	0.5	40.0	108%	109%	0%
Toluene	ug/L	0.5	40.0	110%	108%	1%
Ethylbenzene	ug/L	0.5	40.0	109%	108%	0%
Xylenes, Total	ug/L	0.5	80.0	110%	109%	0%

MDL Method Detection Limit
 RPD Relative Percent Difference



PO Box 578
 Novato, California 94948
 415/892-0821
 Telecopy: General 415/892-0831
 Accounting 415/898-1052

Lab: Yave

Samplers: David McEvans

Job Number: 09382, 039, 02

Name/Location: P. R. P

Project Manager: Dave Leland

Recorder: David McEvans
 (Signature Required)

ANALYSIS REQUESTED										
EPA 601/8010										
EPA 607/8020	X									
EPA 624/8240	X									
EPA 625/8270	X									
ICP METALS	X									
EPA 8015M/TPH	X									

SOURCE CODE	MATRIX				CONTAINERS & PRESERV.			SAMPLE NUMBER OR LAB NUMBER			DATE				STATION DESCRIPTION/NOTES	
	Water	Sediment	Soil	Oil	Unpres.	H ₂ SO ₄	HNO ₃	4Cl	Yr	Wk	Seq	Yr	Mo	Dy		Time
23	X							3	9	20	3	27	0	5	10	6126.1
23	X							3	9	20	3	27	0	5	25	27.0
23	X							3	9	20	3	27	0	5	55	28.8
23	X				2			3	9	20	3	27	0	6	10	29.6
23	X							3	9	20	3	27	0	6	20	30.0

5/1

LAB NUMBER			DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
Yr	Wk	Seq				
						Standard TAT

CHAIN OF CUSTODY RECORD		
RELINQUISHED BY: (Signature) <u>David McEvans</u>	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) <u>David McEvans</u>	DATE/TIME 2/25/92 10:56	RECEIVED FOR LAB BY: (Signature) <u>V. Scott</u>
METHOD OF SHIPMENT <u>Hand delivered</u>		

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MARCH 1992
CHINATOWN REDEVELOPMENT PROJECT AREA
OAKLAND, CALIFORNIA
May 20, 1992**

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QUALITY CONTROL REVIEWER



R. Bruce Scheibach
Registered Geologist - 5062