April 5, 2000

49560 1

Mr. Jeff Christoff
BPS Reprographic Services
2748 Willow Pass Road
Concord, California 94519

Quarterly Report
January 1, through March 31, 2000
Groundwater Remediation and Monitoring
BPS Reprographic Services Facility
1700 Jefferson Street
Oakland, California

Dear Mr. Christoff:

Harding Lawson Associates (HLA) presents this quarterly status report of groundwater monitoring and remedial action at the BPS Reprographic Services (BPS) facility at 1700 Jefferson Street, Oakland, California (see Plate 1). This report covers the period of January 1, through March 31, 2000, and was prepared to satisfy quarterly groundwater monitoring requirements of the Alameda County Environmental Health Services (Alameda County).

BACKGROUND

Three underground gasoline storage tanks were removed from the property in 1987 and a preliminary soil and groundwater investigation indicated that a release of fuel into the subsurface had occurred. Three groundwater monitoring wells (MW-1, MW-2, and MW-3) were installed on the property to evaluate the distribution of petroleum hydrocarbons in the groundwater and to determine the direction of groundwater flow. Free phase gasoline was found in MW-1. Groundwater level measurements indicated that the local groundwater gradient was in a north to northwest direction.

In November 1987, monitoring well MW-2 was abandoned to facilitate the construction of the present BPS facility and in January 1988, two additional wells (MW-1A and MW-4) were installed as groundwater extraction wells. HLA also installed one downgradient monitoring well (MW-5) offsite in August 1988. A second offsite well (MW-6) was installed in April 1996 to better evaluate groundwater gradient direction. The locations of the monitoring wells are shown on Plate 1.

In 1992, a groundwater extraction system was constructed at the site to remove free phase product from the groundwater surface. Groundwater was extracted from MW-1A and MW-4, and passed through an oil-water separator that removed the free phase gasoline. The water was then drawn into a 3,000-gallon bioreactor tank for treatment by hydrocarbon reducing microbes. Air and nutrients were supplied to the water within the bioreactor to facilitate microbial growth. The treated water from the bioreactor was

pumped in batches of approximately 500 gallons through three granular activated carbon vessels before discharge under a wastewater discharge permit from the East Bay Utility District to the sanitary sewer. The treatment system has processed approximately 1,385,490 gallons of groundwater and an estimated 5,062 pounds of free-phase gasoline have been recovered.

In 1999, the influent no longer contained free phase product, and free phase product was no longer present in any of the groundwater monitoring wells. Dissolved hydrocarbon concentrations were decreasing and HLA requested approval from Alameda County to terminate groundwater extraction and to modify the remediation technique to insitu-bioremediation using an oxygen-releasing compound (ORC). ORC is manufactured and distributed by Regenisis, Inc.; its purpose is to increase the concentration of dissolved oxygen (DO) in the groundwater and to augment the ability of naturally occurring microbial organisms in the groundwater to biodegrade the dissolved petroleum hydrocarbons. Alameda County approved this plan in a letter dated September 28, 1999, following the submittal of an ORC calculation sheet and a Groundwater Monitoring Plan dated September 23, 1999.

HLA implemented the insitu remediation technique by placement of ORC in the treatment wells (MW-1A, MW-3, MW-4, and MW-5) on September 29, 1999. The ORC is contained in fabric "socks" which release oxygen over time until the compound's oxygen releasing potential is depleted. HLA hung five socks in each treatment well, at the approximate depth of the well's screened interval. The Groundwater Monitoring Plan outlined procedures for groundwater sampling using a non-purge method approved by the Regional Water Quality Control Board in a letter dated January 31, 1997. The first quarter of implementation of this plan (third quarter 1999) included duplicate sampling using both the purge and non-purge methods (see HLA's quarterly report, dated October 25, 1999).

GROUNDWATER SAMPLING AND ANALYSIS

In accordance with HLA's Groundwater Monitoring Plan, HLA removed the ORC socks from MW-5 and MW-3 on January 28, 2000, approximately two weeks before sampling. At this time, HLA measured the dissolved oxygen concentrations in monitoring wells MW-1, MW-3, MW-5, and MW-6 to evaluate the continued potential of the ORC to increase oxygen content of the groundwater. These measurements are presented in Table 1.

On February 11, 2000, HLA conducted the quarterly groundwater sampling of wells MW-1, MW-3, MW-5, and MW-6 using the non-purge method outlined in the Groundwater Monitoring Plan. Prior to sampling, the depth to groundwater was measured in each well using an electric water level sounder. These measurements are presented in Table 2. HLA then raised the dedicated Teflon tubing contained in each well until the end of the tubing was 2 to 4 feet below the groundwater surface and then connected the tubing to a peristaltic pump with silicon tubing. The silicon tubing was replaced prior to sampling each well. After removing the approximate volume of groundwater equal to the volume capacity of the Teflon tubing, HLA collected a sample for conductivity, pH, DO, and temperature measurements. These measurements are included in Table 1.

After these groundwater parameters were measured, HLA pumped the groundwater directly into containers provided by the laboratory, which were then labeled and stored in a cooler with ice. The groundwater

samples were submitted under chain-of-custody protocol to California Laboratory Services (CLS), a California certified laboratory, and analyzed using the following methods:

- Total petroleum hydrocarbons as gasoline (TPHg) in accordance with EPA Method 8015 modified;
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) and methyl t-butyl ether(MTBE) in accordance with EPA Method 8020.

The laboratory reports are presented in the Appendix.

Upon completion of the groundwater sampling, HLA replaced the ORC socks back into monitoring wells MW-3 and MW-5. On February 11, 2000, the socks in MW-1A and MW-4 were removed and five new ORC socks were placed in each well.

DISCUSSION

Groundwater elevation data is presented in Table 2. HLA's monitoring data indicates that the groundwater surface elevation increased slightly in MW-5 and decreased slightly in MW-3, MW-1 and MW-6 as compared to last quarter's measurements. HLA used Surfer™, a contouring computer program, to generate groundwater surface contours. Using the groundwater elevations from MW-3, MW-5, and MW-6, groundwater contours were generated by the program using triangulation. Based on this model, the groundwater gradient was found to be approximately 0.0004 in a northwest direction. Plate 2 presents the groundwater surface contours based on the depth to groundwater as measured in the wells on February 11, 2000.

Plate 3 presents the sample results from this quarter's sampling event. Plate 4 presents graphs of the BTEX results and DO measurements from MW-1, MW-3, and MW-5. Table 3 contains the compilation of historical groundwater sample results using the purge method. Table 4 provides the historical groundwater sample results, since instituting insitu-bioremediation, using the non-purge sampling method.

There has been a significant reduction in all BTEX constituents in MW-3. This well also show the largest increase in DO measurements, which may be due to the low oxygen demand from the microbial population because of the limited petroleum hydrocarbons present. The reduction of BTEX constituents in MW-1, while not as dramatic, also shows a declining trend. The results of the sampling at MW-5 show mixed results, with benzene and toluene increasing slightly and ethylbenzene and xylenes decreasing slightly. The DO content in all three wells declined sharply in the two weeks following removal to the ORC socks, which would be expected if a healthy population of hydrocarbon reducing microbes was present. The groundwater sample from MW-6 did not contain any detectable concentrations of TPHg, BTEX, or MTBE. MTBE was detected in MW-1, MW-3, and MW-5 at concentrations ranging from 6.6 to 31 micrograms per liter, however these concentrations may be due to petroleum interference when analyzed by EPA Test Method 8020. Fingerprint analyses of a product sample from the site in 1998 found the product recovered by the treatment system did not contain MTBE.

CONCLUSIONS AND RECOMMENDATIONS

HLA recommends continued quarterly monitoring utilizing the procedures outlined in our Groundwater Monitoring Plan. ORC socks should be replaced as oxygen levels approach their original concentrations to promote continued biodegradation of the residual petroleum hydrocarbons.

HLA recommends that Blue Print Services send a copy of this report to the following address:

Mr. Don Hwang
Alameda County
Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, California, 94502-6577

While under contract to BPS, HLA will continue to provide quarterly groundwater monitoring and reporting as required by Alameda County. HLA anticipates the next groundwater sampling will be performed during the second quarter of 2000.

If you have any questions, please contact James McCarty at (510) 628-3220.

Yours very truly,

HARDING LAWSON ASSOCIATES

James G. McCarty
Project Engineer

Michael J. Brink
Civil Engineer

JGM/MJB/mlw/49560/037651L

4 copies submitted

Attachments: Table 1 – Groundwater Parameters
Table 2 – Groundwater Elevation Data
Table 3 – Groundwater Monitoring Analytical Results - Using Purge Method
Table 4 – Groundwater Monitoring Analytical Results – Non-Purge Method
Plate 1 – Vicinity Map
Plate 2 –Groundwater Contours, February 11, 2000
Plate 3 – TPHg, BTEX and MTBE Concentrations, February 11, 2000
Plate 4 – BTEX and DO Results
Appendix – Laboratory Reports

Table 1. Groundwater Parameters
BPS Reprographic Services Facility
1700 Jefferson Street
Oakland, California

Dissolved Oxygen (mg/l)	MW-1	MW-3	MW-5	MW-6
9/29/1999	2.9	1.7	0.4	1.8
11/05/99	4.0	10.3	4.0	2.8
11/22/99	1.8	2.4	2.0	3.2
01/28/00	2.9	8.4	3.6	2.2
02/11/00	2.5	2.3	1.8	3.5
Temperature (deg F)				
09/29/99	67.0	72.6	67.7	73.8
11/22/99	66.4	62.9	65.0	69.8
02/11/00	61.3	63.2	62.0	68.5
pH				
09/29/99	8.39	8.53	8.43	8.44
11/22/99	6.86	8.42	6.84	6.79
02/11/00	6.80	6.94	6.83	6.72
Specific Conductance (µS/cm)				
09/29/99	976	880	1,577	966
11/22/99	1,004	1,500	1,352	1,038
02/11/00	992	1,327	1,275	1,149

Note:
Baseline dissolved oxygen measurement taken on 09/29/99, prior to initial installation of oxygen releasing compound

mg/l = milligrams per liter
deg F = degrees Fahrenheit
µS/cm = micromho per centermeter

Table 2. Groundwater Elevation Data
BPS Reprographic Services Facility
1700 Jefferson Street
Oakland, California

	MW-1		MW-3		MW-5		MW-6	
	TOC Elev.	32.36	TOC Elev.	31.77	TOC Elev.	30.56	TOC Elev.	31.26
Date Sampled	Water Level	Water Elevation	Water Level	Water Elevation	Water Level	Water Elevation	Water Level	Water Elevation
03/06/96	NM	--	24.79	6.98	23.53	7.03	NA	--
06/11/96	FP	--	25.60	6.17	23.78	6.78	25.16	6.10
09/19/96	FP	--	26.09	5.68	24.48	6.08	25.76	5.50
12/23/96	FP	--	FP	--	24.83	5.73	25.88	5.38
03/27/97	FP	--	FP	--	23.82	6.74	24.78	6.48
06/04/97	26.41	5.95	25.11	6.66	23.92	6.64	24.60	6.66
09/26/97	26.80	5.56	25.41	6.36	24.29	6.27	24.80	6.46
12/22/97	26.00	6.36	24.91	6.86	24.02	6.54	24.71	6.55
03/31/98	26.06	6.30	24.05	7.72	22.78	7.78	23.75	7.51
06/18/98	25.60	6.76	23.71	8.06	22.51	8.05	23.22	8.04
08/28/98	25.45	6.91	23.70	8.07	22.74	7.82	22.23	9.03
12/02/98	24.92	7.44	23.60	8.17	23.16	7.40	23.72	7.54
03/10/99	24.90	7.46	22.65	9.12	22.82	7.74	23.54	7.72
06/30/99	25.53	6.83	23.07	8.70	22.41	8.15	23.04	8.22
09/29/99	24.23	8.13	23.03	8.74	22.81	7.75	23.42	7.84
11/22/99	24.33	8.03	23.68	8.09	22.88	7.68	23.64	7.62
02/11/00	24.38	7.98	23.74	8.03	22.74	7.82	23.67	7.59

TOC Elev. = top of well casing elevation baed on City of Oakland Datum
NM = not measured
FP = free product
-- = no data
NA = not applicable (MW-6 was installed in April 1996)

Table 3. Historical Purge Groundwater Monitoring Analytical Results - Using Purge Method
BPS Reprographic Services Facility
1700 Jefferson Street
Oakland, California

	Date Sampled													
TPHg (mg/l)	08/01/91	09/30/92	03/30/93	01/13/94	04/13/94	06/29/94	12/08/94	04/03/95	06/27/95	09/19/95	12/13/95	03/06/96	06/11/96	09/19/96
MW-1	FP	FP	FP	FP	FP	FP	FP	NA	NA	NA	NA	NA	FP	FP
MW-1A	350	FP	FP	FP	170	95	190	67	53	52	62	200	140	100
MW-3	74	FP	FP	FP	FP	39	4,600	51	20	6.2	19	7	16	6
MW-4	86	FP	FP	FP	58	16	92	35	13	14	11	110	260	95
MW-5	120	51	74	80	63	64	59	51	41	50	45	51	48	48
MW-6	--	--	--	--	--	--	--	--	--	--	--	--	ND(0.05)	ND(0.05)
Benzene (µg/l)														
MW-1	FP	FP	FP	FP	FP	FP	FP	NA	NA	NA	NA	NA	FP	FP
MW-1A	17,000	FP	FP	FP	17,000	16,000	13,000	11,000	11,000	8,900	9,900	14,000	18,000	16,000
MW-3	1,600	FP	FP	FP	FP	3,200	1,500	1,100	270	70	220	120	170	45
MW-4	1,500	FP	FP	FP	1,500	1,300	1,700	1,200	1,300	2,200	630	2,600	6,600	9,900
MW-5	20,000	13,000	16,000	19,000	14,000	29,000	13,000	15,000	12,000	1,600	13,000	15,000	12,000	12,000
MW-6	--	--	--	--	--	--	--	--	--	--	--	--	ND(0.5)	ND(0.5)
Toluene (µg/l)														
MW-1	FP	FP	FP	FP	FP	FP	FP	NA	NA	NA	NA	NA	FP	FP
MW-1A	31,000	FP	FP	FP	31,000	21,000	21,000	13,000	9,900	9,200	11,000	22,000	28,000	22,000
MW-3	4,600	FP	FP	FP	FP	2,900	4,200	2,300	550	140	480	170	270	30
MW-4	6,200	FP	FP	FP	2,500	790	4,100	3,400	1,600	2,100	470	3,600	19,000	19,000
MW-5	14,000	5,900	5,000	8,200	3,500	5,400	3,800	2,200	2,100	2,700	2,100	2,800	2,900	4,500
MW-6	--	--	--	--	--	--	--	--	--	--	--	--	ND(0.5)	ND(0.5)
Ethylbenzene (µg/l)														
MW-1	FP	FP	FP	FP	FP	FP	FP	NA	NA	NA	NA	NA	FP	FP
MW-1A	3,000	FP	FP	FP	2,100	1,500	1,400	910	500	710	790	2,700	2,800	2,100
MW-3	670	FP	FP	FP	FP	580	6,000	580	190	68	140	49	68	15
MW-4	1,000	FP	FP	FP	520	51	310	280	77	110	14	780	3,700	2,000
MW-5	1,900	1,400	1,800	1,400	1,500	2,800	1,800	2,800	1,400	2,000	16,000	2,000	2,000	2,300
MW-6	--	--	--	--	--	--	--	--	--	--	--	--	ND(0.5)	ND(0.5)
Xylenes (µg/l)														
MW-1	FP	FP	FP	FP	FP	FP	FP	NA	NA	NA	NA	NA	FP	FP
MW-1A	22,000	FP	FP	FP	14,000	12,000	11,000	9,800	6,300	6,800	5,300	22,000	19,000	14,000
MW-3	4,300	FP	FP	FP	FP	4,300	95,000	4,800	1,700	500	1,700	440	1,500	300
MW-4	7,300	FP	FP	FP	3,200	3,400	5,400	5,800	1,800	2,100	1,800	10,000	28,000	13,000
MW-5	4,900	2,600	2,700	2,700	2,100	4,500	2,900	4,500	1,600	2,100	1,900	2,400	2,700	4,000
MW-6	--	--	--	--	--	--	--	--	--	--	--	--	ND(2)	ND(2)
MTBE (µg/l)														
MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-6	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA

TPHg = total petroleum hydrocarbons as gasoline
MTBE = methyl t-butyl ether
(mg/l) milligrams per liter
(µg/l) micrograms per liter

ND = Not detected above the reporting limit in parenthesis
NA = Not analyzed
FP = Free Product - well not sampled
-- = Well did not exist at date indicated

Table 3. Historical Purge Groundwater Monitoring Analytical Results - Using Purge Method
BPS Reprographic Services Facility
1700 Jefferson Street
Oakland, California

	Date Sampled											
TPHg (mg/l)	12/23/96	03/27/97	06/04/97	09/26/97	12/23/97	03/31/98	06/18/98	08/28/98	12/02/98	03/10/99	06/30/99	09/29/99
MW-1	FP	FP	68	59	41	44	32	26	26	26	18	21
MW-1A	FP	66	54	73	66	51	50	15	41	10	18	NA
MW-3	FP	FP	85	47	32	32	16	17	3.2	9.6	7.9	5.0
MW-4	FP	37	24	41	48	NA	25	48	10	11	8.8	NA
MW-5	45	44	35	36	39	48	17	16	15	23	7.7	11
MW-6	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)
Benzene (µg/l)												
MW-1	FP	FP	2,200	6,000	6,800	8,300	1,100	8,600	9,200	8,200	7,000	9,200
MW-1A	FP	12,000	11,000	10,000	10,000	9,100	11,000	1,100	8,500	2,300	6,400	NA
MW-3	FP	FP	8,500	610	640	690	180	84	39	86	31	120
MW-4	FP	2,600	2,600	2,900	6,000	NA	2,000	9,700	1,700	2,300	1,800	NA
MW-5	12,000	11,000	8,900	7,900	13,000	10,000	9,500	5,400	8,400	14,000	5,200	9,600
MW-6	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)
Toluene (µg/l)												
MW-1	FP	14,000	4,500	3,000	3,000	3,700	3,800	2,300	4,300	5,900	5,800	10,000
MW-1A	FP	15,000	12,000	16,000	16,000	11,000	15,000	830	11,000	1,900	7,800	NA
MW-3	FP	FP	13,000	6,000	5,300	3,800	1,500	1,100	85	540	330	340
MW-4	FP	6,900	3,200	5,000	11,000	NA	460	11,000	610	2,100	3,000	NA
MW-5	2,200	1,100	560	270	500	400	310	160	120	300	270	710
MW-6	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)
Ethylbenzene (												
MW-1	FP	FP	1,500	1,600	1,400	1,100	550	730	820	870	950	1,200
MW-1A	FP	1,400	1,000	1,400	1,400	1,100	870	31	720	1,600	660	NA
MW-3	FP	FP	2,400	930	800	870	490	430	25	250	200	230
MW-4	FP	540	140	350	580	NA	ND(15)	890	ND(15)	88	150	NA
MW-5	2,700	1,900	1,500	1,500	1,900	2,000	420	1,100	1,500	1,800	1,100	1,100
MW-6	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	0.5	ND(0.5)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)
Xylenes (µg/l)												
MW-1	FP	FP	11,000	8,600	6,600	4,300	3,000	2,100	2,800	3,500	2,500	5,500
MW-1A	FP	100	7,200	8,500	12,000	6,800	5,800	3,000	6,700	2,300	4,100	NA
MW-3	FP	FP	16,000	5,900	5,900	5,200	3,700	3,800	360	2,300	1,800	1,300
MW-4	FP	5,300	3,500	4,800	8,200	NA	6,400	5,000	2,300	1,600	2,700	NA
MW-5	6,500	2,800	1,700	1,300	1,700	2,200	850	900	840	1,100	690	1,100
MW-6	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(0.60)	ND(0.60)	ND(0.60)	ND(0.60)	ND(0.60)	ND(0.60)
MTBE (µg/l)												
MW-1	FP	FP	ND(500)	ND(500)	300	420	ND(50)	ND(50)	ND(50)	ND(50)	ND(25)	ND(250)
MW-1A	NA	1,800	ND(500)	ND(500)	1,900	300	ND(50)	ND(50)	ND(50)	ND(50)	ND(25)	NA
MW-3	FP	FP	ND(500)	ND(100)	ND(300)	350	ND(25)	ND(50)	ND(50)	ND(25)	ND(25)	10
MW-4	NA	1,400	ND(300)	ND(500)	270	NA	ND(50)	ND(50)	ND(50)	ND(25)	ND(25)	NA
MW-5	600	300	ND(100)	ND(500)	ND(1000)	350	ND(10)	ND(50)	ND(50)	ND(50)	ND(25)	ND(100)
MW-6	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)

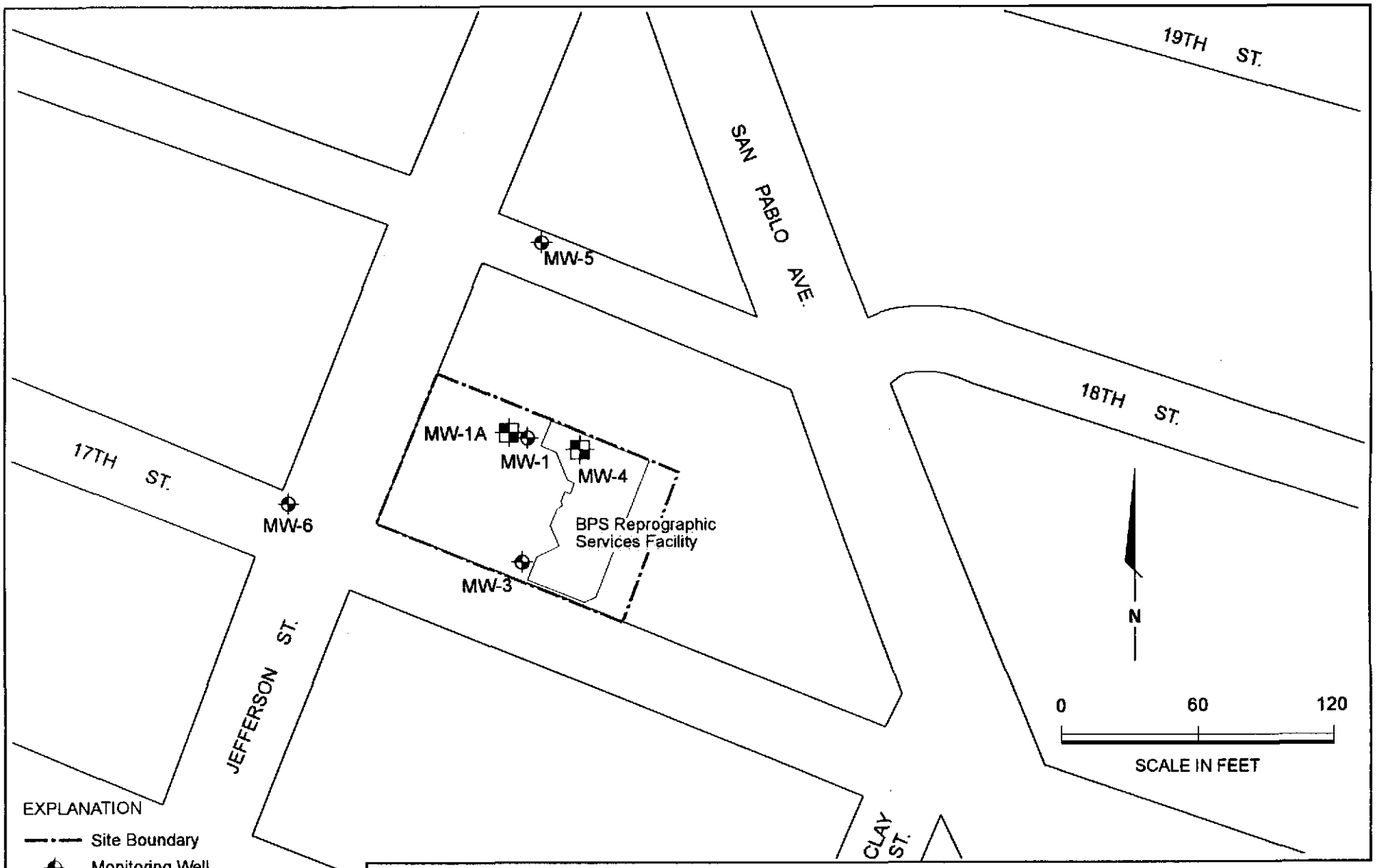
TPHg = total petroleum hydrocarbons as gasoline
MTBE = methyl t-butyl ether
(mg/l) milligrams per liter
(µg/l) micrograms per liter

ND = Not detected above the reporting limit in parenthesis
NA = Not analyzed
FP = Free Product - well not sampled
-- = Well did not exist at date indicated

Table 4. Groundwater Monitoring Analytical Results – Non-Purge Method
BPS Reprographic Services Facility
1700 Jefferson Street
Oakland, California

TPHg (mg/l)		09/29/99	11/22/99	02/11/00
	MW-1	14	24	19
	MW-3	4.1	3.1	0.54
	MW-5	10	30	23
	MW-6	ND<0.5	ND<0.05	ND<0.05
Benzene (µg/l)				
	MW-1	6,200	4,900	4,100
	MW-3	180	6.5	8.3
	MW-5	14,000	11,000	12,000
	MW-6	ND<0.3	ND<0.3	ND<0.3
Toluene (µg/l)				
	MW-1	5,900	5,000	4,800
	MW-3	340	33	20
	MW-5	470	3,400	4,500
	MW-6	ND<0.3	ND<0.3	ND<0.3
Ethylbenzene (µg/l)				
	MW-1	620	730	530
	MW-3	130	27	2.4
	MW-5	1,100	1,500	1,200
	MW-6	ND<0.3	ND<0.3	ND<0.3
Xylenes (µg/l)				
	MW-1	3,500	3,500	2,800
	MW-3	580	260	28
	MW-5	600	2,500	1,300
	MW-6	ND<0.6	ND<0.6	ND<0.6
MTBE (µg/l)				
	MW-1	ND<250	ND<100	6.6
	MW-3	14	ND<1.0	31
	MW-5	ND<100	ND<100	6.6
	MW-6	ND<1.0	ND<1.0	ND<1.0

mg/l = milligrams per liter
µg/l = micrograms per liter
ND = Not detected above the reporting limit following the less than sign
MTBE = methyl t-butyl ether

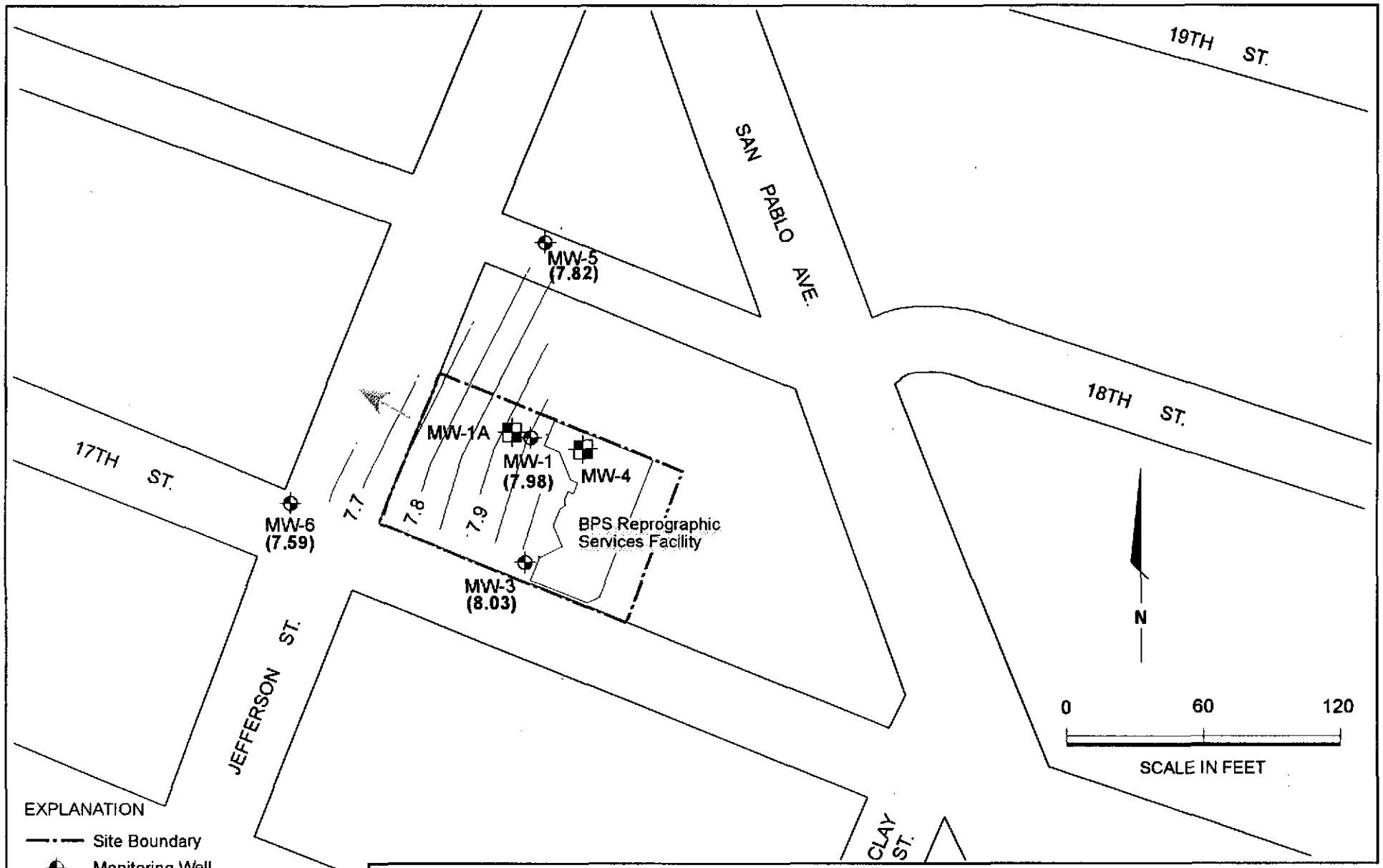


Harding Lawson Associates
Engineering and
Environmental Services

Vicinity Map
1700 Jefferson Street
BPS Reprographic Services Facility
Oakland, California

PLATE
1

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
jgm	46559.1		3/31/2000	



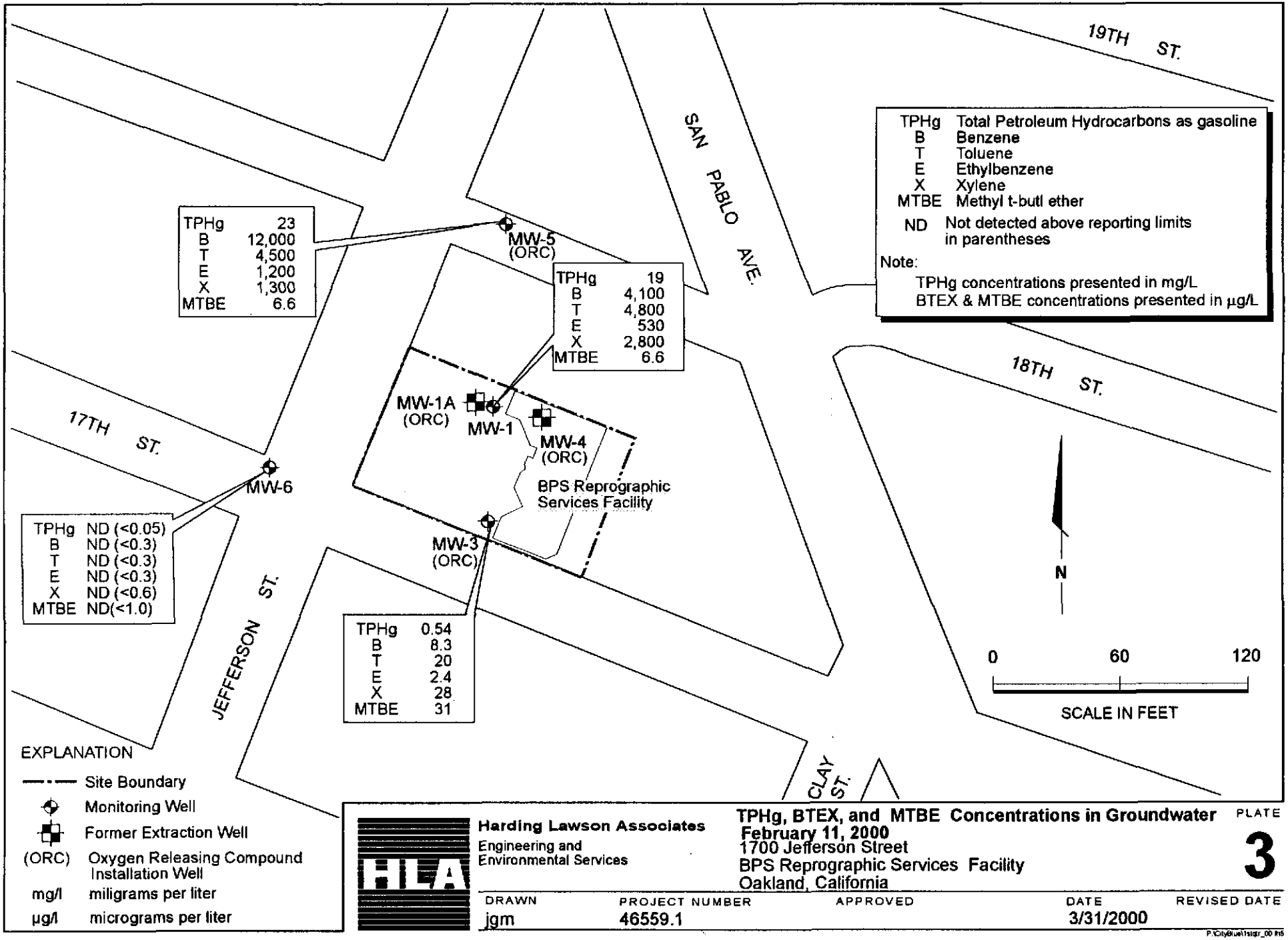
Harding Lawson Associates
Engineering and Environmental Services

Groundwater Contours
February 11, 2000
1700 Jefferson Street
BPS Reprographic Services Facility
Oakland, California

PLATE **2**

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
jgm	46559.1		3/31/2000	

P:\City\Blue\1\dgn_00.fm5



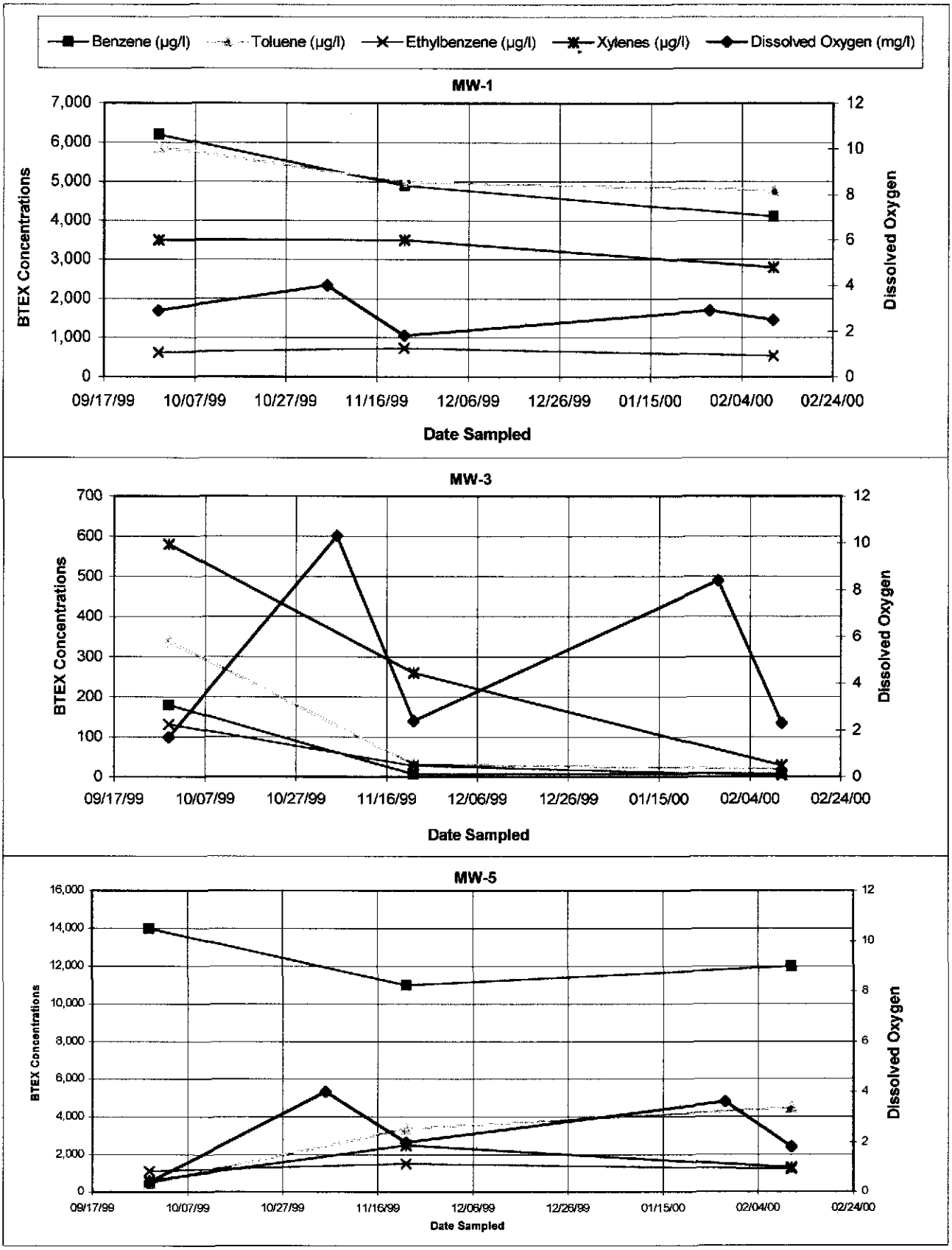
Harding Lawson Associates
Engineering and Environmental Services

TPHg, BTEX, and MTBE Concentrations in Groundwater
February 11, 2000
1700 Jefferson Street
BPS Reprographic Services Facility
Oakland, California

PLATE **3**

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
jgm	46559.1		3/31/2000	

P:\CityBlue\1stqtr_00.fh5



Harding Lawson Associates
Engineering and
Environmental Services

HLA

BTEX and DO Results
Quarterly Groundwater Monitoring Report
BPS Reprographic Services Facility
1700 Jefferson Steet
Oakland, California

Plate
4

Drawn by	JOB NUMBER	APPROVED	DATE	REVISED DATE
jgm	449560.1		03/30/00	

APPENDIX

LABORATORY REPORTS

CLS Labs

Harding Lawson Associates
Engineering and Environmental
383 4th Street, Third Floor
Oakland, CA 94607

02/21/2000

Attention: JIM MCCARTY

Reference: Analytical Results

Project Name: CITY BLUE GROUNDWATER MONITORING
Project No.: 49560.1
Date Received: 02/11/2000
Chain Of Custody: 2446

CLS ID No.: R7543
CLS Job No.: 827543

The following analyses were performed on the above referenced project:

No. of Samples	*Turnaround Time*	*Analysis Description*
4	10 Days	**TPH as Gasoline, BTEX and MTBE**

These samples were received by CLS Labs in a chilled, intact state and accompanied by a valid chain of custody document.

Calibrations for analytical testing have been performed in accordance to and pass the EPA's criteria for acceptability.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

3249 Fitzgerald Road Rancho Cordova, CA 95742 (916) 638-7301 Fax (916) 638-4510

CLS Labs

Analysis Report: **Total Petroleum Hydrocarbons, EPA Method 8015**
Purge and Trap, EPA Method 5030

Client: **Harding Lawson Associates**
Engineering and Environmental
383 4th Street, Third Floor
Oakland, CA 94607

Project: **CITY BLUE GROUNDWATER MONITORING**

Date Sampled: **02/11/2000**
Date Received: **02/11/2000**
Date Extracted: **N/A**
Date Analyzed: **02/15/2000**
Date Reported: **02/18/2000**
Client ID No.: **MW-6**

Project No.: **49560.1**
Contact: **JIM MCCARTY**
Phone: **(510)451-1001**

Lab Contact: **JAMES LIANG**
Lab ID No.: **R7543-1A**
Job No.: **827543**
COC Log No.: **2446**
Batch No.: **27765**
Instrument ID: **GC018**
Analyst ID: **LEVIF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (mg/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	0.0200	111

MW-6

Analyte	CAS No.	Results (mg/L)	Rep. Limit (mg/L)	Dilution (factor)
TPH as Gasoline	N/A	ND	0.050	1.0

ND = Not detected at or above indicated Reporting Limit

CLS Labs

Analysis Report: **Total Petroleum Hydrocarbons, EPA Method 8015**
Purge and Trap, EPA Method 5030

Client: **Harding Lawson Associates**
Engineering and Environmental
383 4th Street, Third Floor
Oakland, CA 94607

Project: **CITY BLUE GROUNDWATER MONITORING**

Date Sampled: **02/11/2000**
Date Received: **02/11/2000**
Date Extracted: **N/A**
Date Analyzed: **02/15/2000**
Date Reported: **02/18/2000**
Client ID No.: **MW-5**

Project No.: **49560.1**
Contact: **JIM MCCARTY**
Phone: **(510)451-1001**

Lab Contact: **JAMES LIANG**
Lab ID No.: **R7543-2A**
Job No.: **827543**
COC Log No.: **2446**
Batch No.: **27765**
Instrument ID: **GC018**
Analyst ID: **LEVIF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (mg/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	0.500	99

MW-5

Analyte	CAS No.	Results (mg/L)	Rep. Limit (mg/L)	Dilution (factor)
TPH as Gasoline	N/A	23	1.3	25

ND = Not detected at or above indicated Reporting Limit

CLS Labs

Analysis Report: **Total Petroleum Hydrocarbons, EPA Method 8015**
Purge and Trap, EPA Method 5030

Client: **Harding Lawson Associates**
Engineering and Environmental
383 4th Street, Third Floor
Oakland, CA 94607

Project: **CITY BLUE GROUNDWATER MONITORING**

Date Sampled: **02/11/2000**
Date Received: **02/11/2000**
Date Extracted: **N/A**
Date Analyzed: **02/15/2000**
Date Reported: **02/18/2000**
Client ID No.: **MW-1**

Project No.: **49560.1**
Contact: **JIM MCCARTY**
Phone: **(510)451-1001**

Lab Contact: **JAMES LIANG**
Lab ID No.: **R7543-3A**
Job No.: **827543**
COC Log No.: **2446**
Batch No.: **27765**
Instrument ID: **GC018**
Analyst ID: **LEVIF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (mg/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	0.500	100

MW-1

Analyte	CAS No.	Results (mg/L)	Rep. Limit (mg/L)	Dilution (factor)
TPH as Gasoline	N/A	19	1.3	25

ND = Not detected at or above indicated Reporting Limit

CLS Labs

Analysis Report: **Total Petroleum Hydrocarbons, EPA Method 8015**
Purge and Trap, EPA Method 5030

Client: **Harding Lawson Associates**
Engineering and Environmental
383 4th Street, Third Floor
Oakland, CA 94607

Project: **CITY BLUE GROUNDWATER MONITORING**

Date Sampled: **02/11/2000**
Date Received: **02/11/2000**
Date Extracted: **N/A**
Date Analyzed: **02/15/2000**
Date Reported: **02/18/2000**
Client ID No.: **MW-3**

Project No.: **49560.1**
Contact: **JIM MCCARTY**
Phone: **(510)451-1001**

Lab Contact: **JAMES LIANG**
Lab ID No.: **R7543-4A**
Job No.: **827543**
COC Log No.: **2446**
Batch No.: **27765**
Instrument ID: **GC018**
Analyst ID: **LEVIF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (mg/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	0.0200	102

MW-3

Analyte	CAS No.	Results (mg/L)	Rep. Limit (mg/L)	Dilution (factor)
TPH as Gasoline	N/A	0.54	0.050	1.0

ND = Not detected at or above indicated Reporting Limit

CLS Labs

Analysis Report: **Total Petroleum Hydrocarbons, EPA Method 8015**
Purge and Trap, EPA Method 5030

Client: **Harding Lawson Associates**
Engineering and Environmental
383 4th Street, Third Floor
Oakland, CA 94607

Project: **CITY BLUE GROUNDWATER MONITORING**

Date Extracted: **N/A**
Date Analyzed: **02/15/2000**
Date Reported: **02/18/2000**

Project No.: **49560.1**
Contact: **JIM MCCARTY**
Phone: **(510)451-1001**

Lab Contact: **JAMES LIANG**
Lab ID No.: **R7543**
Job No.: **827543**
COC Log No.: **2446**
Batch No.: **27765**
Instrument ID: **GC018**
Analyst ID: **LEVIF**
Matrix: **WATER**

MB SURROGATE

Analyte	CAS No.	Surr Conc. (mg/L)	MB Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	0.0200	112

METHOD BLANK

Analyte	CAS No.	Results (mg/L)	Reporting Limit (mg/L)
TPH as Gasoline	N/A	ND	0.050

ND = Not detected at or above indicated Reporting Limit

CLS Labs

Analysis Report: **EPA 8020, BTEX and MTBE**
Purge and Trap, EPA Method 5030

Client: **Harding Lawson Associates**
Engineering and Environmental
383 4th Street, Third Floor
Oakland, CA 94607

Project: **CITY BLUE GROUNDWATER MONITORING**

Date Sampled: **02/11/2000**
Date Received: **02/11/2000**
Date Extracted: **N/A**
Date Analyzed: **02/15/2000**
Date Reported: **02/18/2000**
Client ID No.: **MW-6**

Project No.: **49560.1**
Contact: **JIM MCCARTY**
Phone: **(510)451-1001**

Lab Contact: **JAMES LIANG**
Lab ID No.: **R7543-1A**
Job No.: **827543**
COC Log No.: **2446**
Batch No.: **27765**
Instrument ID: **GC018**
Analyst ID: **LEVIF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (ug/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	20.0	110

MW-6

Analyte	CAS No.	Results (ug/L)	Rep. Limit (ug/L)	Dilution (factor)
Methyl t-butyl ether	1634-04-4	ND	1.0	1.0
Benzene	71-43-2	ND	0.30	1.0
Toluene	108-88-3	ND	0.30	1.0
Ethylbenzene	100-41-4	ND	0.30	1.0
Xylenes, total	1330-20-7	ND	0.60	1.0

ND = Not detected at or above indicated Reporting Limit

CLS Labs

Analysis Report: **EPA 8020, BTEX and MTBE**
Purge and Trap, EPA Method 5030

Client: **Harding Lawson Associates**
Engineering and Environmental
383 4th Street, Third Floor
Oakland, CA 94607

Project: **CITY BLUE GROUNDWATER MONITORING**

Date Sampled: **02/11/2000**
Date Received: **02/11/2000**
Date Extracted: **N/A**
Date Analyzed: **02/15/2000**
Date Reported: **02/18/2000**
Client ID No.: **MW-5**

Project No.: **49560.1**
Contact: **JIM MCCARTY**
Phone: **(510)451-1001**

Lab Contact: **JAMES LIANG**
Lab ID No.: **R7543-2A**
Job No.: **827543**
COC Log No.: **2446**
Batch No.: **27765**
Instrument ID: **GC018**
Analyst ID: **LEVIF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (ug/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	20.0	104

MW-5

Analyte	CAS No.	Results (ug/L)	Rep. Limit (ug/L)	Dilution (factor)
Methyl t-butyl ether	1634-04-4	6.6	1.0	1.0
Benzene	71-43-2	12000	75	250
Toluene	108-88-3	4500	75	250
Ethylbenzene	100-41-4	1200	75	250
Xylenes, total	1330-20-7	1300	150	250

ND = Not detected at or above indicated Reporting Limit

CLS Labs

Analysis Report: **EPA 8020, BTEX and MTBE**
Purge and Trap, EPA Method 5030

Client: **Harding Lawson Associates**
Engineering and Environmental
383 4th Street, Third Floor
Oakland, CA 94607

Project: **CITY BLUE GROUNDWATER MONITORING**

Date Sampled: **02/11/2000**
Date Received: **02/11/2000**
Date Extracted: **N/A**
Date Analyzed: **02/15/2000**
Date Reported: **02/18/2000**
Client ID No.: **MW-1**

Project No.: **49560.1**
Contact: **JIM MCCARTY**
Phone: **(510)451-1001**

Lab Contact: **JAMES LIANG**
Lab ID No.: **R7543-3A**
Job No.: **827543**
COC Log No.: **2446**
Batch No.: **27765**
Instrument ID: **GC018**
Analyst ID: **LEVIF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (ug/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	20.0	84

MW-1

Analyte	CAS No.	Results (ug/L)	Rep. Limit (ug/L)	Dilution (factor)
Methyl t-butyl ether	1634-04-4	6.6	1.0	1.0
Benzene	71-43-2	4100	75	250
Toluene	108-88-3	4800	75	250
Ethylbenzene	100-41-4	530	75	250
Xylenes, total	1330-20-7	2800	150	250

ND = Not detected at or above indicated Reporting Limit

CLS Labs

Analysis Report: **EPA 8020, BTEX and MTBE**
Purge and Trap, EPA Method 5030

Client: **Harding Lawson Associates**
Engineering and Environmental
383 4th Street, Third Floor
Oakland, CA 94607

Project: **CITY BLUE GROUNDWATER MONITORING**

Date Sampled: **02/11/2000**
Date Received: **02/11/2000**
Date Extracted: **N/A**
Date Analyzed: **02/15/2000**
Date Reported: **02/18/2000**
Client ID No.: **MW-3**

Project No.: **49560.1**
Contact: **JIM MCCARTY**
Phone: **(510)451-1001**

Lab Contact: **JAMES LIANG**
Lab ID No.: **R7543-4A**
Job No.: **827543**
COC Log No.: **2446**
Batch No.: **27765**
Instrument ID: **GC018**
Analyst ID: **LEVIF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (ug/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	20.0	97

MW-3

Analyte	CAS No.	Results (ug/L)	Rep. Limit (ug/L)	Dilution (factor)
Methyl t-butyl ether	1634-04-4	31	5.0	5.0
Benzene	71-43-2	8.3	0.30	1.0
Toluene	108-88-3	20	0.30	1.0
Ethylbenzene	100-41-4	2.4	0.30	1.0
Xylenes, total	1330-20-7	28	0.60	1.0

ND = Not detected at or above indicated Reporting Limit

CLS Labs

Analysis Report: **EPA 8020, BTEX and MTBE**
Purge and Trap, EPA Method 5030

Client: **Harding Lawson Associates**
Engineering and Environmental
383 4th Street, Third Floor
Oakland, CA 94607

Project: **CITY BLUE GROUNDWATER MONITORING**

Date Extracted: **N/A**
Date Analyzed: **02/15/2000**
Date Reported: **02/18/2000**

Project No.: **49560.1**
Contact: **JIM MCCARTY**
Phone: **(510)451-1001**

Lab Contact: **JAMES LIANG**
Lab ID No.: **R7543**
Job No.: **827543**
COC Log No.: **2446**
Batch No.: **27765**
Instrument ID: **GC018**
Analyst ID: **LEVIF**
Matrix: **WATER**

MB SURROGATE

Analyte	CAS No.	Surr Conc. (ug/L)	MB Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	20.0	110

METHOD BLANK

Analyte	CAS No.	Results (ug/L)	Reporting Limit (ug/L)
Methyl t-butyl ether	1634-04-4	ND	1.0
Benzene	71-43-2	ND	0.30
Toluene	108-88-3	ND	0.30
Ethylbenzene	100-41-4	ND	0.30
Xylenes, total	1330-20-7	ND	0.60

ND = Not detected at or above indicated Reporting Limit

CLS Labs

Analysis Report: **EPA 8020, BTEX and MTBE**
Purge and Trap, EPA Method 5030

Client: **Harding Lawson Associates**
Engineering and Environmental
383 4th Street, Third Floor
Oakland, CA 94607

Project: **CITY BLUE GROUNDWATER MONITORING**

Date Extracted: **N/A**
Date Analyzed: **02/15/2000**
Date Reported: **02/18/2000**

Project No.: **49560.1**
Contact: **JIM MCCARTY**
Phone: **(510)451-1001**

Lab Contact: **JAMES LIANG**
Lab ID No.: **R7543**
Job No.: **827543**
COC Log No.: **2446**
Batch No.: **27765**
Instrument ID: **GC018**
Analyst ID: **LEVIF**
Matrix: **WATER**

MS SURROGATE

Analyte	CAS No.	MS Surr. Conc. (ug/L)	MS Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	20.0	101

MATRIX SPIKE

Analyte	CAS No.	MS Conc. (ug/L)	MS Recovery (percent)
Benzene	71-43-2	20.0	97
Toluene	108-88-3	20.0	99
Ethylbenzene	100-41-4	20.0	98
Xylenes, total	1330-20-7	60.0	96

MSD SURROGATE

Analyte	CAS No.	Surr. Conc. (ug/L)	MSD Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	20.0	100

MATRIX SPIKE DUPLICATE

Analyte	CAS No.	MSD Conc. (ug/L)	MSD Recovery (percent)
Benzene	71-43-2	20.0	96
Toluene	108-88-3	20.0	98
Ethylbenzene	100-41-4	20.0	97
Xylenes, total	1330-20-7	60.0	95

RELATIVE % DIFFERENCE

Analyte	CAS No.	Relative Percent Difference (percent)

CLS Labs

Analysis Report: **EPA 8020, BTEX and MTBE**
Purge and Trap, EPA Method 5030

Client: **Harding Lawson Associates**
Engineering and Environmental
383 4th Street, Third Floor
Oakland, CA 94607

Project: **CITY BLUE GROUNDWATER MONITORING**

Date Extracted: **N/A**
Date Analyzed: **02/15/2000**
Date Reported: **02/18/2000**

Project No.: **49560.1**
Contact: **JIM MCCARTY**
Phone: **(510)451-1001**

Lab Contact: **JAMES LIANG**
Lab ID No.: **R7543**
Job No.: **827543**
COC Log No.: **2446**
Batch No.: **27765**
Instrument ID: **GC018**
Analyst ID: **LEVIF**
Matrix: **WATER**

RELATIVE % DIFFERENCE(cont.)

Analyte	CAS No.	Relative Percent Difference (percent)
Benzene	71-43-2	1
Toluene	108-88-3	1
Ethylbenzene	100-41-4	1
Xylenes, total	1330-20-7	1

CLS Labs

Analysis Report: **EPA 8020, BTEX and MTBE**
Purge and Trap, EPA Method 5030

Client: **Harding Lawson Associates**
Engineering and Environmental
383 4th Street, Third Floor
Oakland, CA 94607

Project: **CITY BLUE GROUNDWATER MONITORING**

Date Extracted: **N/A**
Date Analyzed: **02/15/2000**
Date Reported: **02/18/2000**

Project No.: **49560.1**
Contact: **JIM MCCARTY**
Phone: **(510)451-1001**

Lab Contact: **JAMES LIANG**
Lab ID No.: **R7543**
Job No.: **827543**
COC Log No.: **2446**
Batch No.: **27765**
Instrument ID: **GC018**
Analyst ID: **LEVIF**
Matrix: **WATER**

LCS SURROGATE

Analyte	CAS No.	LCS Conc. (ug/L)	LCS Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	20.0	101

LAB CONTROL SAMPLE

Analyte	CAS No.	LCS Conc. (ug/L)	LCS Recovery (percent)
Benzene	71-43-2	20.0	97
Toluene	108-88-3	20.0	99
Ethylbenzene	100-41-4	20.0	105
Xylenes, total	1330-20-7	60.0	101

CHAIN OF CUSTODY FORM

RT513

No. 2446

Harding Lawson Associates
383 Fourth Street, Third Floor
Oakland, California 94607
(510) 451-1001 - Phone
(510) 451-3165 - Fax

Lab: CLS

Samplers: Heather Lee

Job Number: 49560.1

Name/Location: City Blue Groundwater Monitoring

Project Manager: Jim McCarty

Recorder: Heather Lee (Signature required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	# CONTAINERS & PRESERV.: Unpres	H_2SO_4	HNO_3	HCL	Ice	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Day	Time	STATION DESCRIPTION/ NOTES
	X							3		MW	6		00	02	11	0658	
	X							3		MW	5		00	02	11	0725	
	X							3		MW	1		00	02	11	0800	
	X							3		MW	3		00	02	11	0817	

ANALYSIS REQUESTED

EPA 8010	EPA 8020	EPA 8260	EPA 8270	METALS	EPA 8015M/TPHG	EPA 8020/BTEX + MTBE	EPA 8015M/TPHd,o
					X	X	
					X	X	
					X	X	
					X	X	

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

MISCELLANEOUS: Standard TAT

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) Heather Lee	RECEIVED BY: (Signature) CLS	DATE/TIME 2/11/00 11:2
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)	DATE/TIME 2/11/00 16:1

METHOD OF SHIPMENT

SAMPLE CONDITION WHEN RECEIVED BY THE LABORATORY

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