A Report Prepared for

California Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street, Room 6000
Oakland, California 94607

REPORT OF SYSTEM MONITORING
DECEMBER 1989
SOIL TREATMENT SYSTEM
PACIFIC RENAISSANCE PLAZA
OAKLAND, CALIFORNIA

HLA Job No. 9382,040.02

Submitted on behalf of:

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1.0 INTRODUCTION AND BACKGROUND

1.1 Introduction

This report describes the operation and monitoring of the in situ soil treatment system at the Pacific Renaissance Plaza (PRP) site in Oakland, California, for the period between December 4, 1989 and January 4, 1990. The PRP site, part of the Oakland Chinatown Redevelopment Project Area, is bounded by 9th, Franklin, and Webster streets and the East Bay Municipal Utility District (EBMUD) property line approximately 100 feet north of the center line of 10th Street (Plate 1). The soil treatment system is designed to remove petroleum hydrocarbons from soil within the site boundaries before the soil is excavated during construction of the complex. The system began operation on March 4, 1989. Discussions with Pacific Renaissance Associates, the developer of the project, indicate that construction is scheduled to begin in May 1990.

This report has been prepared by Harding Lawson Associates (HLA) on behalf of the City of Oakland Redevelopment Agency (Agency). It is submitted in accordance with monitoring and reporting requirements set forth by the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB), in a letter to the City of Oakland dated February 22, 1989, and clarified in a letter dated March 17, 1989, from HLA to the RWQCB.

1.2 Previous Reports

Site history and characterization activities completed by HLA in 1988 are reported in *Site Characterization, Pacific Renaissance Plaza, Chinatown Redevelopment Project Area, Oakland, California (HLA, 1988)*. The site characterization report also presents a preliminary screening of soil treatment alternatives and an evaluation of the

potential for effectively removing hydrocarbons from soil at the site using biodegradation. The *Report of Waste Discharge, Pacific Renaissance Plaza, Chinatown Redevelopment Project Area, Oakland, California* (*HLA, 1989a*), discusses the design of the soil treatment system and presents the results of the biodegradation treatability study and the proposed operations and monitoring plan for the system. Site background, environmental setting, and previous investigations are also described in the report.

Characterization of the extent of soil contamination at the PRP site was updated in the *Report of System Monitoring: March 1989, Soil Treatment System, Pacific Renaissance Plaza, Oakland, California (HLA, 1989b)*, using results of analyses of soil samples collected during treatment system well installation activities. System operation and monitoring from March through November are described in *HLA 1989b through j*. The objective of the system and a description of the process are presented in *HLA, 1989e*.

2.0 TREATMENT SYSTEM OPERATIONS

System operational activities and adjustments made in December are summarized below:

- Pumps in Extraction Wells EW-1, EW-3, EW-9, EW-13, EW-15, and EW-20 were reconditioned; the pumps were removed from the wells and run in a chlorine/soap bath. Water-level probes for all of the wells were also cleaned.
- The concentration of nutrients in the injection water was increased from 60 parts per million (ppm) to 80 ppm.
- Injection Well IW-9 was turned off on December 1 and Infiltration Basins BA-5 and BA-6 were shut off on December 4 to maintain the total extraction rate greater than the injection rate.
- The sand filter at the influent of the carbon treatment system was backwashed twice daily. The sand was changed on December 1 and on December 21. The bag filters were changed approximately every two days. The carbon canisters were backwashed on December 12 and 14.

3.0 TREATMENT SYSTEM MONITORING

3.1 Flow Rate, Water-Level, and Water Chemistry Monitoring

Flow rates, water levels, and water chemistry were monitored using procedures described in *HLA, 1989e*. Water samples were collected from selected extraction wells, injection wells, and monitoring wells and analyzed for inorganic and organic constituents and microbial populations. For each well, Table 1 presents the sampling frequency, analytical parameters, and EPA test methods used (for organic constituents). The sampling schedule may be modified in subsequent months in response to the operation and performance of the system.

3.2 Numerical Modeling of Ground-Water Flow

The numerical model of ground-water flow at the site, developed during the design phase of the project, is described in the *Report of Waste Discharge* (*HLA, 1989a*). The model is based on the ground-water flow computer code MODFLOW developed by U.S. Geological Survey (*McDonald and Harbaugh, 1984*). Individual injection well, infiltration basin, and extraction well flow rates from December 4 to January 2 were averaged for use as model input (Tables 2 and 3) for simulating ground-water elevations at the site for January 2 (Plate 2).

3.3 Confirmation Borings - Soil Sampling and Analysis

Soil samples were collected and analyzed for petroleum hydrocarbons and volatile organic constituents to assess the progress of soil treatment and to further characterize chemicals in site soils. On December 11, 1989, four confirmation borings, designated BC-17 through BC-20, were drilled and sampled (Plate 1). Drilling was performed by Gregg Drilling and Testing, Inc., of Concord, California, using a CME-63 hollow-stem auger rig. An HLA geologist supervised the drilling; performed health and safety

monitoring; and collected samples for lithological characterization, for field screening of volatile organic compounds (VOCs), and for chemical analyses. Soils were logged using the Unified Classification System (USCS). Field screening for VOCs was performed using a portable Century flame ionization organic vapor analyzer (OVA).

Soil samples were collected at 1.5-foot intervals from approximately 22 feet below ground surface (bgs) to the total depth of the borings (28 feet bgs) using a 1.5-foot long modified California split-barrel sampler lined with three 6-inch long 2.5-inch diameter stainless steel tubes. This sampling scheme provided a 6-foot long continuously sampled interval through the target zone of suspected soil contamination. The bottom tube of each sample drive was sealed on both ends with aluminum foil, plastic end caps, and electrician's tape, labeled, and placed in an ice chest for cool storage. Soil in the second tube was screened in the field for VOCs using an OVA and checked for the presence of hydrocarbon odors and evidence of staining. The remaining tube of soil was used for lithological logging.

Drilling and soil sampling equipment was decontaminated prior to and after use according to standard HLA protocol. HLA employees performing field work were safety trained and used Level D protective equipment. Soil cuttings were stockpiled on site.

Soil samples were submitted to Pace Laboratories, Inc., of Novato, California under chain of custody for chemical analysis. Two samples from each boring (one discrete sample and one composite from four sample depths) were analyzed for total petroleum hydrocarbons (TPH) calibrated as gasoline and for benzene, toluene, ethylbenzene, and xylenes (BTEX) using EPA Test Methods 8015 (modified) and 8020, respectively.

3.4 Monitoring Wells MW-19 and MW-20

3.4.1 Drilling Activities, Soil Sampling and Analysis

Monitoring Wells MW-19 and MW-20 were installed on December 12 and 13, 1989. The boreholes were drilled to depths of 41 and 43 feet using a CME-63 hollow-stem auger rig by Gregg Drilling and Testing, Inc., of Concord, California. An HLA geologist supervised the drilling and well installation and collected soil samples for chemical analysis. Locations of the wells are shown on Plate 1. Borings were logged using the Unified Soil Classification System (USCS) and the Munsell Color Index Chart.

To further characterize hydrocarbon distribution, soil samples were collected at 5-foot intervals from Monitoring Wells MW-19 and MW-20. Samples were collected and handled as described in Section 3.3. Decontamination, safety procedures, and handling of cutting were also performed as described in Section 3.3.

Soil samples for chemical analysis were submitted under chain of custody to Pace Laboratories. The 20-, 25-, and 30-foot samples from MW-19 and the 21- and 26-foot samples from MW-20 were analyzed for total petroleum hydrocarbons (TPH) as gasoline by EPA Test Method 8015 (modified) and for volatile organic compounds by EPA Test Methods 8010 and 8020.

3.4.2 Well Installation

The monitoring wells were constructed of 4-inch-diameter Schedule 40 PVC casing with 20 feet of 0.020-inch slotted screen. Screened intervals are from 18 to 38 feet below grade and from 19.6 to 39.6 feet below grade for MW-19 and MW-20, respectively. The filter pack, consisting of #3 Monterey Sand, was placed from the bottom of the borehole to approximately two feet above the top of the screen. A two foot bentonite seal was placed above the sand and the remaining borehole annulus was

sealed with cement grout. Both wells were completed in steel vaults below grade. Boring logs and well completion details of Monitoring Wells MW-19 and MW-20 are presented in Appendix A.

Wells MW-19 and MW-20 were developed by bailing and surging until the discharged water was clear. All development water was contained in a Baker tank. The water was subsequently processed through the carbon treatment system before it was discharged to the storm drain under authority of NPDES permit CA 0029394.

Kister, Savio, and Rei, of El Cerrito, California, surveyed horizontal coordinates, top-of-casing, and ground surface elevations for wells MW-19 and MW-20 in January 1990.

4.0 RESULTS

4.1 Hydraulic Analysis

Flow rates for wells and infiltration basins installed by HLA were calculated based on readings from the flowmeters on the wellheads. Average injection and extraction rates for December are presented in Tables 2 and 3. From December 4 to January 2, the total flow rate for all injection wells was about 13.5 gallons per minute (gpm). The flow rate for injection wells located south of 10th Street, (Wells IW-1 to IW-9, and IW-12 to IW-14) was about 13.3 gpm. The average flow rate into Basins BA-1 to BA-7 was about 2.0 gpm from December 4 to January 2; the average flow rate into Basins BA-8 and BA-9 was about 0.6 gpm and into BA-10 about 0.8 gpm (Table 2). All the influent to these covered basins is assumed to infiltrate. Total flow into all injection wells and infiltration basins, calculated as a monthly average, was about 16.9 gpm.

During this monitoring period, the total flow rate for all extraction wells was 26.4 gpm. The flow rate for Wells EW-1 through EW-20 was about 25.5 gpm, and for Well EW-21 and Well EW-22 was about 0.9 gpm (Table 3). The average extraction rates exceeded the average injection/infiltration rates by about 9.5 gpm in December.

Table 4 presents measurements of depth to water in monitoring wells and calculated water-level elevations from January 3, 1989 to January 2, 1990. Ground-water elevations on January 2, 1990 are shown on Plate 2 and represent conditions approximately 304 days after system startup. Contours of ground-water elevations simulated using the numerical model are also presented on Plate 2. In some cases, locations of injection and extraction points used in the model differ slightly from actual well locations because of the nature of discretization of the modeled area.

Water-level contours calculated using the site model can be used to assess the hydraulic control of injected water. Simulated contours for January 2 (Plate 2) indicate overall hydraulic control of injected water. Most injected water is recovered by the extraction wells without traveling off site. At the eastern and western ends of the site, some of the injected water may travel off site as it moves toward the extraction wells.

In general, the simulated water levels show good agreement with water-level elevations measured at monitoring wells. Plate 3 presents the results of a linear regression analysis of observed versus simulated ground-water elevations. The correlation coefficient, r, is the measure of least squares best fit straight line and was calculated to have a value of 0.96 for the January 2 results, where r = 1.00 represents a perfect match.

4.2 Distribution of Inorganic Constituents and Microbial Populations in Ground Water

Tables 5 and 6 present the inorganic chemical and microbiological analysis results for the bioremediation treatment system from startup through January 4, 1990. Nitrate and phosphate concentrations in ground water at the site for the January 2-4 sampling round are presented on Plate 4 and 5, respectively.

4.3 Distribution of Petroleum Hydrocarbons in Ground Water

Results of organic analyses of ground-water samples are presented in Table 7. Laboratory data sheets are presented in Appendix B. Petroleum hydrocarbon concentrations as TPH (gasoline) for the January 2-4 sampling round are presented on Plate 6.

Reported TPH values for samples from Monitoring Wells MW-9, MW-12 and MW-18 are higher for the January sampling round than for the December round.

Reported January TPH values for remaining monitoring wells are similar to or less than values for December. TPH values in samples from the transect wells, MW-15, MW-16, and MW-17, showed declines from December to January. Petroleum hydrocarbons as gasoline were detected at MW-12 and at MW-18, but were not detected at MW-20, located west of Franklin Street.

TPH values in ground-water samples from Extraction Wells EW-1, EW-6, EW-8, and EW-21 increased from the previous sampling round, while concentrations in samples from EW-4, EW-7, EW-9, EW-12, EW-15, and EW-19 remained stable or decreased.

Monitoring Wells MW-19 and MW-20 were sampled for TPH and BTEX on December 15, 1989 and January 3, 1990. TPH was detected in samples from MW-19 at 12 and 13 mg/l. BTEX compounds were also detected in MW-19 samples (Table 7). TPH was not detected in the samples from MW-20 for either sampling event. Low concentrations of benzene, toluene, and xylenes were detected only in the January 3 sample from MW-20. The field blank collected January 3 also showed concentrations of toluene (0.0006 mg/l) and xylenes (0.0017 mg/l).

4.4 Soil Analysis

Lithologic characterization of soils from confirmation borings and monitoring well borings indicated geologic materials similar to those observed and characterized during previous soil boring and well installation activities at the site, as described in *HLA, 1988* and *1989b*. Predominantly brown and yellowish brown silty clay (CL), silty sands (SM), poorly graded sands (SP), and clayey sands (SC) were encountered to the total depths of the borings.

Results of OVA headspace and laboratory analysis of soil samples from the confirmation borings and Monitoring Wells MW-19 and MW-20 are presented in Table 8. Locations of the confirmation borings and new monitoring wells are shown on Plate 1. Laboratory data sheets for soil samples are presented in Appendix C.

Of the eight soil samples analyzed from the confirmation borings, only three had TPH concentrations greater than 1,000 milligrams per kilogram (mg/kg), and one sample had TPH concentrations less than 100 mg/kg. The highest measured TPH concentration (as gasoline) was 4,500 mg/kg in the 24.5 to 25 foot sample from BC-18.

BTEX compounds were detected in confirmation boring soil samples. The maximum concentrations of benzene, ethylbenzene, and xylenes were measured in the composite sample (23-28 feet) from Boring BC-17 at 37 mg/kg benzene, 83 mg/kg ethylbenzene, and 360 mg/kg xylenes. The maximum toluene concentration was detected in the 24.5-25 foot sample from boring BC-18 at 260 mg/kg.

TPH was detected in the 25-25.5 foot sample from monitoring well boring MW-19 at 28 mg/kg and in the 26-26.5 foot sample from monitoring well boring MW-20 at 3.1 mg/kg. TPH was not detected in the other monitoring well soil samples.

Toluene was detected at 0.007 mg/kg in the 20-20.5 foot sample from MW-19 and the 25-25.5 foot sample had detectable concentrations of benzene (0.010 mg/kg), toluene (0.49 mg/kg), ethylbenzene (0.43 mg/kg), and xylenes (2.3 mg/kg). BTEX compounds were not detected in the 30-30.5 foot sample from MW-19. Benzene, toluene, ethylbenzene, and xylenes were detected in the 21-21.5 foot sample from MW-20 at 0.010, 0.041, 0.006, and 0.036 mg/kg, respectively. Toluene (0.007 mg/kg) and xylenes (0.006 mg/kg) were detected in the 26-26.5 foot sample from MW-20.

6.0 REFERENCES

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McDonald, D.G., and A.W. Harbaugh, 1984. *A Modular Three-Dimensional Finite Difference Ground-Water Flow Model,* U.S. Geological Survey, Open-File Report 83-875.

Table 1. Schedule for Sampling, Measurement, and Analysis
Soil Treatment System, Pacific Renaissance Plaza

Sampling Station	Flow/Water Levels	Measurement/Analysis								
		Nitrate	Ammonia	Phosphate	Microbial Enumeration	Dissolved Iron	Dissolved Oxygen	EPA 8015 (TPH)	EPA 8010	EPA 8020 (BTEX)
Injection Wells										
Composite	D	B	B	B	--	--	--	--	--	--
IW-1	D	--	--	--	--	--	--	--	--	--
IW-2	D	--	--	--	--	--	--	--	--	--
IW-3	D	--	--	--	--	--	--	--	--	--
IW-4	D	--	--	--	--	--	--	--	--	--
IW-5	D	--	--	--	--	--	--	--	--	--
IW-6	D	--	--	--	--	--	--	--	--	--
IW-7	D	--	--	--	--	--	--	--	--	--
IW-8	D	--	--	--	--	--	--	--	--	--
IW-9	D	--	--	--	--	--	--	--	--	--
IW-10	D	--	--	--	--	--	--	--	--	--
IW-11	D	--	--	--	--	--	--	--	--	--
Extraction Wells										
Composite	D	B	B	B	--	--	--	M	M	M
EW-1	D	M	M	M	--	--	M	M	--	M
EW-2	D	--	--	--	--	--	M	--	--	--
EW-3	D	--	--	--	--	--	M	--	--	--
EW-4	D	M	M	M	M	--	M	M	--	M
EW-5	D	--	--	--	--	--	M	--	--	--

Table 1. Schedule for Sampling, Measurement, and Analysis (continued)
Soil Treatment System, Pacific Renaissance Plaza

Sampling Station	Flow/Water Levels	Measurement/Analysis								
		Nitrate	Ammonia	Phosphate	Microbial Enumeration	Dissolved Iron	Dissolved Oxygen	EPA 8015 (TPH)	EPA 8010	EPA 8020 (BTEX)
EW-6	D	B	B	B	--	--	B	M	--	M
EW-7	D	B	B	B	B	--	B	M	--	M
EW-8	D	B	B	B	B	--	B	M	--	M
EW-9	D	B	B	B	--	--	M	B	--	B
EW-10	D	M	M	M	B	--	B	--	--	--
EW-11	D	M	M	M	--	--	B	--	--	--
EW-12	D	M	M	M	M	--	M	M	--	M
EW-13	D	--	--	--	--	--	M	--	--	--
EW-14	D	--	--	--	--	--	--	--	--	--
EW-15	D	B	B	B	B	--	B	M	--	M
EW-16	D	M	M	M	--	--	--	--	--	--
EW-17	D	--	--	--	--	--	--	--	--	--
EW-18	D	--	--	--	--	--	--	--	--	--
EW-19	D	M	M	M	--	--	M	M	--	M
EW-20	D	--	--	--	--	--	--	--	--	--
EW-21	D	B	B	B	--	--	B	M	--	M
EW-22	D	M	M	M	--	--	M	M	--	M

Table 1. Schedule for Sampling, Measurement, and Analysis (continued)
Soil Treatment System, Pacific Renaissance Plaza

Sampling Station	Flow/Water Levels	Measurement/Analysis: Nitrate	Ammonia	Phosphate	Microbial Enumeration	Dissolved Iron	Dissolved Oxygen	EPA 8015 (TPH)	EPA 8010	EPA 8020 (BTEX)
Monitoring Wells										
MW-2	B	--	--	--	--	--	--	--	--	--
MW-3	B	--	--	--	--	--	--	--	--	--
MW-5	B	--	--	--	--	--	--	--	--	--
MW-6	B	--	--	--	--	--	--	--	--	--
MW-7	B	M	M	M	--	--	--	M	--	M
MW-8	B	--	--	--	--	--	--	--	--	--
MW-9	B	M	M	M	--	--	M	M	--	M
MW-10	B	B	B	B	B	--	B	M	--	M
MW-11	B	B	B	B	B	--	B	M	--	M
MW-12	B	M	M	M	--	--	M	M	--	M
MW-13	B	M	M	M	--	--	M	M	--	M
MW-14	B	M	M	M	--	--	M	M	--	M
MW-15	B	M	M	M	--	--	M	M	--	M
MW-16	B	B	B	B	B	--	B	M	--	M
MW-17	B	B	B	B	B	--	B	M	--	M
MW-18	B	M	M	M	--	--	M	M	--	M
MW-19	B	M	M	M	--	--	--	M	--	M
MW-20	B	M	M	M	--	--	--	M	--	M

Notes:
D = daily
W = weekly
B = biweekly
M = monthly
X = sampled this round but not scheduled for regular sampling
-- = no analysis or measurement

Table 2. Injection Well and Infiltration Basin Flow Rates - December 1989

Injection Well Flow Rates

Meter No.	02-Jan-90 Totalizer Reading	04-Dec-89 Totalizer Reading	Elapsed Time (min)	Average Flow Rate (gpm)
IW-1	1483895	1403390	40340	2.00
IW-2	1402463	1314088	40340	2.19
IW-3	1189260	1113220	40340	1.88
IW-4	1382119	1290757	40340	2.26
IW-5	446781	411668	40340	0.87
IW-6	657623	622190	40340	0.88
IW-7	1578566	1472840	40340	2.62
IW-8	528229	502894	40340	0.63
IW-9	836898	836898	40340	0.00
IW-10	104914	104054	40340	0.02
IW-11	557179	551596	40340	0.14
IW-12	143863	12365	40340	3.26
IW-13	119442	21030	40340	2.44
IW-14	121807	23270	40340	2.44
Total (1-9,12-14)	9505834	8967945	40340	13.33
Total (10,11)	662093	655650	40340	0.16
Total (1-14)	10167927	9623595	40340	13.49

Note: Totalizer readings in gallons.

Infiltration Basin Flow Rates

Meter No.	02-Jan-90 Totalizer Reading	04-Dec-89 Totalizer Reading	Elapsed Time (min)	Average Flow Rate (gpm)
BA-1	219990	201193	40340	0.47
BA-2	123442	106951	40340	0.41
BA-3	175619	157385	40340	0.45
BA-4	115548	103084	40340	0.31
BA-5	380205	380204	40340	0.00
BA-6 **	2909	2909	40340	0.00
BA-7	143206	127161	40340	0.40
BA-8	136713	115453	40340	0.53
BA-9	53011	48856	40340	0.10
BA-10	71731	40380	40340	0.78
Total (1-7)	1160919	1078887	40340	2.03
Total (8,9)	189724	164309	40340	0.63
Total (1-10)	1422374	1283576	40340	3.44

Note: Totalizer readings in gallons.

**: Basin flow rate is included in BA-5

Table 3. Extraction Well Flow Rates - December 1989

Meter No.	02-Jan-90 Totalizer Reading	04-Dec-89 Totalizer Reading	Elapsed Time (min)	Average Flow Rate (gpm)
EW-1	387287	357441	40340	0.74
EW-2	434551	389027	40340	1.13
EW-3	714218	639434	40340	1.85
EW-4	507985	449111	40340	1.46
EW-5	526408	492936	40340	0.83
EW-6	186803	180186	40340	0.16
EW-7	152792	143905	40340	0.22
EW-8	387079	352712	40340	0.85
EW-9	478496	424397	40340	1.34
EW-10	369951	335001	40340	0.87
EW-11	405076	359179	40340	1.14
EW-12	332962	294333	40340	0.96
EW-13	348982	317501	40340	0.78
EW-14	400115	364144	40340	0.89
EW-15	663856	580816	40340	2.06
EW-16	1043499	936246	40340	2.66
EW-17	920690	814492	40340	2.63
EW-18	897661	798303	40340	2.46
EW-19	695185	631705	40340	1.57
EW-20	355655	318902	40340	0.91
EW-21	126648	109494	40340	0.43
EW-22	66582	47440	40340	0.47
Total (1-20)	10209251	9179771	40340	25.52
Total (21-22)	193230	156934	40340	0.90
Total (1-22)	10402481	9336705	40340	26.42

Note: Totalizer readings in gallons.

Table 4. Water-Level Elevations - January through December 1989

Well No.	MW-2		MW-3		MW-5		MW-6		MW-7		MW-8		MW-9	
	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	GROUND SURFACE	TOP OF CASING
	40.05	39.55	39.02	38.35	38.45	37.86	39.95	39.59	39.35	39.10	40.63	40.47	38.65	38.50
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	Depth to Water	Elevation
03-Jan-89	33.10	6.45	32.35	6.00	33.00	4.86	30.22	9.37	31.15	7.95	32.78	7.69	30.58	7.92
05-Jan-89	-	-	32.35	6.00	33.00	4.86	30.22	9.37	31.15	7.95	32.78	7.69	30.58	7.92
02-Feb-89	33.05	6.50	33.01	5.34	31.82	6.04	30.23	9.36	30.51	8.59	32.62	7.85	31.67	6.83
08-Feb-89	33.83	5.72	32.21	6.14	32.02	5.84	31.05	8.54	31.44	7.66	33.03	7.44	30.65	7.85
15-Feb-89	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18-Feb-89	30.59	8.96	29.26	9.09	31.90	5.96	30.05	9.54	30.21	8.89	31.96	8.51	30.16	8.34
25-Feb-89	29.85	9.70	28.68	9.67	30.32	7.54	30.57	9.02	31.10	8.00	31.90	8.57	30.80	7.70
02-Mar-89	-	-	-		-	-	-	-	-	-	-	-	30.05	8.45
11-Mar-89	-	-	-		-	-	-	-	-	-	-	-	23.06	15.44
18-Mar-89	-	-	32.20	6.15	32.01	5.85	-	-	31.52	7.58	-	-	22.45	16.05
25-Mar-89	-	-	27.76	10.59	27.53	10.33	-	-	30.08	9.02	-	-	22.62	15.88
30-Mar-89	-	-	-	-	-	-	-	-	-	-	-	-	23.00	15.50
04-Apr-89	28.52	11.03	27.56	10.79	-	-	28.00	11.59	29.00	10.10	30.45	10.02	22.61	15.89
08-Apr-89	-	-	-	-	-	-	-	-	-	-	-	-	23.12	15.38
11-Apr-89	-	-	-	-	-	-	-	-	-	-	-	-	23.37	15.13
12-Apr-89	28.59	10.96	27.63	10.72	-	-	27.17	12.42	28.96	10.14	30.45	10.02	-	-
18-Apr-89	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19-Apr-89	-	-	-	-	-	-	-	-	28.13	10.97	-	-	23.36	15.14
25-Apr-89	-	-	-	-	-	-	-	-	-	-	-	-	22.80	15.70
02-May-89	28.71	10.84	26.84	11.51	-	-	27.49	12.10	28.54	10.56	29.80	10.67	22.73	15.77
09-May-89	27.99	11.56	26.58	11.77	26.11	11.75	27.34	12.25	28.34	10.76	29.68	10.79	23.04	15.46
17-May-89	27.80	11.75	26.62	11.73	-	-	27.11	12.48	28.16	10.94	29.27	11.20	23.33	15.17
22-May-89	27.52	12.03	28.17	10.18	25.98	11.88	26.89	12.70	27.69	11.41	28.68	11.79	23.94	14.56
31-May-89	27.99	11.56	26.28	12.07	-	-	27.11	12.48	28.28	10.82	29.31	11.16	24.17	14.33
05-Jun-89	27.60	11.95	25.83	12.52	24.96	12.90	27.00	12.59	28.18	10.92	29.41	11.06	19.72	18.78
14-Jun-89	27.58	11.97	26.00	12.35	25.52	12.34	26.88	12.71	28.09	11.01	29.20	11.27	20.53	17.97
19-Jun-89	-	-	-	-	-	-	-	-	-	-	-	-	20.31	18.19
28-Jun-89	-	-	27.88	10.47	25.39	12.47	-	-	-	-	-	-	21.26	17.24
05-Jul-89	27.34	12.21	25.92	12.43	25.50	12.36	26.66	12.93	27.68	11.42	28.99	11.48	21.88	16.62
21-Jul-89	-	-	24.73	13.62	25.44	12.42	-	-	27.60	11.50	-	-	21.39	17.11
28-Jul-89	-	-	-	-	-	-	-	-	-	-	-	-	21.36	17.14
01-Aug-89	27.22	12.33	26.67	11.68	25.36	12.50	26.61	12.98	27.44	11.66	28.79	11.68	21.60	16.90
09-Aug-89	27.18	12.37	25.91	12.44	25.36	12.50	26.57	13.02	27.40	11.70	28.74	11.73	21.66	16.84
15-Aug-89	27.24	12.31	25.95	12.40	25.48	12.38	27.63	11.96	27.62	11.48	28.79	11.68	21.80	16.70
30-Aug-89	27.21	12.34	-	-	25.69	12.17	26.60	12.99	27.52	11.58	28.66	11.81	22.98	15.52
06-Sep-89	27.22	12.33	25.93	12.42	25.55	12.31	26.61	12.98	27.38	11.72	28.77	11.70	21.97	16.53
28-Sep-89	-	-	-	-	-	-	-	-	-	-	-	-	22.37	16.13
03-Oct-89	26.71	12.84	25.24	13.11	24.75	13.11	26.30	13.29	27.35	11.75	28.29	12.18	22.55	15.95
01-Nov-89	26.49	13.06	25.07	13.28	24.55	13.31	26.12	13.47	26.96	12.14	28.14	12.33	22.33	16.17
20-Nov-89	26.28	13.27	24.91	13.44	-	-	25.96	13.63	26.80	12.30	28.00	12.47	22.46	16.04
04-Dec-89	26.18	13.37	24.76	13.59	24.04	13.82	25.88	13.71	26.87	12.23	27.91	12.56	22.22	16.28
21-Dec-89	26.40	13.15	26.05	12.30	24.55	13.31	25.10	14.49	26.93	12.17	27.98	12.49	22.98	15.52
02-Jan-90	26.40	13.15	25.08	13.27	24.58	13.28	25.00	14.59	26.96	12.14	27.91	12.56	23.38	15.12

Notes:

Elevations are in feet above mean sea level (MSL).
Depth to water in feet measured from top of casing.

Table 4. Water-Level Elevations - January through December 1989

Well No.	MW-10		MW-11		MW-12		MW-13		MW-14		MW-15		MW-16	
	GROUND SURFACE 36.74	TOP OF CASING 36.35	GROUND SURFACE 37.98	TOP OF CASING 37.55	GROUND SURFACE 37.70	TOP OF CASING 37.00	GROUND SURFACE 39.79	TOP OF CASING 40.77	GROUND SURFACE 39.27	TOP OF CASING 40.26	GROUND SURFACE 39.69	TOP OF CASING 40.73	GROUND SURFACE 39.55	TOP OF CASING 40.53
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	Depth to Water	Elevation
03-Jan-89	27.34	9.01	30.30	7.25	-	-	-	-	-	-	-	-	-	-
05-Jan-89	27.34	9.01	30.30	7.25	-	-	-	-	-	-	-	-	-	-
02-Feb-89	28.11	8.24	30.03	7.52	-	-	-	-	-	-	-	-	-	-
08-Feb-89	27.65	8.70	29.52	8.03	-	-	-	-	-	-	-	-	-	-
15-Feb-89	-	-	-	-	28.89	8.11	-	-	-	-	-	-	-	-
18-Feb-89	27.65	8.70	28.02	9.53	-	-	-	-	-	-	-	-	-	-
25-Feb-89	27.12	9.23	29.05	8.50	30.87	6.13	32.63	8.14	31.07	9.19	32.83	7.90	32.43	8.10
02-Mar-89	27.23	9.12	28.98	8.57	28.46	8.54	32.79	7.98	32.28	7.98	32.40	8.33	32.50	8.03
11-Mar-89	23.59	12.76	28.93	8.62	28.22	8.78	30.12	10.65	28.64	11.62	27.10	13.63	25.64	14.89
18-Mar-89	23.17	13.18	27.79	9.76	27.85	9.15	30.29	10.48	28.20	12.06	26.62	14.11	24.74	15.79
25-Mar-89	23.19	13.16	28.10	9.45	27.47	9.53	29.76	11.01	27.79	12.47	26.28	14.45	24.88	15.65
30-Mar-89	23.56	12.79	28.48	9.07	27.43	9.57	30.12	10.65	27.99	12.27	26.50	14.23	25.48	15.05
04-Apr-89	23.34	13.01	28.61	8.94	28.44	8.56	29.60	11.17	27.84	12.42	26.84	13.89	25.53	15.00
08-Apr-89	23.50	12.85	29.31	8.24	-	-	30.49	10.28	27.81	12.45	26.81	13.92	25.74	14.79
11-Apr-89	23.64	12.71	29.45	8.10	-	-	30.62	10.15	28.04	12.22	27.21	13.52	26.24	14.29
12-Apr-89	-	-	-	-	28.64	8.36	-	-	-	-	-	-	-	-
18-Apr-89	-	-	-	-	-	-	-	-	-	-	27.08	13.65	26.02	14.51
19-Apr-89	23.41	12.94	26.77	10.78	26.98	10.02	30.19	10.58	27.13	13.13	-	-	-	-
25-Apr-89	23.39	12.96	29.18	8.37	27.47	9.53	30.40	10.37	27.75	12.51	27.01	13.72	25.97	14.56
02-May-89	23.54	12.81	28.44	9.11	27.36	9.64	29.42	11.35	27.50	12.76	25.91	14.82	24.42	16.11
09-May-89	23.86	12.49	27.09	10.46	26.85	10.15	29.86	10.91	27.38	12.88	26.63	14.10	25.37	15.16
17-May-89	23.63	12.72	28.88	8.67	27.63	9.37	29.10	11.67	27.73	12.53	27.25	13.48	26.23	14.30
22-May-89	23.54	12.81	28.56	8.99	27.62	9.38	30.24	10.53	27.95	12.31	27.25	13.48	26.34	14.19
31-May-89	24.54	11.81	29.18	8.37	28.16	8.84	30.34	10.43	27.99	12.27	27.42	13.31	26.31	14.22
05-Jun-89	23.22	13.13	28.92	8.63	28.08	8.92	29.88	10.89	26.18	14.08	25.83	14.90	24.67	15.86
14-Jun-89	22.66	13.69	28.66	8.89	27.97	9.03	29.31	11.46	26.54	13.72	24.54	16.19	24.73	15.80
19-Jun-89	22.74	13.61	28.20	9.35	27.47	9.53	29.06	11.71	26.21	14.05	24.11	16.62	22.06	18.47
28-Jun-89	22.66	13.69	28.57	8.98	27.83	9.17	29.47	11.30	26.65	13.61	24.97	15.76	23.01	17.52
05-Jul-89	23.41	12.94	27.61	9.94	27.10	9.90	29.15	11.62	26.78	13.48	25.23	15.50	23.52	17.01
21-Jul-89	23.04	13.31	27.58	9.97	27.03	9.97	28.71	12.06	26.62	13.64	25.19	15.54	23.42	17.11
28-Jul-89	23.03	13.32	27.48	10.07	-	-	28.61	12.16	26.38	13.88	24.32	16.41	22.29	18.24
01-Aug-89	23.19	13.16	26.64	10.91	26.35	10.65	28.74	12.03	26.43	13.83	24.78	15.95	22.94	17.59
09-Aug-89	21.77	14.58	27.17	10.38	26.85	10.15	29.21	11.56	26.68	13.58	25.28	15.45	23.45	17.08
15-Aug-89	22.86	13.49	27.16	10.39	26.98	10.02	29.42	11.35	26.97	13.29	25.85	14.88	24.07	16.46
30-Aug-89	23.20	13.15	26.87	10.68	26.44	10.56	29.17	11.60	27.42	12.84	26.24	14.49	24.86	15.67
06-Sep-89	23.78	12.57	26.92	10.63	26.33	10.67	28.88	11.89	27.17	13.09	26.00	14.73	24.45	16.08
28-Sep-89	22.40	13.95	28.26	9.29	-	-	29.83	10.94	26.75	13.51	26.28	14.45	24.93	15.60
03-Oct-89	21.60	14.75	27.30	10.25	26.85	10.15	29.53	11.24	26.85	13.41	26.50	14.23	25.19	15.34
01-Nov-89	22.57	13.78	28.12	9.43	27.28	9.72	29.27	11.50	26.97	13.29	26.55	14.18	25.39	15.14
20-Nov-89	22.30	14.05	27.43	10.12	26.73	10.27	29.18	11.59	26.68	13.58	26.45	14.28	25.31	15.22
04-Dec-89	20.89	15.46	27.59	9.96	26.82	10.18	29.16	11.61	26.20	14.06	25.92	14.81	24.83	15.70
21-Dec-89	22.07	14.28	26.38	11.17	26.36	10.64	29.15	11.62	26.84	13.42	26.33	14.40	25.09	15.44
02-Jan-90	22.32	14.03	26.63	10.92	26.79	10.21	29.32	11.45	26.94	13.32	26.15	14.58	25.22	15.31

Notes:

Elevations are in feet above mean sea level (MSL).
Depth to water in feet measured from top of casing.

Table 4. Water-Level Elevations - January through December 1989

Well No.	MW-17		MW-18		MW-19		MW-20	
	GROUND SURFACE	TOP OF CASING	GROUND SURFACE	TOP OF CASING	GROUND SURFACE	TOP OF CASING	GROUND SURFACE	TOP OF CASING
	39.16	40.16	36.52	35.88	37.15	36.62	38.32	37.86
DATE	Depth to Water	Elevation	Depth to Water	Elevation	Depth to Water	Elevation	Depth to Water	Elevation
03-Jan-89	-	-	-	-				
05-Jan-89	-	-	-	-				
02-Feb-89	-	-	-	-				
08-Feb-89	-	-	-	-				
15-Feb-89	-	-	26.89	8.99				
18-Feb-89	-	-	-	-				
25-Feb-89	32.02	8.14	26.90	8.98				
02-Mar-89	-	-	26.66	9.22				
11-Mar-89	23.45	16.71	26.28	9.60				
18-Mar-89	23.35	16.81	26.18	9.70				
25-Mar-89	23.35	16.81	25.70	10.18				
30-Mar-89	-	-	-	-				
04-Apr-89	24.18	15.98	26.10	9.78				
08-Apr-89	24.28	15.88	25.82	10.06				
11-Apr-89	24.83	15.33	-	-				
12-Apr-89	-	-	26.16	9.72				
18-Apr-89	24.64	15.52	-	-				
19-Apr-89	-	-	25.89	9.99				
25-Apr-89	24.57	15.59	27.91	7.97				
02-May-89	22.71	17.45	25.76	10.12				
09-May-89	23.89	16.27	25.38	10.50				
17-May-89	24.85	15.31	25.59	10.29				
22-May-89	25.28	14.88	25.27	10.61				
31-May-89	24.91	15.25	26.04	9.84				
05-Jun-89	22.62	17.54	25.98	9.90				
14-Jun-89	20.44	19.72	25.89	9.99				
19-Jun-89	19.72	20.44	25.91	9.97				
28-Jun-89	20.89	19.27	25.76	10.12				
05-Jul-89	21.56	18.60	25.68	10.20				
21-Jul-89	21.52	18.64	25.58	10.30				
28-Jul-89	20.25	19.91	-	-				
01-Aug-89	21.15	19.01	25.32	10.56				
09-Aug-89	21.59	18.57	25.31	10.57				
15-Aug-89	21.21	18.95	25.49	10.39				
30-Aug-89	23.24	16.92	25.37	10.51				
06-Sep-89	22.75	17.41	25.24	10.64				
28-Sep-89	23.34	16.82	-	-				
03-Oct-89	23.65	16.51	25.38	10.50				
01-Nov-89	23.98	16.18	25.68	10.20				
20-Nov-89	23.91	16.25	25.46	10.42				
04-Dec-89	23.31	16.85	25.45	10.43				
21-Dec-89	23.53	16.63	25.32	10.56	22.32	14.30	26.63	11.23
02-Jan-90	23.85	16.31	25.37	10.51	22.60	14.02	26.80	11.06

Notes:

Elevations are in feet above mean sea level (MSL).
Depth to water in feet measured from top of casing.

Harding Lawson Associates

Table 5. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from System Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED OXYGEN	DISSOLVED IRON	AMMONIA	MICROBIAL ENUMERATION TC	MICROBIAL ENUMERATION HCU
LOD		0.5(ppm)	0.5(ppm)	0.1(ppm)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
EW-1								
	15-Mar-89	17.6	ND	NT	ND	ND	7.8E+6	1.2E+2
	29-Mar-89	9.7	3.5	NT	NT	ND	1.8E+6	3.8E+2
	04-Apr-89	13.2	3.8	NT	ND	ND	3.3E+5	2.2E+2
	11-Apr-89	24.6	2.8	NT	NT	ND	NT	NT
	18-Apr-89	30.8	1.0	4.1	ND	ND	3.3E+5	7.8E+1
	25-Apr-89	33.4	3.0	4.8	NT	ND	6.8E+4	2.1E+1
	02-May-89	37.0	5.0	4.9	NT	ND	4.5E+5	9.5E+1
	09-May-89	22.9	2.5	9.8*	NT	ND	5.2E+5	7.0E+2
	17-May-89	37.0	1.5	7.5	NT	ND	2.6E+5	1.4E+2
	23-May-89	15.8	5.3	11.1	NT	ND	NT	NT
	31-May-89	52.8	2.8	5.9	NT	ND	7.6E+5	4.6E+2
	05-Jun-89	25.9	ND	14.5	NT	ND	NT	NT
	14-Jun-89	17.6	2.3	12.6	NT	ND	NT	NT
	20-Jun-89	NT	NT	19.3	NT	NT	NT	NT
	27-Jun-89	52.8	NT	16.5	NT	NT	NT	NT
	06-Jul-89	47.3	4.0	13.3	NT	ND	9.3E+5	7.0E+3
	22-Jul-89	33.0	6.7	NT	NT	ND	NT	NT
	03-Aug-89	46.2	7.8	NT	NT	ND	NT	NT
	07-Sep-89	63.8	14.5	17.7	NT	ND	NT	NT
	18-Sep-89	74.8	17.0	12.2	NT	ND	NT	NT
	29-Sep-89	NT	NT	17.3	NT	NT	NT	NT
	05-Oct-89	59.4	21.5	14.9	NT	ND	NT	NT
	02-Nov-89	59.4	24.0	16.2	NT	ND	NT	NT
	04-Dec-89	54.2	21.3	10.2	NT	ND	NT	NT
	21-Dec-89	NT	NT	>20.0	NT	NT	NT	NT
	02-Jan-90	58.0	22.4	NT	NT	0.7	NT	NT
EW-2								
	23-May-89	NT	NT	15.8	NT	NT	NT	NT
	31-May-89	NT	NT	12.7	NT	NT	NT	NT
	05-Jun-89	NT	NT	16.3	NT	NT	NT	NT
	14-Jun-89	NT	NT	15.6	NT	NT	NT	NT
	20-Jun-89	NT	NT	19.6	NT	NT	NT	NT
	27-Jun-89	NT	NT	18.9	NT	NT	NT	NT
	06-Jul-89	NT	NT	16.5	NT	NT	NT	NT
	21-Jul-89	NT	NT	16.5	NT	NT	NT	NT
	07-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	18-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	29-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	05-Oct-89	NT	NT	>20.0	NT	NT	NT	NT
	04-Dec-89	NT	NT	19.0	NT	NT	NT	NT
	21-Dec-89	NT	NT	>20.0	NT	NT	NT	NT
	02-Jan-90	NT	NT	>20.0	NT	NT	NT	NT
EW-3								
	23-May-89	NT	NT	20.0	NT	NT	NT	NT

Table 5. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from System Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED OXYGEN	DISSOLVED IRON	AMMONIA	MICROBIAL ENUMERATION TC	HCU
LOD		0.5(ppm)	0.5(ppm)	0.1(ppm)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	31-May-89	NT	NT	18.3	NT	NT	NT	NT
	05-Jun-89	NT	NT	>20.0	NT	NT	NT	NT
	14-Jun-89	NT	NT	>20.0	NT	NT	NT	NT
	20-Jun-89	NT	NT	19.7	NT	NT	NT	NT
	27-Jun-89	NT	NT	NT	NT	NT	NT	NT
	06-Jul-89	NT	NT	14.0	NT	NT	NT	NT
	21-Jul-89	NT	NT	>20.0	NT	NT	NT	NT
	07-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	18-Sep-89	NT	NT	19.9	NT	NT	NT	NT
	29-Sep-89	NT	NT	18.5	NT	NT	NT	NT
	05-Oct-89	NT	NT	>20.0	NT	NT	NT	NT
	04-Dec-89	NT	NT	13.5	NT	NT	NT	NT
	21-Dec-89	NT	NT	15.2	NT	NT	NT	NT
	02-Jan-90	NT	NT	11.1	NT	NT	NT	NT
EW-4								
	15-Mar-89	16.7	0.6	NT	ND	ND	5.1E+6	9.5E+1
	29-Mar-89	25.5	2.8	NT	NT	ND	5.3E+5	1.7E+2
	04-Apr-89	31.7	4.0	NT	ND	ND	2.5E+5	6.8E+1
	11-Apr-89	34.1	3.3	NT	NT	ND	4.3E+4	4.5E+1
	18-Apr-89	43.6	5.3	7.9	ND	ND	4.3E+4	1.1E+2
	25-Apr-89	49.3	5.0	4.8	NT	ND	9.0E+4	1.7E+2
	02-May-89	48.4	9.0	4.9	NT	ND	2.5E+5	2.0E+3
	09-May-89	70.4	11.8	9.8*	NT	ND	NT	NT
	17-May-89	50.6	16.0	7.5	NT	ND	NT	NT
	23-May-89	52.8	17.0	NT	NT	ND	5.8E+6	7.8E+1
	31-May-89	47.9	17.0	18.9	NT	ND	NT	NT
	05-Jun-89	49.1	16.6	>20.0	NT	ND	1.3E+5	4.9E+2
	14-Jun-89	27.1	17.0	14.5	NT	ND	6.1E+5	2.4E+5
	20-Jun-89	48.4	17.0	18.5	NT	ND	2.3E+6	2.2E+4
	27-Jun-89	NT	18.0	16.8	NT	ND	8.0E+5	1.4E+4
	06-Jul-89	48.4	17.0	13.9	NT	ND	NT	NT
	22-Jul-89	45.1	20.5	NT	NT	ND	NT	NT
	03-Aug-89	57.2	20.5	NT	NT	ND	NT	NT
	17-Aug-89	61.6	20.0	NT	NT	0.7	NT	NT
	07-Sep-89	83.6	12.0	9.0	NT	1.3	NT	NT
	18-Sep-89	72.6	24.6	8.1	NT	1.2	NT	NT
	29-Sep-89	NT	NT	8.6	NT	NT	NT	NT
	05-Oct-89	NT	NT	4.8	NT	NT	NT	NT
	23-Oct-89	70.4	17.0	9.1	NT	1.2	2.9E+5	5.4E+3
	02-Nov-89	69.5	18.0	4.7	NT	0.9	1.0E+6	2.3E+2
	04-Dec-89	78.5	20.3	>20.0	NT	1.6	NT	NT
	21-Dec-89	NT	NT	4.1	NT	NT	NT	NT
	02-Jan-90	72.9	16.5	8.4	NT	1.8	NT	NT
EW-5								
	29-Mar-89	28.0	3.8	NT	NT	ND	NT	NT
	18-Apr-89	NT	NT	8.6	NT	NT	NT	NT

Table 5. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from System Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED OXYGEN	DISSOLVED IRON	AMMONIA	MICROBIAL ENUMERATION TC	MICROBIAL ENUMERATION HCU
LOD		0.5(ppm)	0.5(ppm)	0.1(ppm)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	25-Apr-89	NT	NT	12.8	NT	NT	NT	NT
	02-May-89	NT	NT	NT	NT	NT	NT	NT
	09-May-89	NT	NT	15.0*	NT	NT	NT	NT
	17-May-89	NT	NT	NT	NT	NT	NT	NT
	23-May-89	NT	NT	>20.0	NT	NT	NT	NT
	31-May-89	NT	NT	17.8	NT	NT	NT	NT
	05-Jun-89	NT	NT	>20.0	NT	NT	NT	NT
	14-Jun-89	NT	NT	>20.0	NT	NT	NT	NT
	20-Jun-89	NT	NT	19.9	NT	NT	NT	NT
	27-Jun-89	NT	NT	19.6	NT	NT	NT	NT
	06-Jul-89	NT	NT	19.0	NT	NT	NT	NT
	18-Sep-89	NT	NT	18.5	NT	NT	NT	NT
	29-Sep-89	NT	NT	8.5	NT	NT	NT	NT
	05-Oct-89	NT	NT	16.5	NT	NT	NT	NT
	04-Dec-89	NT	NT	19.4	NT	NT	NT	NT
	21-Dec-89	NT	NT	12.0	NT	NT	NT	NT
	02-Jan-90	NT	NT	11.2	NT	NT	NT	NT
EW-6								
	23-May-89	NT	NT	7.6	NT	NT	NT	NT
	31-May-89	NT	NT	17.5	NT	NT	NT	NT
	05-Jun-89	NT	NT	14.5	NT	NT	NT	NT
	14-Jun-89	NT	NT	12.3	NT	NT	NT	NT
	20-Jun-89	NT	NT	19.5	NT	NT	NT	NT
	27-Jun-89	NT	NT	12.0	NT	NT	NT	NT
	06-Jul-89	NT	NT	8.2	NT	NT	NT	NT
	18-Sep-89	NT	NT	10.3	NT	NT	NT	NT
	29-Sep-89	NT	NT	0.8	NT	NT	NT	NT
	05-Oct-89	NT	NT	0.8	NT	NT	NT	NT
	02-Nov-89	34.8	11.0	2.6	NT	ND	1.6E+7	3.5E+4
	20-Nov-89	33.7	6.7	2.0	NT	0.5	9.5E+6	2.2E+4
	04-Dec-89	29.9	6.4	1.1	NT	0.5	3.8E+6	7.9E+3
	21-Dec-89	2.1	8.0	2.9	NT	0.9	1.5E+5	4.8E+3
	02-Jan-90	2.4	8.8	2.6	NT	1.1	--	--
EW-7								
	23-May-89	NT	NT	1.8	NT	NT	NT	NT
	31-May-89	NT	NT	11.2	NT	NT	NT	NT
	05-Jun-89	NT	NT	5.3	NT	NT	NT	NT
	14-Jun-89	NT	NT	5.6	NT	NT	NT	NT
	20-Jun-89	NT	NT	1.9	NT	NT	NT	NT
	27-Jun-89	NT	NT	8.0	NT	NT	NT	NT
	06-Jul-89	37.4	3.3	6.2	NT	ND	NT	NT
	18-Sep-89	NT	NT	1.5	NT	NT	NT	NT
	29-Sep-89	NT	NT	1.1	NT	NT	NT	NT
	05-Oct-89	39.2	11.0	1.0	NT	0.6	2.2E+6	7.9E+3
	23-Oct-89	26.9	4.8	0.9	NT	ND	3.5E+5	3.5E+3
	02-Nov-89	17.6	3.5	1.5	NT	ND	1.4E+6	1.7E+4

Table 5. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from System Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED OXYGEN	DISSOLVED IRON	AMMONIA	MICROBIAL ENUMERATION TC	MICROBIAL ENUMERATION HCU
LOD		0.5(ppm)	0.5(ppm)	0.1(ppm)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	20-Nov-89	29.9	1.6	2.9	NT	ND	4.5E+6	3.5E+4
	04-Dec-89	36.5	2.4	4.5	NT	ND	9.3E+6	1.3E+4
	21-Dec-89	41.5	1.6	NT	0.5	ND	5.2E+6	--
	02-Jan-90	7.3	4.3	NT	ND	ND	--	--
EW-8								
	15-Mar-89	11.4	0.5	NT	ND	ND	NT	NT
	29-Mar-89	28.0	3.5	NT	NT	ND	NT	NT
	04-Apr-89	33.0	3.8	NT	ND	ND	3.1E+5	1.4E+2
	11-Apr-89	37.8	2.8	NT	NT	ND	2.0E+4	4.5E+1
	18-Apr-89	33.4	3.8	4.0	NT	ND	4.1E+5	1.4E+2
	25-Apr-89	47.5	8.0	10.9	NT	ND	3.4E+4	9.5E+1
	02-May-89	39.6	11.0	9.8	NT	ND	6.8E+4	5.6E+2
	09-May-89	39.6	15.5	12.1*	NT	ND	6.5E+5	1.8E+2
	17-May-89	57.2	14.3	6.9	NT	ND	NT	NT
	23-May-89	47.5	13.3	14.9	NT	ND	NT	NT
	31-May-89	57.2	13.0	NT	NT	ND	2.5E+5	3.8E+2
	05-Jun-89	57.2	15.8	15.9	NT	ND	NT	NT
	14-Jun-89	39.6	15.0	16.9	NT	ND	NT	NT
	20-Jun-89	NT	NT	>20.0	NT	NT	NT	NT
	27-Jun-89	55.0	15.5	15.6	NT	0.5	NT	NT
	06-Jul-89	36.4	16.4	10.7	NT	0.6	2.3E+6	4.9E+4
	22-Jul-89	33.7	18.3	NT	NT	0.8	6.4E+5	4.9E+4
	03-Aug-89	46.2	25.5	NT	NT	3.1	1.5E+7	1.2E+3
	17-Aug-89	49.5	20.0	NT	NT	1.3	2.9E+6	5.4E+3
	07-Sep-89	29.7	20.0	4.3	NT	2.9	NT	NT
	18-Sep-89	39.6	21.0	14.4	NT	2.0	NT	NT
	29-Sep-89	NT	NT	5.2	NT	NT	NT	NT
	05-Oct-89	59.0	25.0	9.2	NT	2.0	6.3E+6	3.5E+4
	23-Oct-89	46.2	22.0	10.8	NT	1.9	1.2E+6	2.2E+4
	02-Nov-89	40.7	19.6	9.7	NT	1.5	3.8E+6	1.1E+4
	20-Nov-89	39.3	18.1	7.4	NT	2.9	4.1E+6	2.2E+4
	04-Dec-89	28.1	11.2	1.1	NT	5.6	7.1E+6	9.2E+4
	21-Dec-89	43.9	17.1	12.3	NT	2.9	3.7E+6	NT
	02-Jan-90	45.8	18.1	11.8	NT	4.0	NT	NT
EW-9								
	23-May-89	NT	NT	11.9	NT	NT	NT	NT
	31-May-89	NT	NT	17.2	NT	NT	NT	NT
	05-Jun-89	NT	NT	12.7	NT	NT	NT	NT
	14-Jun-89	NT	NT	19.1	NT	NT	NT	NT
	20-Jun-89	NT	NT	NT	NT	NT	NT	NT
	27-Jun-89	NT	NT	15.3	NT	NT	NT	NT
	06-Jul-89	NT	NT	12.8	NT	NT	NT	NT
	18-Sep-89	NT	NT	16.3	NT	NT	NT	NT
	29-Sep-89	NT	NT	14.0	NT	NT	NT	NT
	05-Oct-89	NT	NT	13.6	NT	NT	NT	NT
	04-Dec-89	40.2	16.5	9.3	NT	2.6	NT	NT

Table 5. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from System Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED OXYGEN	DISSOLVED IRON	AMMONIA	MICROBIAL ENUMERATION TC	MICROBIAL ENUMERATION HCU
LOD		0.5(ppm)	0.5(ppm)	0.1(ppm)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	21-Dec-89	50.5	18.1	19.1	NT	3.6	NT	NT
	02-Jan-90	48.6	19.7	13.8	NT	3.8	NT	NT
EW-10								
	23-May-89	NT	NT	10.7	NT	NT	NT	NT
	31-May-89	NT	NT	11.1	NT	NT	NT	NT
	05-Jun-89	NT	NT	13.0	NT	NT	NT	NT
	14-Jun-89	NT	NT	16.0	NT	NT	NT	NT
	20-Jun-89	NT	NT	NT	NT	NT	NT	NT
	27-Jun-89	NT	NT	16.4	NT	NT	NT	NT
	06-Jul-89	NT	NT	13.5	NT	NT	NT	NT
	07-Sep-89	42.9	15.5	4.6	NT	ND	NT	NT
	18-Sep-89	48.4	NT	17.2	NT	NT	2.6E+7	2.2E+4
	29-Sep-89	NT	NT	7.2	NT	NT	NT	NT
	05-Oct-89	56.8	21.5	4.5	NT	NT	3.5E+6	1.4E+4
	23-Oct-89	55.0	21.6	14.9	NT	ND	2.8E+6	1.8E+4
	02-Nov-89	51.7	22.6	15.8	NT	0.6	NT	NT
	20-Nov-89	46.8	21.3	10.5	NT	1.2	7.6E+6	1.4E+4
	04-Dec-89	NT	NT	14.7	NT	NT	NT	NT
	21-Dec-89	46.8	17.1	15.4	NT	2.3	5.6E+6	9.2E+4
	02-Jan-90	NT	NT	9.3	NT	NT	--	--
EW-11								
	23-May-89	NT	NT	11.9	NT	NT	NT	NT
	31-May-89	NT	NT	15.5	NT	NT	NT	NT
	05-Jun-89	NT	NT	16.5	NT	NT	NT	NT
	14-Jun-89	NT	NT	17.4	NT	NT	NT	NT
	20-Jun-89	NT	NT	15.9	NT	NT	NT	NT
	27-Jun-89	NT	NT	12.9	NT	NT	NT	NT
	06-Jul-89	NT	NT	14.8	NT	NT	NT	NT
	07-Sep-89	49.9	14.3	18.1	NT	ND	NT	NT
	18-Sep-89	NT	NT	18.4	NT	NT	NT	NT
	29-Sep-89	NT	NT	17.7	NT	NT	NT	NT
	05-Oct-89	NT	NT	15.1	NT	NT	NT	NT
	23-Oct-89	57.6	17.0	16.1	NT	ND	NT	NT
	20-Nov-89	43.9	20.8	18.8	NT	1.2	NT	NT
	04-Dec-89	NT	NT	>20.0	NT	NT	NT	NT
	21-Dec-89	NT	NT	>20.0	NT	ND	NT	NT
	02-Jan-90	NT	NT	>20.0	NT	ND	NT	NT
EW-12								
	15-Mar-89	13.2	1.0	NT	ND	ND	NT	NT
	29-Mar-89	22.0	3.3	NT	NT	ND	NT	NT
	04-Apr-89	22.9	3.8	NT	ND	ND	NT	NT
	11-Apr-89	20.2	3.8	NT	NT	ND	NT	NT
	18-Apr-89	28.6	1.3	5.6	NT	ND	NT	NT
	25-Apr-89	39.2	2.8	2.6	NT	ND	NT	NT
	02-May-89	33.4	3.0	4.9	NT	ND	1.0E+6	3.5E+2
	09-May-89	31.7	2.3	5.1*	NT	ND	4.6E+5	2.4E+2

Table 5. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from System Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED OXYGEN	DISSOLVED IRON	AMMONIA	MICROBIAL ENUMERATION TC	MICROBIAL ENUMERATION HCU
LOD		0.5(ppm)	0.5(ppm)	0.1(ppm)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	22-Jul-89	44.0	12.0	NT	NT	ND	NT	NT
	07-Sep-89	53.9	22.0	14.8	NT	1.1	NT	NT
	18-Sep-89	45.1	18.0	17.4	NT	0.6	1.4E+7	1.1E+4
	29-Sep-89	NT	NT	18.0	NT	NT	NT	NT
	05-Oct-89	63.8	25.0	>20.0	NT	ND	1.9E+7	2.4+5
	21-Dec-89	NT	NT	10.6	NT	NT	--	--
	02-Jan-90	NT	NT	18.1	NT	NT	--	--
EW-15								
	18-Apr-89	NT	NT	NT	NT	NT	1.1E+6	1.4E+2
	25-Apr-89	45.8	23.0	1.1	ND	NT	1.6E+5	4.7E+2
	02-May-89	NT	NT	NT	NT	NT	NT	NT
	09-May-89	58.1	26.5	>20.0*	NT	1.2	1.8E+6	1.6E+4
	17-May-89	45.4	22.4	8.9	NT	1.8	3.9E+6	3.5E+3
	23-May-89	41.0	19.1	>20.0	NT	2.7	1.3E+7	1.3E+4
	31-May-89	63.8	21.5	>20.0	NT	3.5	6.6E+6	2.4E+5
	05-Jun-89	43.6	28.1	>20.0	NT	3.7	6.4E+6	1.6E+5
	14-Jun-89	48.4	15.8	18.2	NT	2.0	9.2E+6	2.4E+5
	20-Jun-89	NT	NT	>20.0	NT	NT	NT	NT
	27-Jun-89	NT	NT	18.5	NT	NT	NT	NT
	06-Jul-89	52.8	25.7	19.3	NT	2.5	4.9E+6	1.7E+5
	22-Jul-89	30.4	33.8	NT	NT	3.4	2.4E+6	2.4E+4
	03-Aug-89	50.6	33.8	NT	NT	4.0	3.3E+5	1.8E+3
	07-Sep-89	56.8	85.8	>20.0	NT	7.2	NT	NT
	18-Sep-89	64.9	38.0	>20.0	NT	5.8	2.1E+7	5.4E+4
	29-Sep-89	NT	NT	14.5	NT	NT	NT	NT
	05-Oct-89	59.4	45.0	>20.0	NT	5.2	3.5E+6	5.4E+4
	23-Oct-89	52.1	39.0	>20.0	NT	6.1	7.6E+6	4.9E+4
	02-Nov-89	46.9	36.3	>20.0	NT	7.7	1.4E+6	1.3E+4
	20-Nov-89	51.4	29.3	>20.0	NT	7.0	7.0E+6	2.4E+4
	04-Dec-89	61.7	30.7	>20.0	NT	8.0	4.1E+5	2.4E+4
	21-Dec-89	68.3	29.3	16.9	NT	6.7	2.6E+6	2.8E+4
	02-Jan-90	80.4	30.4	17.1	NT	6.8	--	--
EW-16								
	15-Mar-89	1.8	0.5	NT	ND	ND	NT	NT
	29-Mar-89	18.4	3.0	NT	NT	ND	NT	NT
	04-Apr-89	31.7	5.0	NT	ND	ND	5.7E+5	3.9E+2
	11-Apr-89	28.6	4.8	NT	NT	ND	1.2E+5	2.2E+2
	18-Apr-89	37.8	14.0	1.0	ND	1.2	3.2E+6	1.4E+3
	25-Apr-89	47.5	11.0	NT	NT	ND	8.4E+5	7.0E+2
	02-May-89	46.2	15.0	9.3	NT	ND	3.5E+5	1.4E+4
	09-May-89	46.2	18.5	14.7*	NT	0.6	2.2E+6	1.3E+3
	17-May-89	36.3	13.3	3.7	NT	ND	4.4E+5	2.2E+3
	23-May-89	29.7	11.8	10.1	NT	ND	8.6E+5	1.4E+3
	31-May-89	35.2	11.8	11.1	NT	0.7	5.9E+6	3.5E+3
	05-Jun-89	31.5	12.5	12.6	NT	ND	1.8E+6	2.2E+3
	14-Jun-89	29.7	13.3	11.8	NT	ND	3.7E+7	2.4E+5

Table 5. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from System Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED OXYGEN	DISSOLVED IRON	AMMONIA	MICROBIAL ENUMERATION TC	HCU
LOD		0.5(ppm)	0.5(ppm)	0.1(ppm)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	20-Jun-89	8.8	13.5	15.8	NT	ND	2.0E+7	3.5E+4
	27-Jun-89	42.9	13.3	19.7	NT	ND	9.5E+5	2.4E+5
	06-Jul-89	55.0	16.0	15.8	NT	ND	9.1E+6	1.1E+5
	22-Jul-89	23.8	18.3	NT	NT	1.4	NT	NT
	03-Aug-89	42.9	20.0	NT	NT	2.1	NT	NT
	17-Aug-89	52.8	25.6	NT	NT	2.3	8.0E+5	3.1E+3
	07-Sep-89	55.0	25.0	18.8	NT	1.3	NT	NT
	18-Sep-89	NT	NT	19.8	NT	NT	NT	NT
	29-Sep-89	NT	NT	15.1	NT	NT	NT	NT
	05-Oct-89	55.0	25.8	14.0	NT	2.9	NT	NT
	02-Nov-89	28.2	20.0	13.3	NT	2.2	NT	NT
	21-Dec-89	NT	NT	16.7	NT	NT	NT	NT
	02-Jan-90	NT	NT	19.2	NT	NT	NT	NT
EW-17								
	18-Apr-89	NT	NT	16.8	NT	NT	NT	NT
	25-Apr-89	6.2	8.3	NT	ND	ND	NT	NT
	02-May-89	NT	NT	NT	NT	NT	NT	NT
	09-May-89	66.0	19.8	18.0*	NT	ND	1.2E+6	1.6E+4
	17-May-89	46.2	15.8	7.8	NT	ND	8.5E+5	3.5E+3
	23-May-89	44.0	14.2	18.0	NT	ND	6.5E+5	9.5E+2
	31-May-89	46.2	14.0	19.6	NT	ND	6.5E+5	2.8E+3
	05-Jun-89	52.8	13.2	18.2	NT	ND	NT	NT
	14-Jun-89	45.1	14.2	17.0	NT	ND	NT	NT
	20-Jun-89	NT	NT	18.5	NT	NT	NT	NT
	27-Jun-89	NT	NT	16.1	NT	NT	NT	NT
	06-Jul-89	NT	NT	16.4	NT	NT	NT	NT
	18-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	29-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	05-Oct-89	NT	NT	>20.0	NT	NT	NT	NT
	21-Dec-89	NT	NT	19.3	NT	NT	NT	NT
	02-Jan-90	NT	NT	16.9	NT	NT	NT	NT
EW-18								
	18-Apr-89	NT	NT	10.5	NT	NT	NT	NT
	25-Apr-89	6.2	NT	9.2	NT	NT	NT	NT
	02-May-89	NT	NT	NT	NT	NT	NT	NT
	09-May-89	NT	NT	18.2*	NT	NT	NT	NT
	17-May-89	38.4	NT	8.0	NT	ND	NT	NT
	23-May-89	37.0	NT	17.8	NT	ND	7.0E+5	NT
	31-May-89	46.2	NT	17.8	NT	ND	5.4E+6	1.7E+3
	05-Jun-89	NT	NT	19.1	NT	NT	NT	NT
	14-Jun-89	42.9	NT	14.5	NT	ND	NT	NT
	20-Jun-89	NT	NT	>20.0	NT	NT	NT	NT
	27-Jun-89	NT	NT	>20.0	NT	NT	NT	NT
	06-Jul-89	NT	NT	>20.0	NT	NT	NT	NT
	18-Sep-89	NT	NT	>20.0	NT	NT	NT	NT
	29-Sep-89	NT	NT	>20.0	NT	NT	NT	NT

Table 5. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from System Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED OXYGEN	DISSOLVED IRON	AMMONIA	MICROBIAL ENUMERATION TC	MICROBIAL ENUMERATION HCU
LOD		0.5(ppm)	0.5(ppm)	0.1(ppm)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	31-May-89	17.6	5.0	NT	NT	ND	3.7E+4	2.4E+4
	05-Jun-89	17.6	1.3	NT	NT	ND	9.3E+4	7.9E+3
	14-Jun-89	26.0	1.0	NT	NT	ND	5.8E+4	2.4E+4
	20-Jun-89	29.0	0.8	NT	NT	ND	1.5E+5	7.0E+3
	27-Jun-89	27.1	0.8	NT	NT	ND	NT	NT
	06-Jul-89	43.6	0.5	NT	NT	ND	NT	NT
	22-Jul-89	26.8	0.5	NT	NT	ND	NT	NT
	03-Aug-89	26.8	0.5	NT	NT	ND	NT	NT
	17-Aug-89	48.0	3.0	NT	NT	ND	2.9E+4	1.7E+3
	07-Sep-89	23.8	7.8	9.0	NT	ND	NT	NT
	18-Sep-89	39.2	9.5	9.4	NT	ND	NT	NT
	29-Sep-89	NT	NT	7.9	NT	NT	NT	NT
	05-Oct-89	39.4	9.5	10.3	NT	ND	NT	NT
	23-Oct-89	48.0	9.1	13.8	NT	ND	NT	NT
	02-Nov-89	39.2	12.0	15.4	NT	ND	NT	NT
	20-Nov-89	40.2	10.9	12.4	NT	ND	NT	NT
	05-Dec-89	29.9	8.8	12.6	NT	ND	5.7E+5	1.1E+4
	21-Dec-89	25.2	7.5	5.8	NT	0.5	5.1E+5	2.2E+3
	02-Jan-90	27.1	6.9	6.7	NT	ND	--	--
EW-22								
	20-Nov-89	38.3	7.2	NT	NT	ND	NT	NT
	21-Dec-89	NT	NT	4.9	NT	NT	NT	NT
	02-Jan-90	21.5	4.0	4.5	NT	ND	NT	NT
Injection Composite								
	21-Mar-89	26.0	42.0	NT	NT	15.0	NT	NT
	18-Apr-89	37.8	110.0	NT	NT	37.4	NT	NT
	24-Apr-89	24.6	45.0	NT	NT	22.0	NT	NT
	01-May-89	23.2	40.0	NT	NT	8.3	NT	NT
	09-May-89	29.9	13.5	NT	NT	1.5	NT	NT
	17-May-89	24.6	37.5	NT	NT	6.1	NT	NT
	23-May-89	31.7	42.5	NT	NT	9.1	NT	NT
	31-May-89	45.1	50.0	NT	NT	14.5	NT	NT
	06-Jun-89	35.9	30.0	NT	NT	10.2	NT	NT
	20-Jun-89	35.9	35.0	NT	NT	8.8	NT	NT
	27-Jun-89	26.4	29.0	NT	NT	9.8	NT	NT
	06-Jul-89	34.8	42.5	NT	NT	9.4	NT	NT
	22-Jul-89	23.8	42.5	NT	NT	10.2	NT	NT
	03-Aug-89	23.8	38.5	NT	NT	10.2	NT	NT
	17-Aug-89	17.6	80.0	NT	NT	16.0	NT	NT
	07-Sep-89	35.0	50.0	NT	NT	10.9	NT	NT
	18-Sep-89	55.0	58.0	NT	NT	17.4	NT	NT
	05-Oct-89	48.4	35.0	NT	NT	5.4	NT	NT
	23-Oct-89	33.4	40.5	NT	NT	6.2	NT	NT
	02-Nov-89	18.7	39.0	NT	NT	7.3	NT	NT

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Table 6. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from Monitoring Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED OXYGEN	DISSOLVED IRON (Fe)	AMMONIA	MICROBIAL ENUMERATION TC	HCU
LOD		0.5(ppm)	0.5(ppm)	0.5(mg/l)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
MW-1								
	03-Aug-89	5.3	ND	NT	NT	ND	NT	NT
MW-5								
	06-Jun-89	10.1	2.5	1.7	NT	ND	NT	NT
	06-Jul-89	NT	2.5	1.7	NT	ND	NT	NT
MW-7								
	06-Jun-89	ND	4.8	1.8	NT	ND	NT	NT
	06-Jul-89	ND	ND	1.8	NT	ND	NT	NT
	22-Jul-89	ND	0.5	NT	NT	ND	NT	NT
	03-Aug-89	ND	3.3	NT	NT	ND	NT	NT
	07-Sep-89	ND	9.0	NT	NT	ND	NT	NT
	05-Oct-89	ND	8.0	NT	NT	ND	NT	NT
	02-Nov-89	ND	ND	5.3	NT	ND	NT	NT
	06-Dec-89	ND	5.3	5.9	NT	ND	NT	NT
	02-Jan-90	ND	1.6	NT	NT	ND	NT	NT
MW-8								
	06-Jun-89	NT	NT	4.2	NT	NT	NT	NT
	06-Jul-89	NT	NT	4.2	NT	NT	NT	NT
	02-Nov-89	NT	NT	6.5	NT	NT	NT	NT
MW-9								
	03-Mar-89	37.0/32.0	1.5	1.0**	ND	ND	5.3E+5	9.5E+2
	15-Mar-89	6.0	6.0	NT	ND	ND	5.9E+6	1.8E+2
	29-Mar-89	37.0	32.0	NT	NT	ND	1.8E+6	2.1E+2
	04-Apr-89	41.8	36.0	NT	ND	ND	3.6E+5	1.1E+2
	11-Apr-89	42.1	60.0	NT	NT	ND	3.6E+5	1.4E+2
	18-Apr-89	56.3	60.0	8.4	ND	0.9	1.2E+6	2.2E+2
	25-Apr-89	88.0	50.0	>20.0	NT	2.9	9.9E+5	3.5E+3
	02-May-89	74.8	62.5	18.2	NT	4.8	3.5E+6	5.4E+3
	09-May-89	44.0	37.5	16.6	NT	6.2	NT	NT
	17-May-89	41.0	21.3	8.5	NT	5.6	NT	NT
	23-May-89	54.1	20.0	NT	NT	3.9	NT	NT
	31-May-89	NT	NT	NT	NT	NT	NT	NT
	06-Jun-89	46.2	34.0	NT	NT	10.8	NT	NT
	14-Jun-89	63.8	14.0	13.9	NT	3.3	NT	NT
	06-Jul-89	56.8	30.0	NT	NT	NT	NT	NT
	22-Jul-89	37.4	29.0	NT	NT	4.4	NT	NT
	03-Aug-89	38.5	25.0	NT	NT	5.5	NT	NT
	17-Aug-89	74.4	20.0	NT	NT	3.9	NT	NT
	07-Sep-89	83.6	39.0	15.5	NT	6.6	NT	NT
	05-Oct-89	105.6	41.3	13.5	NT	5.6	NT	NT
	02-Nov-89	78.3	18.6	18.9	NT	2.3	1.7E+6	7.0E+3
	05-Dec-89	91.6	20.3	11.0	NT	2.0	NT	NT
	02-Jan-90	87.9	26.7	NT	NT	1.3	NT	NT
MW-10								
	03-Mar-89	8.4/5.5*	1.0	4.0**	ND	ND	2.3E+5	3.5E+2

Table 6. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from Monitoring Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED OXYGEN	DISSOLVED IRON (Fe)	AMMONIA	MICROBIAL ENUMERATION TC	HCU
LOD		0.5(ppm)	0.5(ppm)	0.5(mg/l)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	15-Mar-89	5.5	1.2	NT	ND	ND	NT	NT
	29-Mar-89	11.4	4.5	NT	NT	ND	NT	NT
	04-Apr-89	15.0	1.3	NT	ND	ND	NT	NT
	11-Apr-89	16.5	2.3	NT	NT	ND	NT	NT
	18-Apr-89	16.0	5.3	5.0	NT	ND	NT	NT
	25-Apr-89	14.1	2.0	2.2	NT	ND	NT	NT
	02-May-89	19.4	6.5	2.6	NT	ND	NT	NT
	09-May-89	17.6	1.8	3.1	NT	ND	NT	NT
	17-May-89	21.1	1.5	1.9	NT	ND	NT	NT
	23-May-89	17.6	1.3	NT	NT	ND	NT	NT
	31-May-89	NT	NT	NT	NT	NT	NT	NT
	06-Jun-89	17.6	2.3	2.0	NT	ND	NT	NT
	14-Jun-89	23.1	ND	2.1	NT	NT	NT	NT
	06-Jul-89	20.9	ND	NT	NT	NT	NT	NT
	22-Jul-89	17.6	0.5	NT	NT	ND	NT	NT
	03-Aug-89	23.8	ND	NT	NT	ND	NT	NT
	17-Aug-89	16.5	1.3	NT	NT	ND	NT	NT
	07-Sep-89	18.0	1.5	6.2	NT	ND	NT	NT
	18-Sep-89	9.9	6.0	NT	NT	ND	NT	NT
	05-Oct-89	21.8	11.0	6.1	NT	0.7	NT	NT
	23-Oct-89	23.8	3.0	6.5	NT	ND	3.2E+6	7.0E+3
	02-Nov-89	21.1	1.5	8.9	NT	ND	NT	NT
	20-Nov-89	7.1	0.5	6.5	NT	ND	1.9E+6	5.4E+4
	05-Dec-89	23.6	7.7	6.5	NT	ND	1.1E+5	2.4E+4
	02-Jan-90	1.1	2.1	NT	NT	0.5	--	--
MW-11								
	03-Mar-89	ND/ND*	0.8	2.0**	ND	ND	1.1E+6	2.8E+3
	15-Mar-89	ND	1.0	NT	ND	ND	NT	NT
	29-Mar-89	31.7	4.3	NT	NT	ND	NT	NT
	04-Apr-89	37.0	5.0	NT	ND	ND	NT	NT
	11-Apr-89	40.7	24.0	NT	NT	ND	3.8E+5	1.1E+2
	18-Apr-89	56.3	26.0	5.7	ND	ND	1.2E+6	1.7E+2
	25-Apr-89	44.0	29.7	11.8	NT	ND	4.7E+5	1.1E+3
	02-May-89	74.8	41.3	17.1	NT	ND	2.4E+6	5.4E+3
	09-May-89	57.2	29.7	12.5	NT	ND	1.4E+6	5.4E+3
	17-May-89	46.2	21.5	9.9	NT	ND	3.5E+6	1.6E+4
	23-May-89	52.8	15.8	NT	NT	ND	2.0E+6	3.3E+3
	31-May-89	58.3	29.7	>20.0	NT	ND	7.0E+5	2.4E+5
	06-Jun-89	66.0	33.0	NT	NT	ND	5.0E+6	2.8E+4
	14-Jun-89	52.8	25.7	14.9	NT	0.5	1.2E+7	2.4E+5
	20-Jun-89	61.6	24.8	12.8	NT	0.9	7.1E+6	1.1E+4
	06-Jul-89	56.8	32.8	NT	NT	NT	8.5E+6	5.4E+5
	22-Jul-89	33.0	27.2	NT	NT	9.6	NT	NT
	03-Aug-89	52.8	19.1	NT	NT	4.3	1.9E+5	1.1E+4
	17-Aug-89	58.3	38.9	NT	NT	5.8	1.1E+6	1.8E+4
	07-Sep-89	61.6	47.2	15.3	NT	7.4	1.3E+6	4.9E+3

Table 6. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from Monitoring Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED OXYGEN	DISSOLVED IRON (Fe)	AMMONIA	MICROBIAL ENUMERATION TC	HCU
LOD		0.5(ppm)	0.5(ppm)	0.5(mg/l)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	23-May-89	48.4	1.8	11.3	NT	ND	1.0E+6	3.3E+2
	06-Jun-89	53.9	2.5	NT	NT	ND	NT	NT
	06-Jul-89	46.9	7.5	NT	NT	ND	3.8E+6	3.3E+4
	22-Jul-89	28.2	10.3	NT	NT	ND	1.7E+6	2.2E+3
	03-Aug-89	38.5	10.8	NT	NT	ND	NT	NT
	17-Aug-89	70.4	18.6	NT	NT	ND	NT	NT
	07-Sep-89	56.8	29.0	16.5	NT	1.6	NT	NT
	18-Sep-89	56.8	32.0	NT	NT	1.6	NT	NT
	05-Oct-89	70.0	29.0	>20.0	NT	1.5	NT	NT
	02-Nov-89	60.7	36.0	>20.0	NT	1.9	1.3E+5	4.9E+3
	05-Dec-89	54.2	30.4	19.2	NT	3.2	NT	NT
	21-Dec-89	43.9	27.2	NT	NT	2.3	1.2E+5	NT
	02-Jan-90	55.2	28.3	NT	NT	6.7	NT	NT
MW-16								
	03-Mar-89	49.3/17.0	1.2	2.0**	ND	ND	8.4E+5	1.4E+2
	10-Mar-89	14.5	2.2	NT	ND	ND	1.4E+5	1.2E+3
	15-Mar-89	11.4	3.0	NT	ND	ND	6.0E+6	1.1E+3
	29-Mar-89	33.4	7.2	NT	NT	ND	1.6E+6	3.5E+3
	04-Apr-89	39.6	11.5	NT	0.2	NT	2.2E+6	1.2E+3
	11-Apr-89	37.8	16.0	NT	NT	ND	6.7E+5	1.4E+3
	18-Apr-89	52.8	20.0	14.0	ND	ND	1.3E+6	2.3E+2
	25-Apr-89	49.3	22.0	>20.0	ND	ND	5.1E+5	2.2E+2
	02-May-89	57.2	31.3	14.6	NT	ND	2.2E+6	1.7E+3
	09-May-89	59.4	23.6	15.3	NT	ND	4.0E+6	9.5E+2
	17-May-89	41.8	16.5	9.5	NT	ND	6.8E+5	1.4E+3
	23-May-89	46.2	23.9	17.3	NT	ND	1.0E+6	2.2E+3
	31-May-89	61.6	15.7	16.2	NT	ND	4.4E+5	4.9E+3
	06-Jun-89	43.6	18.2	NT	NT	ND	4.0E+6	2.8E+4
	20-Jun-89	61.6	7.6	5.3	NT	ND	1.1E+7	5.4E+4
	06-Jul-89	55.4	23.1	NT	NT	1.5	5.7E+6	4.9E+4
	22-Jul-89	55.0	10.7	NT	NT	ND	NT	NT
	03-Aug-89	45.8	10.0	NT	NT	1.3	1.1E+5	1.8E+3
	17-Aug-89	74.8	19.0	NT	NT	1.5	8.1E+5	1.4E+4
	07-Sep-89	61.6	52.1	16.6	NT	3.7	8.2E+5	1.1E+4
	18-Sep-89	28.2	42.9	NT	NT	5.4	1.4E+6	5.4E+4
	05-Oct-89	66.0	49.0	>20.0	NT	6.3	1.8E+6	7.9E+3
	23-Oct-89	48.4	36.5	>20.0	NT	4.7	NT	NT
	02-Nov-89	48.4	35.0	>20.0	NT	5.5	NT	NT
	20-Nov-89	42.1	26.7	18.2	NT	4.1	4.4E+5	1.1E+4
	05-Dec-89	55.2	32.0	>20.0	NT	5.8	9.2E+5	2.8E+4
	02-Jan-90	65.5	30.4	NT	NT	3.8	--	--
MW-17								
	03-Mar-89	NT	NT	NT	NT	NT	NT	NT
	10-Mar-89	12.3	0.8	NT	ND	ND	1.6E+5	1.1E+3
	15-Mar-89	7.5	3.1	NT	ND	ND	1.1E+7	3.5E+3
	29-Mar-89	25.5	3.8	NT	NT	ND	2.6E+6	1.1E+3

Table 6. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from Monitoring Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED OXYGEN	DISSOLVED IRON (Fe)	AMMONIA	MICROBIAL ENUMERATION TC	HCU
LOD		0.5(ppm)	0.5(ppm)	0.5(mg/l)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
	04-Apr-89	35.2	3.5	NT	ND	ND	3.3E+6	6.8E+2
	11-Apr-89	49.4	8.0	NT	NT	ND	1.5E+6	3.9E+2
	18-Apr-89	52.8	16.0	11.8	ND	ND	1.2E+6	1.4E+2
	25-Apr-89	51.0	11.6	13.5	ND	ND	6.0E+5	1.7E+2
	02-May-89	52.8	17.0	13.3	NT	ND	5.1E+6	3.5E+2
	09-May-89	44.9	5.0	6.6	NT	ND	6.5E+6	9.5E+2
	17-May-89	47.7	17.6	8.4	NT	ND	3.0E+6	5.4E+3
	23-May-89	57.2	14.5	17.0	NT	ND	1.1E+6	3.9E+2
	06-Jun-89	46.2	16.0	NT	NT	ND	3.0E+6	3.5E+4
	14-Jun-89	42.9	18.0	15.4	NT	ND	3.0E+6	4.3E+4
	27-Jun-89	56.8	11.0	NT	NT	ND	1.1E+7	9.2E+4
	06-Jul-89	50.6	13.0	NT	NT	ND	7.2E+6	1.1E+5
	22-Jul-89	45.8	20.0	NT	NT	ND	7.3E+5	7.9E+4
	03-Aug-89	70.4	14.0	NT	NT	1.0	8.3E+4	1.3E+3
	17-Aug-89	63.8	20.0	NT	NT	1.7	2.3E+5	9.2E+3
	07-Sep-89	79.2	32.0	NT	NT	1.4	9.2E+6	1.3E+4
	18-Sep-89	71.5	24.6	NT	NT	3.3	6.5E+5	1.7E+4
	05-Oct-89	75.9	39.0	NT	NT	5.8	9.3E+5	2.4E+4
	23-Oct-89	52.8	38.0	>20.0	NT	4.7	8.4E+5	1.6E+5
	02-Nov-89	57.2	36.0	>20.0	NT	6.9	NT	NT
	20-Nov-89	52.4	24.0	15.4	NT	4.8	NT	NT
	05-Dec-89	65.5	28.8	19.4	NT	7.3	NT	NT
	02-Jan-90	53.3	30.4	NT	NT	9.2	NT	NT
MW-18								
	03-Mar-89	15.4/9.3*	0.5	2.9**	ND	ND	1.3E+6	7.9E+1
	15-Mar-89	4.0	1.1	NT	ND	ND	NT	NT
	29-Mar-89	8.8	3.0	NT	NT	ND	NT	NT
	04-Apr-89	6.6	2.8	NT	ND	ND	NT	NT
	11-Apr-89	6.6	3.8	NT	NT	ND	NT	NT
	18-Apr-89	6.6	5.8	5.0	NT	ND	NT	NT
	25-Apr-89	2.2	1.3	3.0	NT	ND	NT	NT
	02-May-89	8.8	4.5	3.4	NT	ND	NT	NT
	09-May-89	11.6	1.8	4.1	NT	ND	NT	NT
	17-May-89	5.8	1.8	3.3	NT	ND	NT	NT
	23-May-89	14.5	1.5	3.9	NT	ND	NT	NT
	31-May-89	NT	NT	NT	NT	NT	NT	NT
	06-Jun-89	17.1	1.3	NT	NT	ND	NT	NT
	27-Jun-89	8.8	0.8	NT	NT	ND	NT	NT
	06-Jul-89	15.7	ND	NT	NT	NT	NT	NT
	22-Jul-89	17.2	0.5	NT	NT	ND	NT	NT
	03-Aug-89	11.0	0.5	NT	NT	ND	NT	NT
	17-Aug-89	16.5	1.3	NT	NT	ND	NT	NT
	07-Sep-89	15.0	3.0	NT	NT	ND	NT	NT
	05-Oct-89	22.0	6.0	NT	NT	ND	NT	NT
	02-Nov-89	15.0	2.3	NT	NT	ND	NT	NT
	06-Dec-89	13.5	5.9	6.1	NT	ND	NT	NT

Table 6. Results of Inorganic Chemical and Microbial Analyses of Ground-Water Samples from Monitoring Wells

WELL	DATE	NITRATE	PHOSPHATE	DISSOLVED OXYGEN	DISSOLVED IRON (Fe)	AMMONIA	MICROBIAL ENUMERATION TC	HCU
LOD		0.5(ppm)	0.5(ppm)	0.5(mg/l)	0.1(ppm)	0.5(ppm)	NA (CFU/ml)	NA (CFU/ml)
MW-19	02-Jan-90	11.6	1.6	NT	NT	ND	NT	NT
MW-20	02-Jan-90	ND	2.4	NT	NT	ND	NT	NT
	02-Jan-90	10.1	2.1	NT	NT	ND	NT	NT

NOTES:

HCU: Hydrocarbon Utilizers
TC: Total Count
LOD: Limit of Detection.
NA: Limit of Detection not applicable.
ND: Not detected at or above LOD.
NT: Not tested.
* : First value from HLA laboratory
Second value from Pace Laboratories, Inc.
**: Results from Pace Laboratories, Inc.
--: Results not available.

Inorganic constituents reported in parts per million (ppm).
Microbial counts reported in colony-forming units per milliliter of water (CFU/ml).
Analyses performed by HLA laboratory unless otherwise indicated.

Table 7. Results of Organic Chemical Analyses of Ground-water Samples from Monitoring and System 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 *		0.25/0.05**
	07-Jun-89	0.082	0.097	0.045	0.167	12
	06-Jul-89 a	2.1/2.3	2.5/2.8	0.14/0.16	2.6/3.0	15/15
	02-Aug-89	7.2	7.5	0.26	7.1	37
	06-Sep-89	5.0	6.5	0.41	5.2	47
	04-Oct-89	3.3	2.8	0.15	2.5	11
	01-Nov-89	2.1	2.8	0.11	1.8	13
	05-Dec-89	1.3	1.5	0.084	1.3	7.6
	03-Jan-90	0.11	0.27	0.017	0.53	2.7
MW-12						
	15-Feb-89	ND	ND	ND	ND	ND
	03-Mar-89	NT	NT	NT	NT	ND
	05-Apr-89	0.0014	0.0023	ND	0.0054	ND
	02-May-89	0.026	0.0033	ND	0.0063	0.10
	07-Jun-89	0.034	0.0037	ND	0.012	0.18
	06-Jul-89	0.029	0.0025	ND	0.0059	0.12
	02-Aug-89	0.023	0.002	ND	0.005	ND
	07-Sep-89 a	0.051/0.059	0.0016/0.0022	ND/ND	0.0049/0.0058	ND/ND
	05-Oct-89 a	0.037/0.040	0.0032/0.0031	ND/ND	0.0086/0.0094	ND/ND
	02-Nov-89	0.0056	0.0011	ND	0.0019	0.071
	06-Dec-89	0.0062	0.0012	ND	0.0017	0.06
	03-Jan-90	0.0086	0.0010	ND	0.0012	0.09
MW-13						
	02-Mar-89	NT	NT	NT	NT	1.4
	04-Apr-89	0.041	0.039	0.0038	0.28	0.71
	01-May-89	0.048	0.049	0.013	0.13	0.34
	07-Jun-89	0.051	0.037	0.02	0.082	0.98
	06-Jul-89	0.210	0.054	0.013	0.109	0.76
	02-Aug-89	0.098	0.011	0.0005	0.031	0.27
	07-Sep-89	0.039	0.0020	ND	0.0050	ND
	04-Oct-89	4.0	1.6	0.20	1.5	9.2
	01-Nov-89	1.7	0.086	0.091	0.37	5.6
	06-Dec-89 a	1.2/1.1	0.15/0.14	0.21/0.19	0.46/0.42	5.1/4.4
	03-Jan-90	0.92	0.13	0.20	0.38	3.7
MW-14						
	02-Mar-89	NT	NT	NT	NT	ND
	04-Apr-89	0.44	0.063	ND	0.27	1.4
	01-May-89	0.35	0.011	ND	0.094	0.94
	07-Jun-89 a	0.057/ND	0.0022/ND	0.0005/ND	0.043/ND	1.1/0.64
	06-Jul-89	3.0	1.7	0.050	3.6	14
	01-Aug-89	0.49	0.084	ND	0.84	4.5
	06-Sep-89	1.0	0.090	ND	1.4	4.9
	04-Oct-89	0.70	0.015	ND	0.75	3.1
	01-Nov-89	0.36	0.0058	ND	0.24	1.4

Table 7. Results of Organic Chemical Analyses of Ground-water Samples from Monitoring and System 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 *		0.25/0.05**
	05-Dec-89	0.35	0.0065	LT 0.0010	0.25	1.3
	02-Jan-90	0.080	0.0017	ND	0.091	0.63
MW-15						
	03-Mar-89	NT	NT	NT	NT	3.9
	04-Apr-89	0.88	0.97	0.11	0.93	3.7
	02-May-89	1.5	1.1	0.086	0.74	2.7
	07-Jun-89	5.7	4.3	0.3	2.4	22
	05-Jul-89	2.0	3.0	0.26	2.0	12
	03-Aug-89	2.6	2.8	0.75	3.8	24
	06-Sep-89	1.1	1.4	0.23	1.3	7.3
	04-Oct-89	0.59	1.1	0.076	0.59	3.7
	01-Nov-89	1.6	2.3	0.23	1.7	9.7
	05-Dec-89	1.7	2.6	0.22	1.3	10
	02-Jan-90	0.37	0.65	0.053	0.35	2.6
MW-16						
	02-Mar-89	NT	NT	NT	NT	2.1
	04-Apr-89	2.1	2.2	0.18	1.4	6.7
	02-May-89	0.74	0.94	0.11	0.95	2.7
	07-Jun-89	0.37	0.56	0.51	0.35	14
	05-Jul-89	1.9	2.7	1.8	4.5	16
	03-Aug-89 @	1.8/1.9	2.6/2.6	0.18/0.19	5.7/6.0	17/17
	06-Sep-89	0.96	3.3	0.26	1.3	8.9
	04-Oct-89	0.72	2.1	0.16	1.3	5.4
	02-Nov-89	0.74	2.8	0.37	2.4	11
	05-Dec-89	0.38	0.79	0.087	0.75	3.6
	02-Jan-90	0.25	0.39	0.037	0.36	1.9
MW-17						
	04-Apr-89	3.1	2.9	0.27	3.9	12
	02-May-89	1.2	1.0	0.11	1.4	3.9
	07-Jun-89	1.2	1.2	ND	1.3	6.3
	05-Jul-89	3.0	3.3	2.7	3.9	18
	02-Aug-89	4.8	9.5	0.63	14	47
	03-Aug-89	5.1	6.1	0.73	12	NT
	06-Sep-89	2.8	4.5	0.32	8.4	21
	04-Oct-89	0.47	0.092	0.018	1.0	2.8
	01-Nov-89	0.19	0.011	0.11	0.18	0.93
	05-Dec-89	0.16	0.036	0.0071	0.13	0.76
	03-Jan-90	0.056	0.0030	0.0010	0.022	0.25
MW-18						
	15-Feb-89	ND	ND	ND	ND	ND
	03-Mar-89	NT	NT	NT	NT	ND
	05-Apr-89	ND	ND	ND	ND	ND
	02-May-89	ND	ND	ND	ND	ND

Table 7. Results of Organic Chemical Analyses of Ground-water Samples from Monitoring and System 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 *		0.25/0.05**
	07-Jun-89	ND	ND	ND	ND	ND
	06-Jul-89	ND	ND	ND	ND	ND
	02-Aug-89	ND	ND	ND	ND	ND
	06-Sep-89	ND	ND	ND	ND	ND
	05-Oct-89	ND	ND	ND	ND	ND
	01-Nov-89	ND	ND	ND	ND	ND
	06-Dec-89	ND	0.0009	ND	0.0013	ND
	02-Jan-90	0.016	0.0080	0.0014	0.0098	0.10
MW-19						
	15-Dec-89	5.0	0.30	0.078	0.61	12
	03-Jan-90	3.0	0.46	0.12	1.1	13
MW-20						
	15-Dec-89	ND	ND	ND	ND	ND
	03-Jan-90	0.0004	0.0004	ND	0.0008	ND
EW-1						
	04-Apr-89	1.6	1.0	0.087	1.8	5.9
	01-May-89	3.2	1.2	0.15	1.4	6.3
	05-Jun-89	7.7	5.0	0.2	3.5	24
	05-Jul-89	4.4	5.1	0.32	3.8	24
	02-Aug-89	3.1	4.0	0.4	2.9	23
	06-Sep-89	3.0	3.7	0.26	3.0	11
	05-Oct-89	1.3	1.7	LT 0.10	0.3	7.3
	02-Nov-89	2.4	4.0	0.23	2.1	19
	05-Dec-89	1.3	2.2	0.016	1.3	7.5
	04-Jan-90	1.7	3.2	0.25	1.7	13.0
EW-4						
	04-Apr-89	NT	NT	NT	NT	2.5
	01-May-89	0.56	0.28	0.034	0.72	2.0
	05-Jun-89	0.4	0.2	ND	0.6	3.1
	05-Jul-89	0.29	0.15	0.021	1.2	4.3
	02-Aug-89	0.23	0.1	0.023	1.1	6.3
	06-Sep-89	0.17	0.038	LT 0.0005	0.80	3.0
	02-Nov-89	0.12	0.089	0.009	0.48	5.3
	05-Dec-89	0.17	0.029	0.011	0.62	3.5
	04-Jan-90	0.17/0.2	0.027/0.0085	0.0085/0.0027	0.19/0.21	1.4/1.7
EW-6						
	02-Nov-89	20	22	0.54	12	100
	05-Dec-89	20	24	1.3	13	93
	04-Jan-90	25	34	2.0	16	160
EW-7						
	05-Jul-89	18	16	0.67	10	74
	05-Oct-89	38	46	LT 0.50	11	210
	02-Nov-89	30	39	1.8	15	170

Table 7. Results of Organic Chemical Analyses of Ground-water Samples from Monitoring and System 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 *		0.25/0.05**
	05-Dec-89	27	36		1.9	17	130
	04-Jan-90	11	11		0.36	7.0	59
EW-8							
	01-May-89	1.1	0.49		0.021	0.30	2.3
	05-Jun-89	2.5	2.0		ND	1.4	8.3
	05-Jul-89	3.3	2.9		0.22	3.1	19
	02-Aug-89	5.7	5.6		0.33	5.8	37
	06-Sep-89	5.7	5.5		0.19	10	38
	05-Oct-89	13	4.6	LT	0.25	7.0	71
	02-Nov-89	8.1	8.6		0.21	6.2	56
	05-Dec-89	8.8	0.51		0.037	3.0	8.8
	04-Jan-90	2.3	2.0		0.078	1.8	14
EW-9							
	21-Nov-89	ND	ND		ND	ND	ND
	05-Dec-89	4.5	6.7		0.35	5.7	27
	04-Jan-90	3.0	3.5		0.17	2.9	17
EW-10							
	07-Sep-89	8.1	7.4		0.80	9.2	42
	05-Oct-89	6.1	4.6		0.20	7.0	19
	02-Nov-89	1.7	1.2		0.048	3.3	14
EW-11							
	07-Sep-89	7.7	8.0		0.52	5.3	25
EW-12							
	01-May-89	1.8	0.66		0.048	0.62	3.6
	05-Jun-89	25	20		0.8	11	71
	05-Jul-89	5.2	5.6		0.38	3.4	25
	02-Aug-89	4.5	5.4		0.39	3.3	25
	07-Sep-89	2.2	1.8		0.059	2.2	9.9
	05-Oct-89	4.4	5.5	LT	0.10	2.0	21
	05-Dec-89	3.2	4.7		0.20	2.3	17
	04-Jan-90	1.8	2.4		0.10	1.7	9.1
EW-13							
	19-Apr-89	0.068	0.0064		ND	0.20	0.79
	07-Sep-89	3.3	3.2		1.8	0.026	15
EW-14							
	05-Jul-89	1.8	1.7		0.08	1.1	8.7
	07-Sep-89	4.1	3.5		0.20	3.7	16
	05-Oct-89	4.3	5.2	LT	0.10	0.74	24
EW-15							
	19-Apr-89 #	13080	61000		16000	140000	660000
	05-Jul-89	2.0	2.8		0.26	2.9	19
	02-Aug-89	1.7	3.4		0.68	2.5	15
	07-Sep-89	8.4	7.6		0.20	6.3	37

Table 7. Results of Organic Chemical Analyses of Ground-water Samples from Monitoring and System 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 *		0.25/0.05**
	05-Oct-89	2.6	1.7	LT 0.10	0.62	12
	02-Nov-89	ND	0.0014	ND	0.0029	0.16
	05-Dec-89	3.1	4.1	0.32	3.0	19
	04-Jan-90	0.72	0.69	0.026	0.43	3.5
EW-16						
	04-Apr-89 a	2.8/3.3	2.0/2.6	0.10/0.14	0.99/1.2	8.9/8.8
	19-Apr-89	0.002	0.0027	ND	0.0021	0.57
	01-May-89	5.0	4.6	0.34	2.5	12
	05-Jun-89	2.5	2.6	ND	1.8	9.5
	05-Jul-89	2.8	3.6	0.28	1.8	16
	02-Aug-89	1.1	1.2	0.86	1.2	6.6
	07-Sep-89	2.6	2.7	0.21	1.9	11
	05-Oct-89	3.6	2.9	0.15	2.4	16
	02-Nov-89	1.8	1.7	0.82	0.33	11
EW-19						
	01-May-89	1.4	1.2	0.068	0.77	3.4
	05-Jun-89	0.9	0.6	ND	0.6	2.9
	05-Jul-89 a	2.2/1.4	0.62/0.71	0.041/0.043	0.72/0.8	4.8/5.3
	02-Aug-89	1.7	1.1	0.039	0.95	7.4
	07-Sep-89	2.5	2.1	0.15	1.5	9.1
	05-Oct-89	5.1	3.7	0.048	3.0	13
	02-Nov-89	0.35	0.29	0.028	0.31	3.2
	05-Dec-89	1.2	0.84	0.092	0.92	5.3
	04-Jan-90	1.0	1.5	0.082	0.9	5.3
EW-21						
	05-Jun-89	ND	ND	ND	0.3	3.2
	05-Jul-89	0.0026	0.015	0.017	0.095	1.1
	02-Aug-89	0.0027	0.012	0.0054	0.031	0.48
	07-Sep-89	0.0060	0.0095	0.0020	0.0026	0.34
	05-Oct-89	0.0009	0.0098	0.0012	0.0093	0.50
	02-Nov-89	0.002	0.028	0.0068	0.14	0.88
	05-Dec-89	0.0034	0.064	0.019	0.14	0.97
	04-Jan-90	0.004	0.10	0.041	0.35	1.8
EW-22						
	21-Nov-89	0.056	0.015	LT 0.005	0.12	6.1
	04-Jan-90	1.3	11.0	0.83	8.4	36.0
BLANK						
	05-Apr-89	0.5	ND	ND	ND	ND
	01-May-89	ND	ND	ND	ND	ND
	06-Jun-89	ND	ND	ND	ND	ND
	06-Jul-89	ND	ND	ND	ND	ND
	01-Aug-89	ND	ND	ND	ND	ND
	02-Aug-89	ND	ND	ND	ND	ND

Table 7. Results of Organic Chemical Analyses of Ground-water Samples from Monitoring and System 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 *		0.25/0.05**
	03-Aug-89	ND	ND	ND	ND	ND
	06-Sep-89	ND	ND	ND	ND	ND
	07-Sep-89	ND	ND	ND	ND	ND
	04-Oct-89	ND	ND	ND	ND	ND
	02-Nov-89	ND	ND	ND	ND	ND
	05-Dec-89	ND	ND	ND	ND	ND
	03-Jan-90	ND	0.0006	ND	0.0017	ND

NOTES:

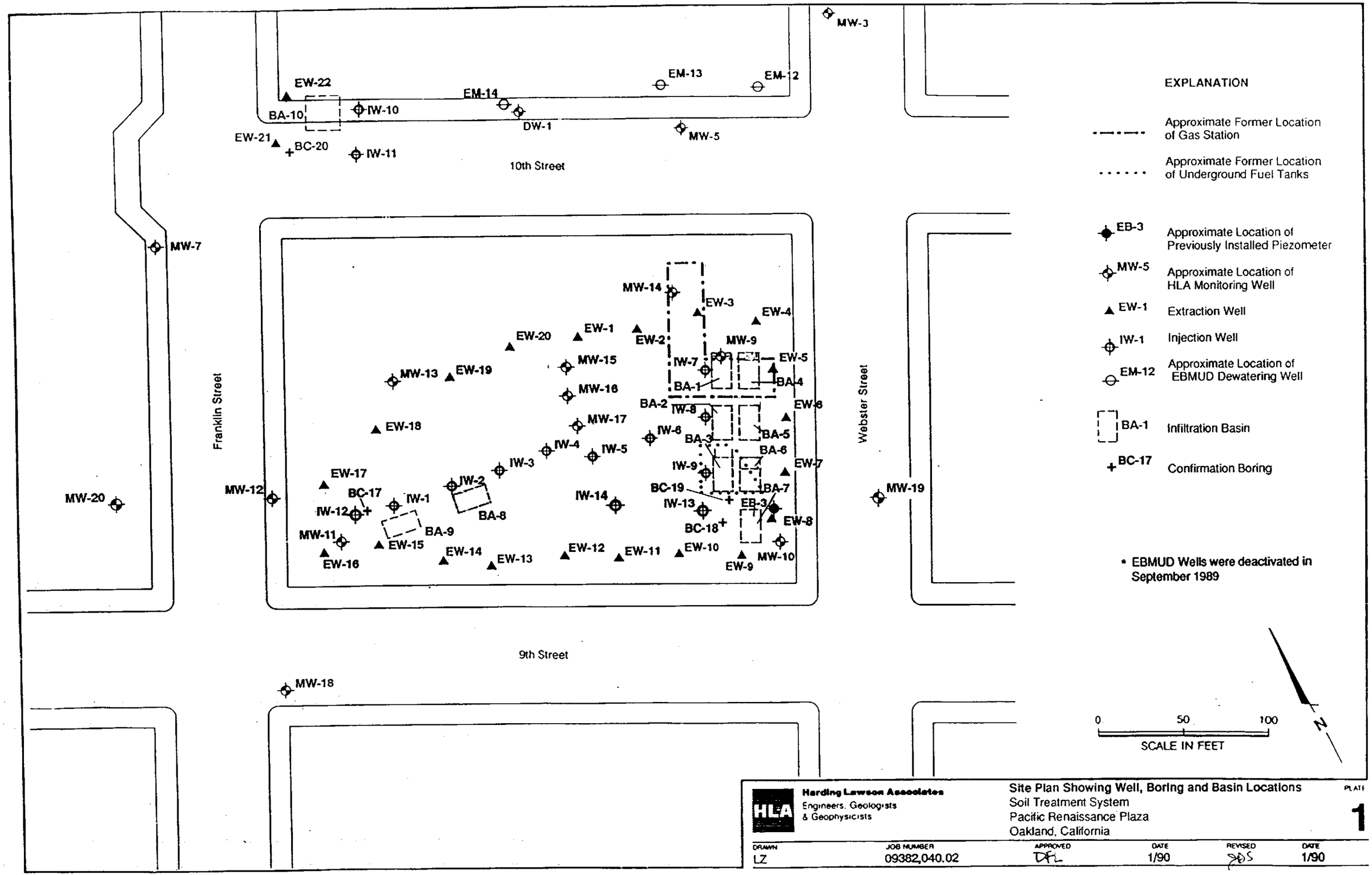
LOD: Limit of Detection.
ND: Not detected at or above LOD.
NT: Not tested.
*: LOD Changed to 0.0002 on 01-May-89
**: LOD Changed to 0.05 on 01-May-89
@: Two values indicate results of duplicate analyses.
LT: Less than the concentration indicated.
#: Free product observed in well.
Organic constituents reported in milligrams per liter.
Analyses performed by PACE Laboratories, Inc.

Table 8. Results of Organic Chemical Analyses of Soil Samples from Confirmation Borings and New Monitoring Wells

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

LOCATION		DEPTH (ft)	OVA HEADSPACE	BENZENE	TOLUENE	ETHYL BENZENE	XYLENES, TOTAL	TPH as GASOLINE
LOD		(mg/kg)		0.005	0.005	0.005	0.005	1.0
CONFIRMATION BORINGS								
BC-17	*	23-23.5	800	NT	NT	NT	NT	NT
12/11/89	*	24-24.5	>1000	NT	NT	NT	NT	NT
		24.5-25	>1000	5.6	21	20	51	1200
	*	26-26.5	>1000	NT	NT	NT	NT	NT
	*	27.5-28	>1000	NT	NT	NT	NT	NT
		Composite (23-28 feet)		37	230	83	360	2700
BC-18	*	23-23.5	80	NT	NT	NT	NT	NT
12/11/89	*	24-24.5	>1000	NT	NT	NT	NT	NT
		24.5-25	>1000	11	260	LT 1.3	310	4500
	*	26-26.5	>1000	NT	NT	NT	NT	NT
	*	27.5-28	110	NT	NT	NT	NT	NT
		Composite (23-28 feet)		LT 0.63	5.0	3.9	25	290
BC-19	*	23-23.5	21	NT	NT	NT	NT	NT
12/11/89	*	24-24.5	>1000	NT	NT	NT	NT	NT
		24.5-25	>1000	10	11	LT 1.3	13	310
	*	26-26.5	>1000	NT	NT	NT	NT	NT
	*	27.5-28	380	NT	NT	NT	NT	NT
		Composite (23-28 feet)		1.4	29	15	100	680
BC-20	*	23-23.5	0	NT	NT	NT	NT	NT
12/12/89	*	24-24.5	0	NT	NT	NT	NT	NT
		25.5-26	75	ND	0.022	ND	0.008	8.4
	*	26-26.5	0	NT	NT	NT	NT	NT
	*	27.5-28	0	NT	NT	NT	NT	NT
		Composite (23-28 feet)		1.4	4.4	18	22	710
NEW MONITORING WELLS								
MW-19		20-20.5	220	ND	ND	ND	0.007	ND
13-Dec-89		25-25.5	>1000	0.10	0.49	0.43	2.3	28
		30-30.5	200	ND	ND	ND	ND	ND
MW-20		21-21.5	0	0.010	0.041	0.006	0.036	ND
12-Dec-89		26-26.5	12	ND	0.007	ND	0.006	3.1

NOTES - LOD: Limit of Detection unless otherwise noted
ND: Not detected at or above limit of detection (LOD)
NT: Not tested; *: Sample used in composite sample
LT: Not detected at or above concentration shown
Organic constituents reported in milligrams per kilogram (mg/kg)
Analyses performed by PACE Laboratories.



Harding Lawson Associates
Engineers, Geologists & Geophysicists

Site Plan Showing Well, Boring and Basin Locations
Soil Treatment System
Pacific Renaissance Plaza
Oakland, California

PLATE **1**

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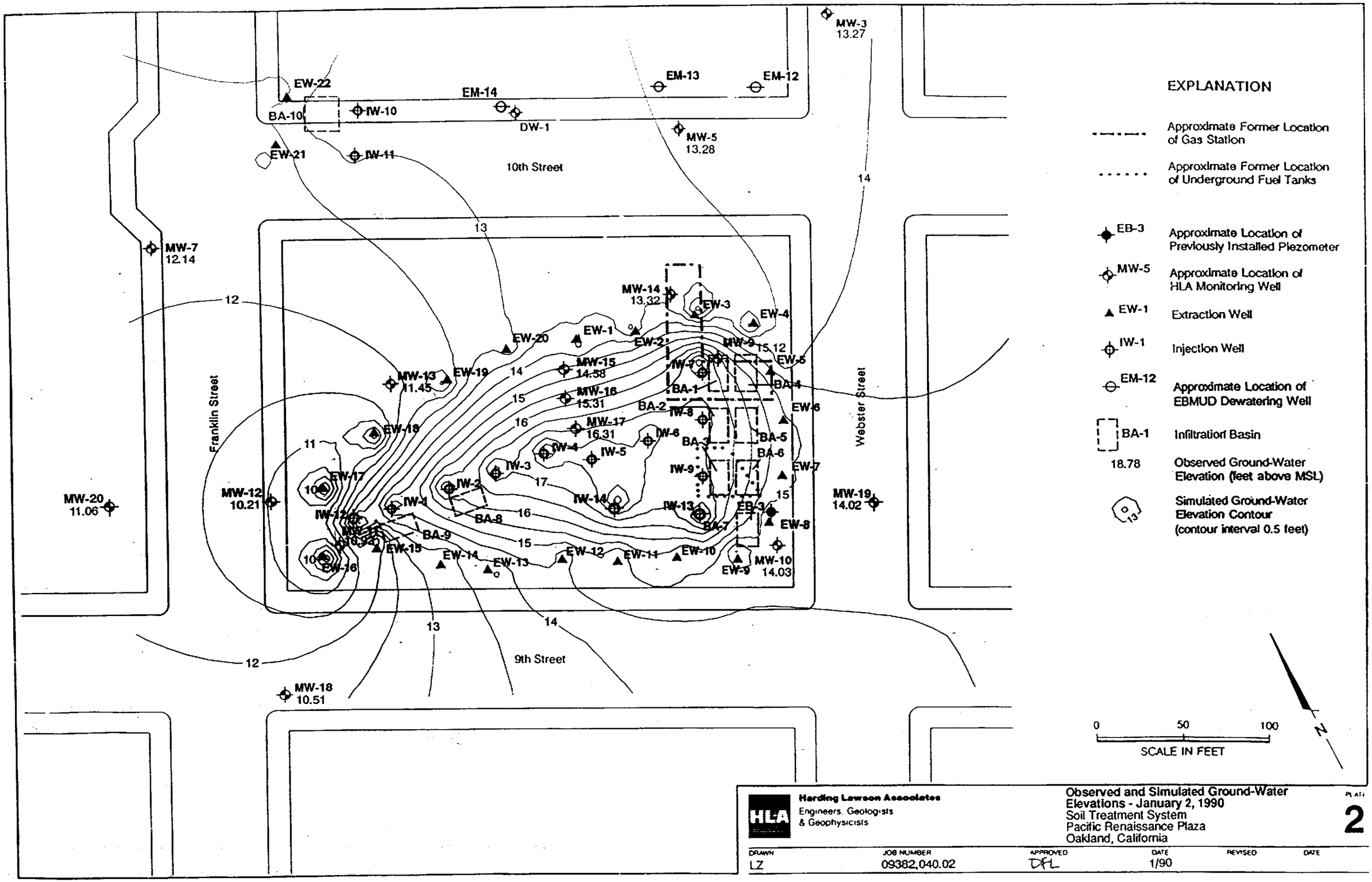


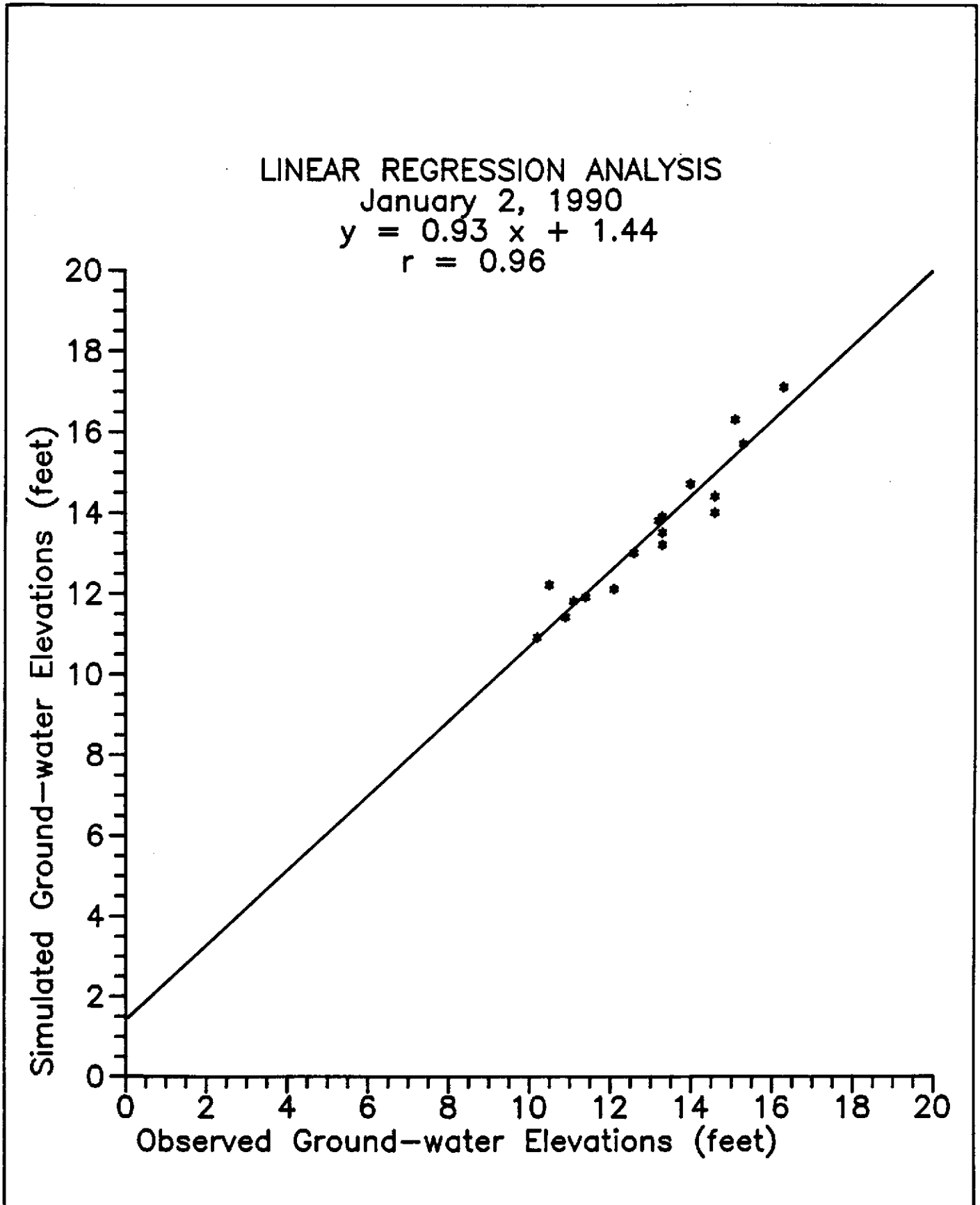
Harding Lawson Associates
Engineers, Geologists & Geophysicists

Observed and Simulated Ground-Water Elevations - January 2, 1990
Soil Treatment System
Pacific Renaissance Plaza
Oakland, California

PLATE 2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
LZ	09382,040.02	DFL	1/90		

16731



Harding Lawson Associates
Engineering and
Environmental Services

Linear Regression of Observed Versus Simulated Ground-Water Elevations-January 2, 1990
Soil Treatment System
Pacific Renaissance Plaza
Oakland, California

PLATE **3**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
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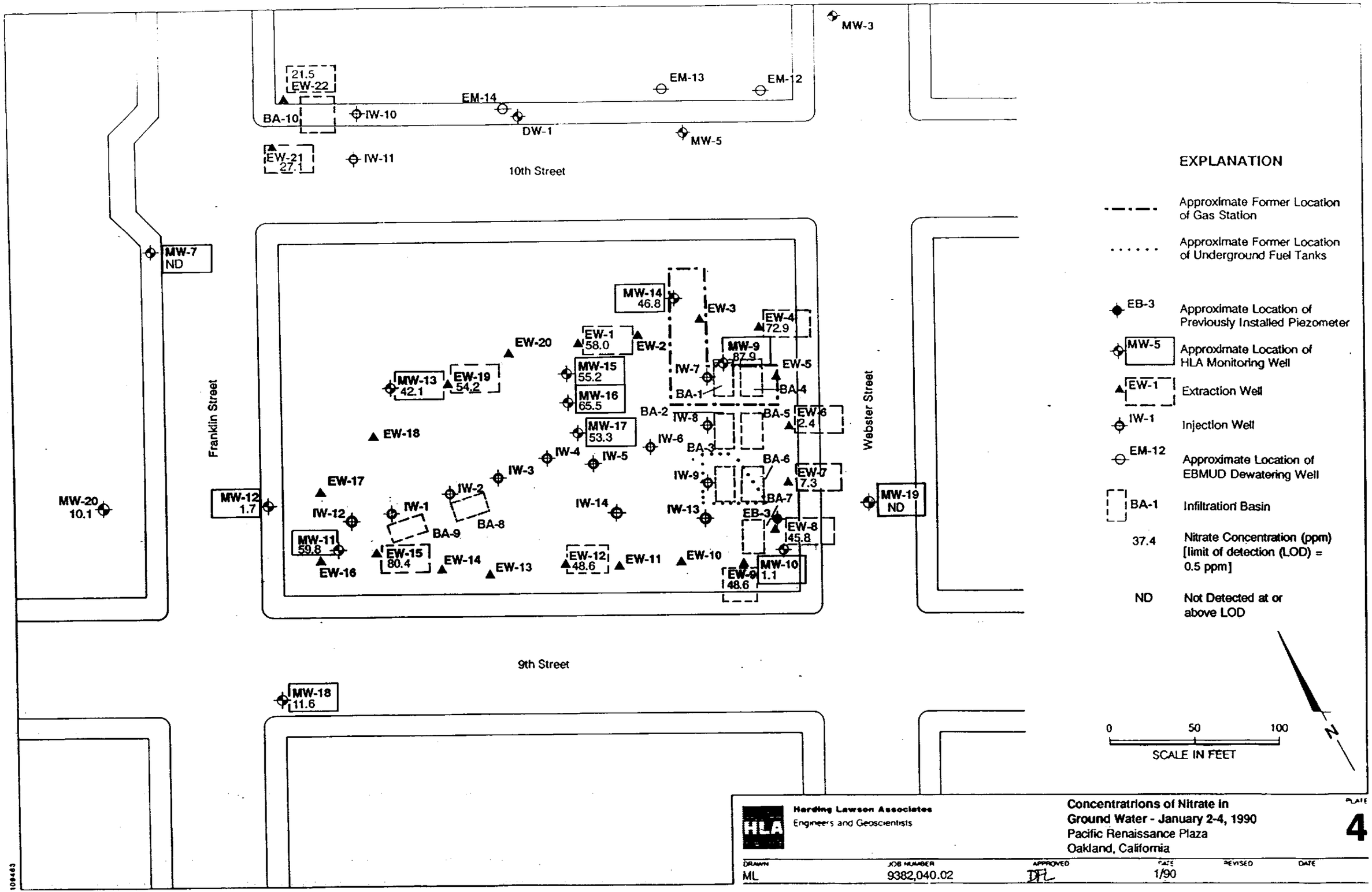


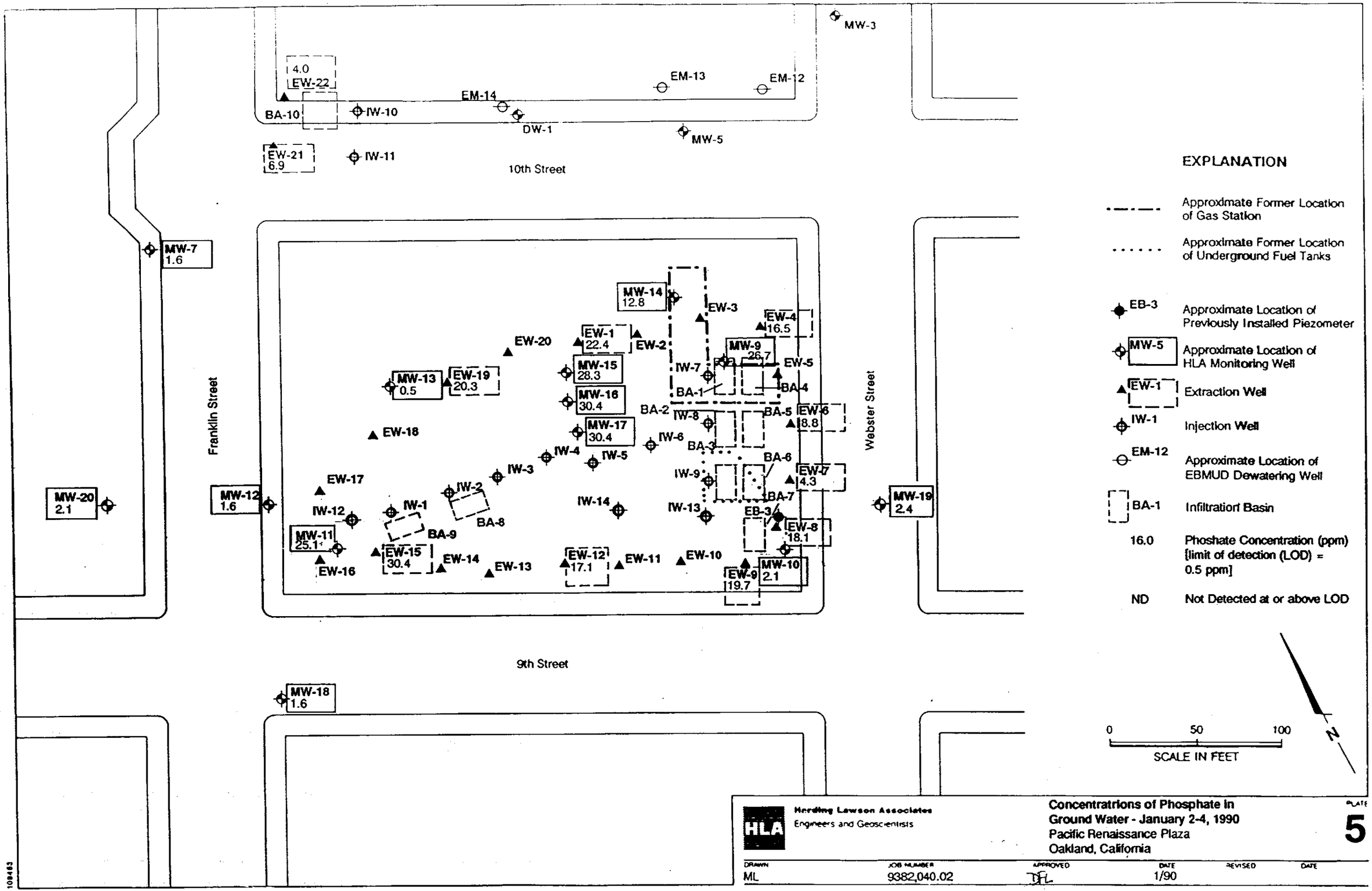
Harding Lawson Associates
Engineers and Geoscientists

Concentrations of Nitrate in Ground Water - January 2-4, 1990
Pacific Renaissance Plaza
Oakland, California

PLATE **4**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
ML	9382,040.02	DFL	1/90		

109463



Herding Lawson Associates
Engineers and Geoscientists

Concentratrions of Phosphate in Ground Water - January 2-4, 1990
Pacific Renaissance Plaza
Oakland, California

PLATE **5**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
ML	9382,040.02	DFL	1/90		

108463

MW-3

36.0
EW-22

BA-10

IW-10

EM-14

EM-13

EM-12

DW-1

MW-5

EW-21
1.8

IW-11

10th Street

MW-7
0.18

Franklin Street

MW-14
0.63

EW-3

EW-4
1.4/1.7

EW-20

EW-1
13.0

EW-2

MW-9
2.2

EW-5

MW-13
3.7

EW-19
5.3

MW-15
2.6

IW-7

BA-4

BA-1

MW-16
1.9

BA-2

IW-8

BA-5

EW-6
160

EW-18

MW-17
0.25

IW-6

BA-3

IW-4

IW-5

BA-6

IW-3

IW-9

EW-7
59

EW-17

IW-2

MW-20
ND

MW-12
0.09

IW-12

IW-1

BA-7

IW-14

IW-13

MW-19
13

EB-3

BA-8

BA-9

MW-11
2.7

EW-8
14

EW-15
3.5

EW-14

EW-13

EW-12
9.1

EW-11

EW-10

EW-16

EW-9
17

MW-10
70

9th Street

MW-18
0.10

EXPLANATION

- Approximate Former Location of Gas Station
- Approximate Former Location of Underground Fuel Tanks
- EB-3 — Approximate Location of Previously Installed Piezometer
- MW-5 — Approximate Location of HLA Monitoring Well
- EW-1 — Extraction Well
- IW-1 — Injection Well
- EM-12 — Approximate Location of EBMUD Dewatering Well
- 12 — Petroleum Hydrocarbon Concentration (mg/l) as Gasoline [limit of detection (LOD) = 0.05 mg/l] Two Values Indicate Duplicate Samples
- ND — Not Detected at or above LOD
- BA-1 — Infiltration Basin

0 50 100
SCALE IN FEET

N

Harding Lawson Associates
Engineers and Geoscientists

Concentrations of Petroleum Hydrocarbons in Ground Water - January 2-4, 1990
Pacific Renaissance Plaza
Oakland, California

PLATE **6**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
ML	9382,040.02	DHL	1/90		

109463

Appendix A

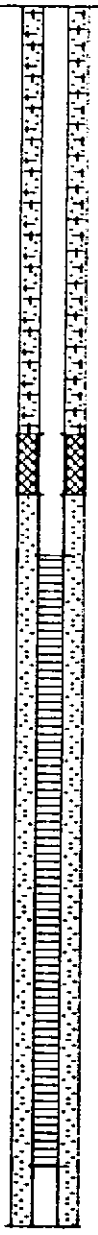
BORING LOGS AND WELL COMPLETION DETAILS

Top of PVC Casing
Elevation 36.62 ft

GROUND SURFACE

Equipment CME-63 HSA

Elevation 37.15 ft Date 12/13/89



Blows/foot	OVA Reading (ppm)	Depth (ft)	Sample	
		0		4" ASPHALT CONCRETE GRAVEL SUB-BASE (fill) DARK BROWN SAND (SP) loose, moist, very fine to fine grained sands, trace clay
14	0	5		
45	4	10		color change to yellow-brown YELLOW-BROWN CLAYEY SAND (SC) medium dense, moist, 60-70% very fine grained sands, 30-40% clay, trace odor
27	20	15		
57	220	20		YELLOW-BROWN SILTY SAND (SM) loose to medium dense, moist, 80-90% fine grained sand, 10-20% silt, trace clay
56	>1000	25		becoming discolored - light blue-green, with hydrocarbon odors becoming wet
				▽ water level on 12/13/89 saturated
86	200	30		
85	15	35		
	0	40		LIGHT BROWN SANDY CLAY (CL) stiff, wet, 70-80% clay, 20-30% very fine to fine grained sand bottom of boring at 41.0 ft
		45		
		50		

10 IN. DIA. BOREHOLE
0 to 41 ft

4 IN. DIA. SCHEDULE 40 PVC BLANK CASING
0.5 to 18 ft

BENTONITE-CEMENT SEAL
0.5 to 14 ft

BENTONITE PELLET SEAL
14 to 16 ft

LONESTAR #3 SAND PACK
16 to 40 ft

4 IN. DIA. SLOTTED SCREEN (.020" slot size)
18 to 38 ft

4 IN. DIA. SCHEDULE 40 PVC BLANK SILT TRAP
38 to 40 ft
BOTTOM WELL CAP at 40 ft
HOLE CLEANED OUT to 40 ft

TOP OF CASING AT 0.5 ft below ground level

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion Detail MW-19
Pacific Renaissance Plaza
Oakland, California

PLATE **A-1**

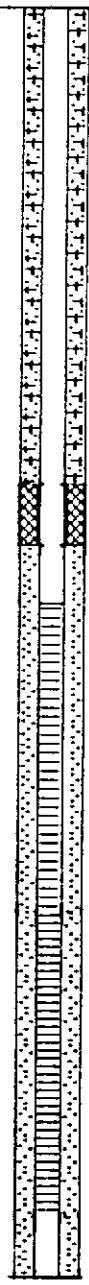
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	9382,040.02	JDS	1/90	

Top of PVC Casing Elevation 37.86 ft

GROUND SURFACE

Equipment CME-63 HSA

Elevation 38.32 ft Date 12/12/89



Blows/foot	OVA Reading (ppm)	Depth (ft)	Sample
9	0	5	
57	0	10	
30	0	15	
73	0	20	
69	12	25	
98	0	30	
91	0	35	
99		40	
		45	
		50	

4" ASPHALT
DARK BROWN SAND (SP) loose, moist, very fine to fine grained sands, trace gravels

YELLOW-BROWN CLAYEY SAND (SC) medium dense, moist, 60-70% very fine to fine grained sands, 30-40% clay, no hydrocarbon odor

YELLOW-BROWN SAND (SP) loose to medium dense, moist, very fine to fine grained sand, trace fines

becoming wet

becoming saturated

▽ water level on 12/12/89

LIGHT BROWN SILTY SAND (SM) loose to medium dense, saturated, 80-90% fine grained sands, 10-20% silts

LIGHT BROWN TO DARK BROWN SANDY CLAY (CL) medium stiff to stiff, wet, 70-80% clay, 20-30% fine to medium grained sands, trace gravels
bottom of boring at 43.0 ft

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Engineering and Environmental Services

Log of Boring and Well Completion Detail MW-20

Pacific Renaissance Plaza
Oakland, California

PLATE **A-2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
	9382,040.02	gps	1/90	

Appendix B

LABORATORY ANALYTICAL RESULTS FOR GROUND-WATER SAMPLES

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REPORT OF LABORATORY ANALYSIS

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Coralville, Iowa
Novato, California
Leawood, Kansas
Irvine, California
Asheboro, North Carolina

Harding Lawson Associates
200 Rush Landing Road
Novato, CA 94945

January 17, 1990
PACE Project
Number: 400102504

Attn: Mr. David Leland

PRP Oakland

			MW-14	MW-9	MW-15
PACE Sample Number:			700300	700310	700320
Date Collected:			01/02/90	01/02/90	01/02/90
Date Received:			01/02/90	01/02/90	01/02/90
Parameter	Units	MDL	90010201	90010202	90010203
ORGANIC ANALYSIS					
PURGEABLE FUELS AND AROMATICS					
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	-	-
Total Purgeable Fuels, as Gasoline	mg/L	0.05	0.63	2.2	2.6
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	-	-
Benzene	mg/L	0.0002	0.080	0.011	0.37
Ethylbenzene	mg/L	0.0002	ND	0.0060	0.053
Toluene	mg/L	0.0002	0.0017	0.041	0.65
Xylenes, Total	mg/L	0.0002	0.091	0.22	0.35

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

pace laboratories, inc.

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Leawood, Kansas
Irvine, California
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Mr. David Leland
Page 2

January 17, 1990
PACE Project
Number: 400102504

PRP Oakland

Parameter	Units	MDL	MW-16	MW-17	MW-13
PACE Sample Number:			700330	700340	700350
Date Collected:			01/02/90	01/02/90	01/02/90
Date Received:			01/02/90	01/02/90	01/02/90
ORGANIC ANALYSIS					
PURGEABLE FUELS AND AROMATICS					
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	-	-
Total Purgeable Fuels, as Gasoline	mg/L	0.05	1.9	0.25	3.7
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	-	-
Benzene	mg/L	0.0002	0.25	0.056	0.92
Ethylbenzene	mg/L	0.0002	0.037	0.0010	0.20
Toluene	mg/L	0.0002	0.39	0.0030	0.13
Xylenes, Total	mg/L	0.0002	0.36	0.022	0.38

MDL Method Detection Limit

The data contained in this report were obtained using EPA or other approved methodologies. All analyses were performed by me or under my direct supervision.

Douglas E. Oram, Ph.D.
Organic Chemistry Manager

Harding Lawson Associates
200 Rush Landing Road
P.O. Box 6107
Novato, California 94948
415/892-0821
Telecopy: 415/892-1586

CHAIN OF CUSTODY FORM

Lab: Pace

Samplers: G M Carter
C A Lieberman

Job Number: 9382 039 07

Name/Location: PRP Oakland

Project Manager: D Leland

Recorder: [signature]
(Signature Required)

SOURCE CODE	MATRIX: Water	MATRIX: Sediment	MATRIX: Soil	MATRIX: Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	HCL	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES
23	X							5	90	01	0201	90	01	02	1340	MW-14
23	X							5	90	01	0202	90	01	02	1415	9
23	X							5	90	01	0203	90	01	02	1450	15
23	X							5	90	01	0204	90	01	02	1530	16
23	Y							5	90	01	0205	90	01	02	1605	17
23	Y							5	90	01	0206	90	01	02	1640	13

ANALYSIS REQUESTED

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pltnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	EPA 8015
	X						X
	Y						X
	Y						Y
	Y						X
	X						Y
	Y						Y

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

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME

DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
[signature]	1/2/90 1730	[signature]	1/2/90 1730

METHOD OF SHIPMENT: In cooler w/ ice PACE Labs.

Laboratory Copy Project Office Copy. Field or Office Copy

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Leawood, Kansas
Irvine, California
Asheville, North Carolina
Charlotte, North Carolina

January 23, 1990

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

RE: PACE Project No. 400103.502
PRP Oakland

Dear Mr. Leland:

Enclosed is the report of laboratory analyses for samples received January 03, 1990.

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

Sincerely,

Stephen Nackord

Stephen F. Nackord
Director, Sampling and Analytical Services

Enclosures

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REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
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Leawood, Kansas
Irvine, California
Asheboro, North Carolina

90 9: 57

January 05, 1990

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

RE: PACE Project No. 491215.506
PRP - Oakland

Dear Mr. Leland:

Enclosed is the report of laboratory analyses for samples received December 15, 1989.

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

Sincerely,

Stephen Nackord

Stephen F. Nackord
Director, Sampling and Analytical Services

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REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
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Irvine, California
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90 9 : 57

January 05, 1990

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

RE: PACE Project No. 491215.506
PRP - Oakland

Dear Mr. Leland:

Enclosed is the report of laboratory analyses for samples received December 15, 1989.

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

Sincerely,

Stephen Nackord

Stephen F. Nackord
Director, Sampling and Analytical Services

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REPORT OF LABORATORY ANALYSIS

Offices:
Minneapolis, Minnesota
Tampa, Florida
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Harding Lawson Associates
200 Rush Landing Road
Novato, CA 94945

January 05, 1990
PACE Project
Number: 491215506

Attn: Mr. David Leland

PRP - Oakland

Parameter	Units	MDL	MW-19 # 89500001	MW-20 # 89500002
PACE Sample Number:			806320	806330
Date Collected:			12/15/89	12/15/89
Date Received:			12/15/89	12/15/89
ORGANIC ANALYSIS				
HALOGENATED VOLATILE COMPOUNDS EPA 8010				
Dichlorodifluoromethane	ug/L	2.0	ND	ND
Chloromethane	ug/L	2.0	ND	ND
Vinyl Chloride	ug/L	2.0	ND	ND
Bromomethane	ug/L	2.0	ND	ND
Chloroethane	ug/L	2.0	ND	ND
Trichlorofluoromethane (Freon 11)	ug/L	2.0	ND	ND
1,1-Dichloroethene	ug/L	0.5	3.8	ND
Methylene Chloride	ug/L	0.5	0.6	ND
trans-1,2-Dichloroethene	ug/L	0.5	ND	ND
1,1-Dichloroethane	ug/L	0.5	0.8	ND
Chloroform	ug/L	0.5	1.2	19
1,1,1-Trichloroethane (TCA)	ug/L	0.5	ND	ND
Carbon Tetrachloride	ug/L	0.5	ND	ND
1,2-Dichloroethane (EDC)	ug/L	0.5	36	1.3
Trichloroethene (TCE)	ug/L	0.5	46	ND
1,2-Dichloropropane	ug/L	0.5	ND	ND
Bromodichloromethane	ug/L	0.5	ND	ND
2-Chloroethylvinyl ether	ug/L	0.5	ND	ND
trans-1,3-Dichloropropene	ug/L	0.5	ND	ND
cis-1,3-Dichloropropene	ug/L	0.5	ND	ND
1,1,2-Trichloroethane	ug/L	0.5	ND	ND
Tetrachloroethene	ug/L	0.5	ND	ND
Dibromochloromethane	ug/L	0.5	ND	ND
Chlorobenzene	ug/L	0.5	ND	ND
Bromoform	ug/L	0.5	ND	ND
1,1,2,2-Tetrachloroethane	ug/L	0.5	ND	ND

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

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REPORT OF LABORATORY ANALYSIS

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January 05, 1990
PACE Project
Number: 491215506

PRP - Oakland

			MW-19	MW-20
PACE Sample Number:			806320	806330
Date Collected:			12/15/89	12/15/89
Date Received:			12/15/89	12/15/89
Parameter	Units	MDL	# 89500001	# 89500002
ORGANIC ANALYSIS				
HALOGENATED VOLATILE COMPOUNDS EPA 8010				
1,3-Dichlorobenzene	ug/L	0.5	ND	ND
1,4-Dichlorobenzene	ug/L	0.5	ND	ND
1,2-Dichlorobenzene	ug/L	0.5	ND	ND
Bromochloromethane (Surrogate Recovery)			92%	110%
1,4-Dichlorobutane (Surrogate Recovery)			101%	108%
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	-
Total Purgeable Fuels, as Gasoline	mg/L	0.05	12	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	-
Benzene	mg/L	0.0002	5.0	ND
Ethylbenzene	mg/L	0.0002	0.078	ND
Toluene	mg/L	0.0002	0.30	ND
Xylenes, Total	mg/L	0.0002	0.61	ND

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

The data contained in this report were obtained using EPA or other approved methodologies. All analyses were performed by me or under my direct supervision.

Steve Mackerd for

Douglas E. Oram, Ph.D.
Organic Chemistry Manager

Harding Lawson Associates
200 Rush Landing Road
P.O. Box 6107
Novato, California 94948
415/892-0821
Telecopy: 415/892-1586

CHAIN OF CUSTODY FORM

Lab: PACE 491215.506

Samplers: Robert L. Nelson

Job Number: 9382,039.02

Name/Location: PRP- Oakland

Project Manager: D. Ikard

Recorder: Robert L Nelson (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	HCl	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pllnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.	EPA 8010	EPA 8015 for - TPH as Gasoline	EPA 602 for BTXE
23	X							5	89	50	0001	89	12	15	1155	80632								X	X	X
23	X							5	89	50	0002	89	12	15	1425	80633								X	X	X

ANALYSIS REQUESTED

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
						9/3
						ST.D. TAT.

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) Robert L. Nelson	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) DATE/TIME	RECEIVED FOR LAB BY: (Signature) C Sontag	DATE/TIME 12/15/16:10
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January 23, 1990

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

RE: PACE Project No. 400104.501
PRP Oakland

Dear Mr. Leland:

Enclosed is the report of laboratory analyses for samples received January 04, 1990.

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

Sincerely,

Stephen Nackord

Stephen F. Nackord
Director, Sampling and Analytical Services

Enclosures

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REPORT OF LABORATORY ANALYSIS

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Charlotte, North Carolina

Harding Lawson Associates
200 Rush Landing Road
Novato, CA 94945

January 23, 1990
PACE Project
Number: 400104501

Attn: Mr. David Leland

PRP Oakland

Parameter	Units	MDL	EW-4	EW-4 Duplicate	EW-6
PACE Sample Number:			700620	700630	700640
Date Collected:			01/04/90	01/04/90	01/04/90
Date Received:			01/04/90	01/04/90	01/04/90
			90010401	90010402	90010403
ORGANIC ANALYSIS					
PURGEABLE FUELS AND AROMATICS					
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	-	-
Total Purgeable Fuels, as Gasoline	mg/L	0.05	1.4	1.7	160
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	-	-
Benzene	mg/L	0.0002	0.17	0.2	25
Ethylbenzene	mg/L	0.0002	0.0085	0.0027	2.0
Toluene	mg/L	0.0002	0.027	0.0085	34
Xylenes, Total	mg/L	0.0002	0.19	0.21	16

MDL Method Detection Limit

pace laboratories, inc.

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REPORT OF LABORATORY ANALYSIS

January 23, 1990
PACE Project
Number: 400104501

PRP Oakland

			EW-7	EW-8	EW-9
PACE Sample Number:			700650	700660	700670
Date Collected:			01/04/90	01/04/90	01/04/90
Date Received:			01/04/90	01/04/90	01/04/90
Parameter	Units	MDL	90010404	90010405	90010406
ORGANIC ANALYSIS					
PURGEABLE FUELS AND AROMATICS					
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	-	-
Total Purgeable Fuels, as Gasoline	mg/L	0.05	59	14	17
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	-	-
Benzene	mg/L	0.0002	11	2.3	3.0
Ethylbenzene	mg/L	0.0002	0.36	0.078	0.17
Toluene	mg/L	0.0002	11	2.0	3.5
Xylenes, Total	mg/L	0.0002	7.0	1.8	2.9

MDL Method Detection Limit

pace laboratories, inc.

REPORT OF LABORATORY ANALYSIS

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Charlotte, North Carolina

January 23, 1990
PACE Project
Number: 400104501

PRP Oakland

PACE Sample Number:			EW-12 700680	EW-15 700690	EW-19 700700
Date Collected:			01/04/90	01/04/90	01/04/90
Date Received:			01/04/90	01/04/90	01/04/90
Parameter	Units	MDL	90010407	90010408	90010409
ORGANIC ANALYSIS					
PURGEABLE FUELS AND AROMATICS					
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	-	-
Total Purgeable Fuels, as Gasoline	mg/L	0.05	9.1	3.5	5.3
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	-	-
Benzene	mg/L	0.0002	1.8	0.72	1.0
Ethylbenzene	mg/L	0.0002	0.10	0.026	0.082
Toluene	mg/L	0.0002	2.4	0.69	1.5
Xylenes, Total	mg/L	0.0002	1.7	0.43	0.9

MDL Method Detection Limit

pace laboratories, inc.

Offices:
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Coralville, Iowa
Novato, California
Leawood, Kansas
Irvine, California
Asheville, North Carolina
Charlotte, North Carolina

REPORT OF LABORATORY ANALYSIS

Mr. David Leland
Page 4

January 23, 1990
PACE Project
Number: 400104501

PRP Oakland

			EW-21	EW-22	EW-1
PACE Sample Number:			700710	700720	700730
Date Collected:			01/04/90	01/04/90	01/04/90
Date Received:			01/04/90	01/04/90	01/04/90
Parameter	Units	MDL	90010410	90010411	90010412
ORGANIC ANALYSIS					
PURGEABLE FUELS AND AROMATICS					
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	-	-
Total Purgeable Fuels, as Gasoline	mg/L	0.05	1.8	36.0	13.0
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	-	-
Benzene	mg/L	0.0002	0.004	1.3	1.7
Ethylbenzene	mg/L	0.0002	0.041	0.83	0.25
Toluene	mg/L	0.0002	0.10	11.0	3.2
Xylenes, Total	mg/L	0.0002	0.35	8.4	1.7

MDL Method Detection Limit

The data contained in this report were obtained using EPA or other approved methodologies. All analyses were performed by me or under my direct supervision.

Douglas E. Oram, Ph.D.
Organic Chemistry Manager

Harding Lawson Associates
200 Rush Landing Road
P.O. Box 6107
Novato, California 94948
415/892-0821
Telecopy: 415/892-1586

CHAIN OF CUSTODY FORM

Lab: Pace

Job Number: 9382 039 02
Name/Location: PRP Oakland
Project Manager: Oakland

Samplers: G M Carter
G A Lieberman

Recorder: [signature]
(Signature Required)

SOURCE CODE		MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	HCL	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES	EPA 601/8010	EPA 602/8020 (8015)	EPA 624/8240	EPA 625/8270	Priority Pllnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.
2	3	X							3	90	01	0401	90	01	04	0730	EW-4		X					
2	3	X							3	90	01	0402	90	01	04	0740	" " Dup		X					
2	3	X							3	90	01	0403	90	01	04	0750	6		X					
2	3	X							3	90	01	0404	90	01	04	0800	7		X					
2	3	X							3	90	01	0405	90	01	04	0820	8		X					
2	3	X							3	90	01	0406	90	01	04	0830	9		X					
2	3	X							3	90	01	0407	90	01	04	0850	12		X					
2	3	X							3	90	01	0408	90	01	04	0905	15		X					
2	3	X							3	90	01	0409	90	01	04	0925	19		X					
2	3	X							3	90	01	0410	90	01	04	0955	21		X					

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

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME

DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
[signature]	1/4/90 1200	[signature]	1/4/90 1200

METHOD OF SHIPMENT: In cooler w/ ice PACE Labs.

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Harding Lawson Associates
200 Rush Landing Road
P.O. Box 6107
Novato, California 94948
415/892-0821
Telecopy: 415/892-1586

CHAIN OF CUSTODY FORM

Lab: Pace

Samplers: G M Carter
C A Liebrman

Job Number: 9382 039 02

Name/Location: RRP Oakland

Project Manager: D. Leland

Recorder: (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	HCL		SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES	ANALYSIS REQUESTED: EPA 601/8010	EPA 602/8020 + 8015	EPA 624/8240	EPA 625/8270	Priority Pllnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.
23	X							3		900104111			900104	1070			EW-20 time 12:40 22		X					
23	X							3		900104123			900104	1035			" 1		X					

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

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	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) DATE/TIME: 1/9 1200	RECEIVED FOR LAB BY: (Signature)	DATE/TIME: 1/10/90 1200

METHOD OF SHIPMENT: In cooler w/ ice PACE Lab

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Appendix C

LABORATORY ANALYTICAL RESULTS FOR SOIL SAMPLES

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REPORT OF LABORATORY ANALYSIS

Offices:
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Irvine, California
Asheboro, North Carolina

JAN 90 9:20

January 10, 1990

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

RE: PACE Project No. 491211.503
Oakland PRP

Dear Mr. Leland:

Enclosed is the report of laboratory analyses for samples received December 11, 1989.

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

Sincerely,

Stephen Nackord

Stephen F. Nackord
Director, Sampling and Analytical Services

Enclosures

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REPORT OF LABORATORY ANALYSIS

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Tampa, Florida
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Leawood, Kansas
Irvine, California
Asheboro, North Carolina

Harding Lawson Associates
200 Rush Landing Road
Novato, CA 94945

January 10, 1990
PACE Project
Number: 491211503

Attn: Mr. David Leland

Oakland PRP

Parameter	Units	MDL	BC-18	BC-18	BC-19
PACE Sample Number:			803050	803060	803110
Date Collected:			12/11/89	12/11/89	12/11/89
Date Received:			12/11/89	12/11/89	12/11/89
			COMPOSITE 8949180-1+2+4+5		COMPOSITE 8949190-1+2+4+5
ORGANIC ANALYSIS		Depth	(23-28)	24.5-25	(23-28)
PURGEABLE FUELS AND AROMATICS					
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	-	-
Purgeable Fuels, as Gasoline (EPA 8015)	mg/kg wet	1.0	290	4500	680
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	-	-
Benzene	mg/kg wet	0.005	LT 0.63	11	1.4
Ethylbenzene	mg/kg wet	0.005	3.9	LT 1.3	15
Toluene	mg/kg wet	0.005	5.0	260	29
Xylenes, Total	mg/kg wet	0.005	25	310	100

MDL Method Detection Limit
LT Less than.

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REPORT OF LABORATORY ANALYSIS

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Asheboro, North Carolina

Mr. David Leland
Page 2

January 10, 1990
PACE Project Number: 491211503

Oakland PRP

			BC-19	BC-17	BC-17
PACE Sample Number:			803120	803170	803180
Date Collected:			12/11/89	12/11/89	12/11/89
Date Received:			12/11/89	12/11/89	12/11/89
				COMPOSITE 8949170-	
Parameter	Units	MDL	89491903	1+2+4+5	89491703
ORGANIC ANALYSIS	Depth		24.5-25	(23-28)	24.5-25
PURGEABLE FUELS AND AROMATICS					
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	-	-
Purgeable Fuels, as Gasoline (EPA 8015)	mg/kg wet	1.0	310	2700	1200
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	-	-
Benzene	mg/kg wet	0.005	10	37	5.6
Ethylbenzene	mg/kg wet	0.005	LT 1.3	83	20
Toluene	mg/kg wet	0.005	11	230	21
Xylenes, Total	mg/kg wet	0.005	13	360	51

MDL Method Detection Limit
LT Less than.

The data contained in this report were obtained using EPA or other approved methodologies. All analyses were performed by me or under my direct supervision.

Stephen Nachlas for

Douglas E. Oram, Ph.D.
Organic Chemistry Manager

Hardi[redacted]aws[redacted]ssoci[redacted]
200 Rush Landing Road
P.O. Box 6107
Novato, California 94948
415/892-0821
Telecopy: 415/892-1586

CHAIN OF CUSTODY FORM

Lab: Pace

Job Number: Oakland PRP
Name/Location: 9383,039,02
Project Manager: D. Leland

Samplers: G. A. Lieberman

Recorder: [signature]
(Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pllnt. Metals	Benzene/Toluene/Xylene + E	Total Petrol. Hydrocarb.
SC			X		X			89	49	1701	89	12	11	1320	23.0-23.5							
										1702				1327	SC 24.0-24.5							
										1704				1340	17 26.0-26.5	comp					X	X
										1705				1346	27.5-28.0							
										1703				1330	24.5-25.0						X	X

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
						Composite 1701 1702
						1704 1705
						[illegible]

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
[signature]	[signature]	12-11-1989
RELINQUISHED BY: (Signature) [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)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
		[signature]	12/11/89 18:15

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415/892-0821
Telecopy: 415/892-1586

CHAIN OF CUSTODY FORM

Lab: PACE

Job Number: ~~[illegible]~~ 9383,039.02

Name/Location: Oakland PRP

Project Manager: ~~[illegible]~~ D. Leland

Samplers: G. A. Lieberman

Recorder: [signature] (Signature Required)

SOURCE CODE	MATRIX (Water / Sediment / Soil / Oil)	#CONTAINERS & PRESERV. (Unpres. / H_2SO_4 / HNO_3)	SAMPLE NUMBER OR LAB NUMBER (Yr / Wk / Seq)	DATE (Yr / Mo / Dy / Time)	STATION DESCRIPTION/NOTES	ANALYSIS REQUESTED: EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pllnt. Metals	Benzene/Toluene/Xylene + E	Total Petrol. Hydrocarb.
S O	Soil X	Unpres. X	89 49 1801	89 12 11 0950	23.0-23.5							
S O	"	"	1802	" 0955	24.0-24.5	comp					X	X
"	"	"	1804	" 1005	BC-18 26.0-26.5							
"	"	"	1805	" ~~1005~~ 1011	27.5-28.0							
"	"	"	1803	" ~~[illegible]~~ 0957	24.5-25.0						X	X
"	"	"	1901	" 1129	23.0-23.5							
"	"	"	1902	" 1140	24.0-24.5							
"	"	"	1904	" 1148	BC-19 26.0-26.5	comp					X	X
"	"	"	1905	" ~~[illegible]~~ 1153	27.5-28.0							
"	"	"	1903	" ~~1133~~ 1143	23.0-23.5						X	X

LAB NUMBER (Yr / Wk / Seq)	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
				Composite 1801, 1802
				1804, 1805
				Composite 1901, 1902
				1904, 1905
				~~[illegible]~~
				2 wk turnaround

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
[signature]	Robert L. Nelson	12-11-89
Robert L. Nelson		

DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
		[signature]	12/11/89 15:15

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Asheboro, North Carolina

N 90 9: 28

January 08, 1990

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

RE: PACE Project No. 491213.504
Oakland PRP

Dear Mr. Leland:

Enclosed is the report of laboratory analyses for samples received December 13, 1989.

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

Sincerely,

Stephen F. Nackord
Director, Sampling and Analytical Services

Enclosures

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REPORT OF LABORATORY ANALYSIS

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Harding Lawson Associates
200 Rush Landing Road
Novato, CA 94945

January 08, 1990
PACE Project
Number: 491213504

Attn: Mr. David Leland

Oakland PRP

Parameter	Units	MDL	BC-20 805540 Composite 8949200-1+2+4+5 (23-28)	BC-20 805550 89492003 25.5-26
PACE Sample Number:				
Date Collected:			12/12/89	12/12/89
Date Received:			12/13/89	12/13/89
ORGANIC ANALYSIS	Depth			
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	-
Purgeable Fuels, as Gasoline (EPA 8015)	mg/kg wet	1.0	710	8.4
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	-
Benzene	mg/kg wet	0.005	1.4	ND
Ethylbenzene	mg/kg wet	0.005	18	ND
Toluene	mg/kg wet	0.005	4.4	0.022
Xylenes, Total	mg/kg wet	0.005	22	0.008

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

The data contained in this report were obtained using EPA or other approved methodologies. All analyses were performed by me or under my direct supervision.

Douglas E. Oram, Ph.D.
Organic Chemistry Manager

[redacted]ardi[redacted]wa[redacted]ocia[redacted]

200 Rush Landing Road
P.O. Box 6107
Novato, California 94948
415/892-0821
Telecopy: 415/892-1586

CHAIN OF CUSTODY FORM

Lab: Pace

Samplers: G.A. Liebman

Job Number: 9380.034.02

Name/Location: Oakland PAP

Project Manager: D. Leland

Recorder: [signature] (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pllnt. Metals	ANALYSIS REQUESTED: Benzene/Toluene/Xylene E	Total Petrol. Hydrocarb.
SC			X		1			89	49	2001	89	12	12	1515	BC-20 230-235							
"			"		1			"	"	2002	"	"	"	1556	24.5-25.0					X	X	
"			"		1			"	"	2004	"	"	"	1605	26.0-26.5							
"			"		1			"	"	2005	"	"	"	1613	27.5-28.0							
"			"		1			"	"	2003	"	"	"	1612	25.5-26.0					X	X	

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
						Composite 2001
						2003
						2004
						2005
						Standard
						Turnaround

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
[signature]	Robert A. McCann	12-13-[illegible]
RELINQUISHED BY: (Signature) [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) DATE/TIME	RECEIVED FOR LAB BY: (Signature) [signature]	DATE/TIME 12/14/89 17:30
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Asheboro, North Carolina

January 08, 1990

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

RE: PACE Project No. 491213.505
Oakland PRP

Dear Mr. Leland:

Enclosed is the report of laboratory analyses for samples received December 13, 1989.

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

Sincerely,

Stephen Nackord

Stephen F. Nackord
Director, Sampling and Analytical Services

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REPORT OF LABORATORY ANALYSIS

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larding Lawson Associates
00 Rush Landing Road
lovato, CA 94945

January 08, 1990
PACE Project
Number: 491213505

ttn: Mr. David Leland

Oakland PRP

			MW-19	MW-19	MW-19
ACE Sample Number:			805560	805570	805580
ate Collected:			12/13/89	12/13/89	12/13/89
ate Received:			12/13/89	12/13/89	12/13/89
arameter	Units	MDL	8949MW01	8949MW02	8949MW03
	Depth		20-20.5	25-25.5	30-30.5
RGANIC ANALYSIS					
URGEABLE FUELS AND AROMATICS					
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	-	-
urgeable Fuels, as Gasoline (EPA 8015)	mg/kg wet	1.0	ND	28	ND
URGEABLE AROMATICS (BTXE BY EPA 8020):			-	-	-
enzene	mg/kg wet	0.005	ND	0.10	ND
thylbenzene	mg/kg wet	0.005	ND	0.43	ND
oluene	mg/kg wet	0.005	ND	0.49	ND
Xylenes, Total	mg/kg wet	0.005	0.007	2.3	ND
ALOGENATED VOLATILE COMPOUNDS EPA 8010					
ichlorodifluoromethane	ug/kg	20	ND	ND	ND
hloromethane	ug/kg	20	ND	ND	ND
inyl Chloride	ug/kg	20	ND	ND	ND
romomethane	ug/kg	20	ND	ND	ND
hloroethane	ug/kg	20	ND	ND	ND
richlorofluoromethane	ug/kg	20	ND	ND	ND
1,1-Dichloroethene	ug/kg	5.0	ND	ND	ND
ethylene Chloride	ug/kg	5.0	ND	ND	ND
rans-1,2-Dichloroethene	ug/kg	5.0	ND	ND	ND
1,1-Dichloroethane	ug/kg	5.0	ND	ND	ND
hloroform	ug/kg	5.0	ND	ND	ND
,1,1-Trichloroethane (TCA)	ug/kg	5.0	ND	ND	ND
arbon Tetrachloride	ug/kg	5.0	ND	ND	ND
,2-Dichloroethane (EDC)	ug/kg	5.0	ND	ND	ND
richloroethene (TCE)	ug/kg	5.0	ND	ND	ND
1,2-Dichloropropane	ug/kg	5.0	ND	ND	ND
romodichloromethane	ug/kg	5.0	ND	ND	ND
2-Chloroethylvinyl ether	ug/kg	5.0	ND	ND	ND

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

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REPORT OF LABORATORY ANALYSIS

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r. David Leland
age 2

January 08, 1990
PACE Project
Number: 491213505

akland PRP

PACE Sample Number:			MW-19 805560	MW-19 805570	MW-19 805580
ate Collected:			12/13/89	12/13/89	12/13/89
ate Received:			12/13/89	12/13/89	12/13/89
arameter	Units	MDL	8949MW01	8949MW02	8949MW03
	Depth		20-20.5	25-25.5	30-30.5
RGANIC ANALYSIS					
ALOGENATED VOLATILE COMPOUNDS EPA 8010					
rans-1,3-Dichloropropene	ug/kg	5.0	ND	ND	ND
is-1,3-Dichloropropene	ug/kg	5.0	ND	ND	ND
,1,2-Trichloroethane	ug/kg	5.0	ND	ND	ND
etrachloroethene	ug/kg	5.0	ND	ND	ND
ibromochloromethane	ug/kg	5.0	ND	ND	ND
hlorobenzene	ug/kg	5.0	ND	ND	ND
romoform	ug/kg	5.0	ND	ND	ND
,1,2,2-Tetrachloroethane	ug/kg	5.0	ND	ND	ND
,3-Dichlorobenzene	ug/kg	5.0	ND	ND	ND
,4-Dichlorobenzene	ug/kg	5.0	ND	ND	ND
,2-Dichlorobenzene	ug/kg	5.0	ND	ND	ND
romochloromethane (Surrogate Recovery)			85%	79%	98%
,4-Dichlorobutane (Surrogate Recovery)			85%	85%	100%

DL Method Detection Limit
D Not detected at or above the MDL.

he data contained in this report were obtained using EPA or other pproved methodologies. All analyses were performed by me or under y direct supervision.

Stephen Machal Jr

Douglas E. Oram, Ph.D.
Organic Chemistry Manager

pace laboratories, inc

Offices:
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Coralville, Iowa
Novato, California
Leawood, Kansas
Irvine, California
Asheboro, North Carolina

REPORT OF LABORATORY ANALYSIS

January 08, 1990
PACE Project
Number: 491213505

akland PRP

			MW-19	MW-19	MW-19
ACE Sample Number:			805560	805570	805580
ate Collected:			12/13/89	12/13/89	12/13/89
ate Received:			12/13/89	12/13/89	12/13/89
arameter	Units	MDL	8949MW01	8949MW02	8949MW03
	Depth		20-20.5	25-25.5	30-30.5
RGANIC ANALYSIS					
ALOGENATED VOLATILE COMPOUNDS EPA 8010					
rans-1,3-Dichloropropene	ug/kg	5.0	ND	ND	ND
is-1,3-Dichloropropene	ug/kg	5.0	ND	ND	ND
,1,2-Trichloroethane	ug/kg	5.0	ND	ND	ND
etrachloroethene	ug/kg	5.0	ND	ND	ND
ibromochloromethane	ug/kg	5.0	ND	ND	ND
hlorobenzene	ug/kg	5.0	ND	ND	ND
romoform	ug/kg	5.0	ND	ND	ND
,1,2,2-Tetrachloroethane	ug/kg	5.0	ND	ND	ND
,3-Dichlorobenzene	ug/kg	5.0	ND	ND	ND
,4-Dichlorobenzene	ug/kg	5.0	ND	ND	ND
,2-Dichlorobenzene	ug/kg	5.0	ND	ND	ND
romochloromethane (Surrogate Recovery)			85%	79%	98%
,4-Dichlorobutane (Surrogate Recovery)			85%	85%	100%

DL Method Detection Limit
D Not detected at or above the MDL.

he data contained in this report were obtained using EPA or other pproved methodologies. All analyses were performed by me or under y direct supervision.

Stephen Nachod Jr

Douglas E. Oram, Ph.D.
Organic Chemistry Manager

[redacted] Harding [redacted]
200 Rush Landing Road
P.O. Box 6107
Novato, California 94948
415/892-0821
Telecopy: 415/892-1586

CHAIN OF CUSTODY FORM

Lab: PACE

Job Number: Outlaw PRD
Name/Location: 9380 046
Project Manager: D Loland

Samplers: G. A Lieberman

Recorder: [signature]
(Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pltnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.
SC			X		1			39	49	MW01	89	12	13	1630	MW-14 20-20.5	X	X					X
SC			X		1			39	49	MW02	89	12	13	1641	MW-14 25-25.5	X	X					X
SC			X		1			39	49	MW03	89	12	13	1651	MW-14 30-30.5	X	X					X

Station notes: EPA 8020 For BTEX Only

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
						EPA 8020 For BTEX Only
						Standard Turnaround

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
[signature]	Robert J. Robson	12-13-1989
Robert J. Robson		

DISPATCHED BY: (Signature)	DATE/TIME	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
		[signature]	12/13/89 17:30

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REPORT OF LABORATORY ANALYSIS

Offices:
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Leawood, Kansas
Irvine, California
Asheboro, North Carolina

January 10, 1990

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

RE: PACE Project No. 491212.505
Oakland PRP

Dear Mr. Leland:

Enclosed is the report of laboratory analyses for samples received December 12, 1989.

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

Sincerely,

Stephen Nackord

Stephen F. Nackord
Director, Sampling and Analytical Services

Enclosures

pace laboratories, inc.

Offices:
Minneapolis, Minnesota
Tampa, Florida
Coralville, Iowa
Novato, California
Leawood, Kansas
Irvine, California
Asheboro, North Carolina

REPORT OF LABORATORY ANALYSIS

Harding Lawson Associates
200 Rush Landing Road
Novato, CA 94945

January 10, 1990
PACE Project
Number: 491212505

Attn: Mr. David Leland

Oakland PRP

			MW-20	MW-20
PACE Sample Number:			804370	804380
Date Collected:			12/12/89	12/12/89
Date Received:			12/12/89	12/12/89
Parameter	Units	MDL	8949MW04	8949MW05
ORGANIC ANALYSIS		Depth	21-21.5	26-26.5
HALOGENATED VOLATILE COMPOUNDS EPA 8010				
Dichlorodifluoromethane	ug/kg	20	ND	ND
Chloromethane	ug/kg	20	ND	ND
Vinyl Chloride	ug/kg	20	ND	ND
Bromomethane	ug/kg	20	ND	ND
Chloroethane	ug/kg	20	ND	ND
Trichlorofluoromethane	ug/kg	20	ND	ND
1,1-Dichloroethene	ug/kg	5.0	ND	ND
Methylene Chloride	ug/kg	5.0	ND	11
trans-1,2-Dichloroethene	ug/kg	5.0	ND	ND
1,1-Dichloroethane	ug/kg	5.0	ND	ND
Chloroform	ug/kg	5.0	ND	ND
1,1,1-Trichloroethane (TCA)	ug/kg	5.0	ND	ND
Carbon Tetrachloride	ug/kg	5.0	ND	ND
1,2-Dichloroethane (EDC)	ug/kg	5.0	ND	ND
Trichloroethene (TCE)	ug/kg	5.0	ND	ND
1,2-Dichloropropane	ug/kg	5.0	ND	ND
Bromodichloromethane	ug/kg	5.0	ND	ND
2-Chloroethylvinyl ether	ug/kg	5.0	ND	ND
trans-1,3-Dichloropropene	ug/kg	5.0	ND	ND
cis-1,3-Dichloropropene	ug/kg	5.0	ND	ND
1,1,2-Trichloroethane	ug/kg	5.0	ND	ND
Tetrachloroethene	ug/kg	5.0	ND	ND
Dibromochloromethane	ug/kg	5.0	ND	ND
Chlorobenzene	ug/kg	5.0	ND	ND
Bromoform	ug/kg	5.0	ND	ND
1,1,2,2-Tetrachloroethane	ug/kg	5.0	ND	ND

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

pace laboratories, inc.

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REPORT OF LABORATORY ANALYSIS

January 10, 1990
PACE Project
Number: 491212505

Oakland PRP

			MW-20	MW-20
PACE Sample Number:			804370	804380
Date Collected:			12/12/89	12/12/89
Date Received:			12/12/89	12/12/89
Parameter	Units	MDL	8949MW04	8949MW05
	Depth		21-21.5	26-26.5
ORGANIC ANALYSIS				
HALOGENATED VOLATILE COMPOUNDS EPA 8010				
1,3-Dichlorobenzene	ug/kg	5.0	ND	ND
1,4-Dichlorobenzene	ug/kg	5.0	ND	ND
1,2-Dichlorobenzene	ug/kg	5.0	ND	ND
Bromochloromethane (Surrogate Recovery)			87%	89%
1,4-Dichlorobutane (Surrogate Recovery)			86%	87%
PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):			-	-
Purgeable Fuels, as Gasoline (EPA 8015)	mg/kg wet	1.0	ND	3.1
PURGEABLE AROMATICS (BTXE BY EPA 8020):			-	-
Benzene	mg/kg wet	0.005	0.010	ND
Ethylbenzene	mg/kg wet	0.005	0.006	ND
Toluene	mg/kg wet	0.005	0.041	0.007
Xylenes, Total	mg/kg wet	0.005	0.036	0.006

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

The data contained in this report were obtained using EPA or other approved methodologies. All analyses were performed by me or under my direct supervision.

Douglas E. Oram, Ph.D.
Organic Chemistry Manager

Harding Lawson Associates
200 Rush Landing Road
P.O. Box 6107
Novato, California 94948
415/892-0821
Telecopy: 415/892-1586

CHAIN OF CUSTODY FORM

Lab: Pace

Samplers: G. A. Lieberman

Job Number: 4387.046.00

Name/Location: Oakland PRP

Project Manager:

Recorder: Dan Coe
(Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES	ANALYSIS REQUESTED: EPA 601/8010	EPA 602/8020 BTEX	EPA 624/8240	EPA 625/8270	Priority Pllnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.
SO			X		1			84	44	MW04	89	12	12	11:04	MW-20 21.0-21.5	X	X					X
SO			X		1			84	44	MW05	89	12	12	11:10	MW-20 26.0-26.5	X	X					X

8020 For BTEX Only

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
						8020 for BTEX only
						Standard turnaround time

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) Dan Coe	RECEIVED BY: (Signature) Robert L. Nelson — DATE/TIME 12-12-89
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DECEMBER 1989
SOIL TREATMENT SYSTEM
PACIFIC RENAISSANCE PLAZA
OAKLAND, CALIFORNIA
February 1, 1990

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QUALITY CONTROL REVIEWER

Tamara L. Williams

Tamara L. Williams
Geologist - 3954