Harding Lawson Associates

ST ID 4148

April 5, 1999

46559 1

Mr. Jeff Christoff
Blue Print Service Company
1057 Shary Circle
Concord, California 94518

Quarterly Report
January 1, 1999 through April 1, 1999
Groundwater Remediation and Monitoring
Blue Print Service Facility
1700 Jefferson Street
Oakland, California

Dear Mr. Christoff:

Harding Lawson Associates (HLA) presents this quarterly monitoring report of the groundwater monitoring wells and treatment system at the Blue Print Service facility at 1700 Jefferson Street, Oakland, California. This report covers the period of January 1, 1999 through April 5, 1999. It was prepared to satisfy quarterly groundwater monitoring requirements of the Alameda County Health Care Services Agency (Alameda County). The report also satisfies the reporting requirements of the East Bay Municipal Utilities District (EBMUD) for treatment system discharge to the sanitary sewer.

BACKGROUND

Three underground gasoline storage tanks were removed from the property in 1987. A preliminary investigation indicated a release of fuel into the soil and groundwater. 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 soil and groundwater and to determine the direction of groundwater flow. Monitoring of these wells revealed free phase gasoline floating on the surface of the groundwater in MW-1. Initial groundwater level measurements indicated that groundwater flows in a north to northwest direction at the site.

In November 1987, monitoring well MW-2 was abandoned to facilitate the construction of the present structures. In January 1988, two additional wells (MW-1A and MW-4) were installed at the facility to be used as groundwater extraction wells. One downgradient monitoring well (MW-5) was installed offsite in August 1988 and in April 1996, monitoring well MW-6 was installed offsite in an upgradient location to improve understanding of groundwater flow at the site. 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 is extracted from MW-1A and MW-4 and passes through an oil-water

separator that removes the free phase gasoline. The water is then drawn into a 3,000-gallon bioreactor tank for treatment by hydrocarbon reducing microbes. Air and nutrient are supplied to the groundwater within the bioreactor to facilitate microbial growth. The treated water from the bioreactor is pumped in batches of approximately 500 gallons through three granular activated carbon (GAC) vessels before being discharged to the sanitary sewer. Since 1992, the three-phase treatment system has processed approximately 1,384,290 gallons of groundwater and discharged the treated effluent to the sanitary sewer. An estimated 5,062 pounds of gasoline have been recovered. Groundwater discharge to the sanitary sewer is authorized under the EBMUD Wastewater Discharge Permit (Account No. 500-68191).

TREATMENT SYSTEM STATUS

During the first quarter of 1999, the treatment system processed approximately 22,630 gallons of groundwater. The average daily discharge flow rate for the treatment system was approximately 294 gallons per day (gpd). Average combined extraction rate for the two extraction wells was 0.20 gallons per minute (gpm). No free phase gasoline was recovered from the groundwater by the oil water separator this quarter. Gasoline was removed in the dissolved phase and treated by the bioreactor or adsorbed by the GAC. Flow totalizer readings and system maintenance activities are summarized in Table 1.

TREATMENT SYSTEM SAMPLING AND ANALYSIS

On March 10, 1999, HLA collected samples from the two extraction wells, the separator effluent, the bioreactor effluent and the treatment system effluent. The two extraction wells are sampled from sample ports prior to entering the separator. The separator effluent was sampled by collecting a grab sample with a Teflon bailer directly from the downstream end of the oil-water separator, the bioreactor effluent sample was collected from a sampling port upstream of the GAC vessels, and the system effluent sample was collected from a sample port downstream of the third and final GAC vessel. These water samples, consisting of 40-milliliter volatile analysis vials (VOAs), were placed in ice-chilled coolers and submitted to California Laboratory Services of Rancho Cordova, California, under chain-of-custody protocol for analyses. The samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg) by EPA Test Method 8015 modified and for benzene, toluene, ethylbenzene and total xylenes (BTEX) and methyl t-butl ether (MTBE) by EPA Test Method 8020.

Results of the chemical analyses of these samples indicate that treatment system effluent concentrations were below the EBMUD discharge limitations of 5 micrograms per liter (µg/l) for each individual BTEX components. HLA's treatment system sampling results are presented in Table 2. The laboratory reports are presented in the Appendix A.

GROUNDWATER SAMPLING AND ANALYSIS

On March 10, 1999, HLA measured the water levels in wells MW-1, MW-3, MW-5 and MW-6. Groundwater surface elevations are presented on Plate 1. The monitoring wells were sampled after purging at least three well volumes from each and allowing the water level to recover to at least 80 percent of the

pre-purge level. HLA monitored the pH, conductivity, and temperature of the groundwater removed during purging. Sampling was not performed until these parameters had stabilized. Three 40-milliliter VOAs of water were collected from each well with a disposable Teflon bailer. Purge water was discharged to the treatment system bioreactor.

HLA collected samples from the two extraction wells, MW-1A and MW-4, at individual sampling ports upstream of the oil-water separator.

All of the water samples were placed in ice-chilled coolers and submitted to California Laboratory Services of Rancho Cordova, California under chain-of-custody protocol. The samples were analyzed for TPHg by EPA Test Method 8015 (modified) and for BTEX and MTBE by EPA Test Method 8020. The historical analytical results are summarized in Table 3. Plate 2 presents the TPHg and BTEX results for this reporting period. The laboratory reports are presented in the Appendix A.

DISCUSSION

The treatment system continues to be effective in removing and treating TPHg and BTEX in the groundwater as evidenced by the reduction of hydrocarbon concentrations in the water sample collected from the oil/water separator effluent as compared to the bioreactor effluent. The lack of free phase product recovered in the oil/water separator indicates that source removal in the form of free product may be complete. The results of effluent sampling by HLA during this quarter show compliance with EBMUD permit discharge limitations.

The groundwater elevation was measured to range from 0.95 feet (MW-3) to 0.03 feet (MW-5) higher than last quarter's measurements. The groundwater elevations presented on Plate 1 show a depression in the groundwater surface elevation at the site of the two extraction wells. Using the groundwater elevations measured from MW-3, MW-5, and MW-6, the groundwater gradient direction appears to be toward the northwest at approximately 0.011 ft/ft. The groundwater elevation at MW-3 may be depressed by the groundwater extraction from MW-1A and MW-4.

Comparison of this quarter's sample results with historical data indicates that TPHg and BTEX concentrations in the monitoring wells remained relatively stable. The groundwater sample from the offsite well MW-6 did not contain any detectable concentrations of TPHg or BTEX. MTBE was not detected in any of the samples collected.

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

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

Ms. Trish Maguire
East Bay Municipal Utility District
P.O. Box 24055
Oakland, California, 94623-1055

Following approval of Blue Print Services, HLA will continue to perform the treatment system monitoring, quarterly groundwater monitoring and reporting as required by Alameda County, and treatment system discharge monitoring reporting as required by EBMUD. The next groundwater sampling will be performed during the second quarter of 1999 and monitoring of the system effluent will continue to be performed as required by the EBMUD permit.

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

Yours very truly,

HARDING LAWSON ASSOCIATES

James G. McCarty
Project Engineer

Stephen J. Osborne
Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
STEPHEN J. OSBORNE
No. GE 656
Exp. 3/31/99
GEOTECHNICAL
STATE OF CALIFORNIA

JGM/SJO/mlw 46559\1STQRT99

5 copies submitted

Attachments: Table 1 - City Blue Groundwater Treatment System Maintenance Log
Table 2 - Groundwater Treatment System Analytical Results
Table 3 - Groundwater Monitoring Analytical Results
Plate 1 - Groundwater Surface Elevations, March 10, 1999
Plate 2 - Groundwater Surface Elevations, March 10, 1999
Appendix A- Laboratory Reports

Table 1. City Blue Groundwater Treatment System Maintenance Log
Blue Print Services Facility
1700 Jeferson Street
Oakland, California

DATE	FLOW TOTALIZER (gal)	DISCHARGE RATE (gpd)	DISCHARGE RATE (gpm)	COMMENTS
01/07/99	1,361,660			Check system, had to clear recycle line, add two new carbon vessels
01/11/99	1,364,620	740	0.51	Check system, compressor not pressuring up, running continuously, turn system off
02/11/99	1,364,640	1	0.00	Fix compressor restart system
02/16/99	1,368,120	696	0.48	Check on system
02/18/99	1,368,800	340	0.24	System down due to rain water in containment, pump into tank and restart
02/23/99	1,371,380	516	0.36	Met EBMUD Rep/collects sample from sys-eff
02/25/99	1,372,230	425	0.30	Met EBMUD Rep/re-sample from sys-eff, sample from 2/23/99 not preserved properly by EBMUD
03/05/99	1,373,940	214	0.15	High bio-tank, restart
03/06/99	1,373,970	30	0.02	High bio-tank, discharge level float not working, fix, clean sand filter
03/09/99	1,374,190	73	0.05	Check system
03/10/99	1,375,910	1720	1.19	Sample wells and system
03/25/99	1,384,290	559	0.39	Check system, clear recycle line

Total (gallons)	Average (gpd)	Average (gpm)
22,630	294	0.20

Table 2. Groundwater Treatment System Analytical Results
Blue Print Service Facility
1700 Jefferson Street
Oakland, California

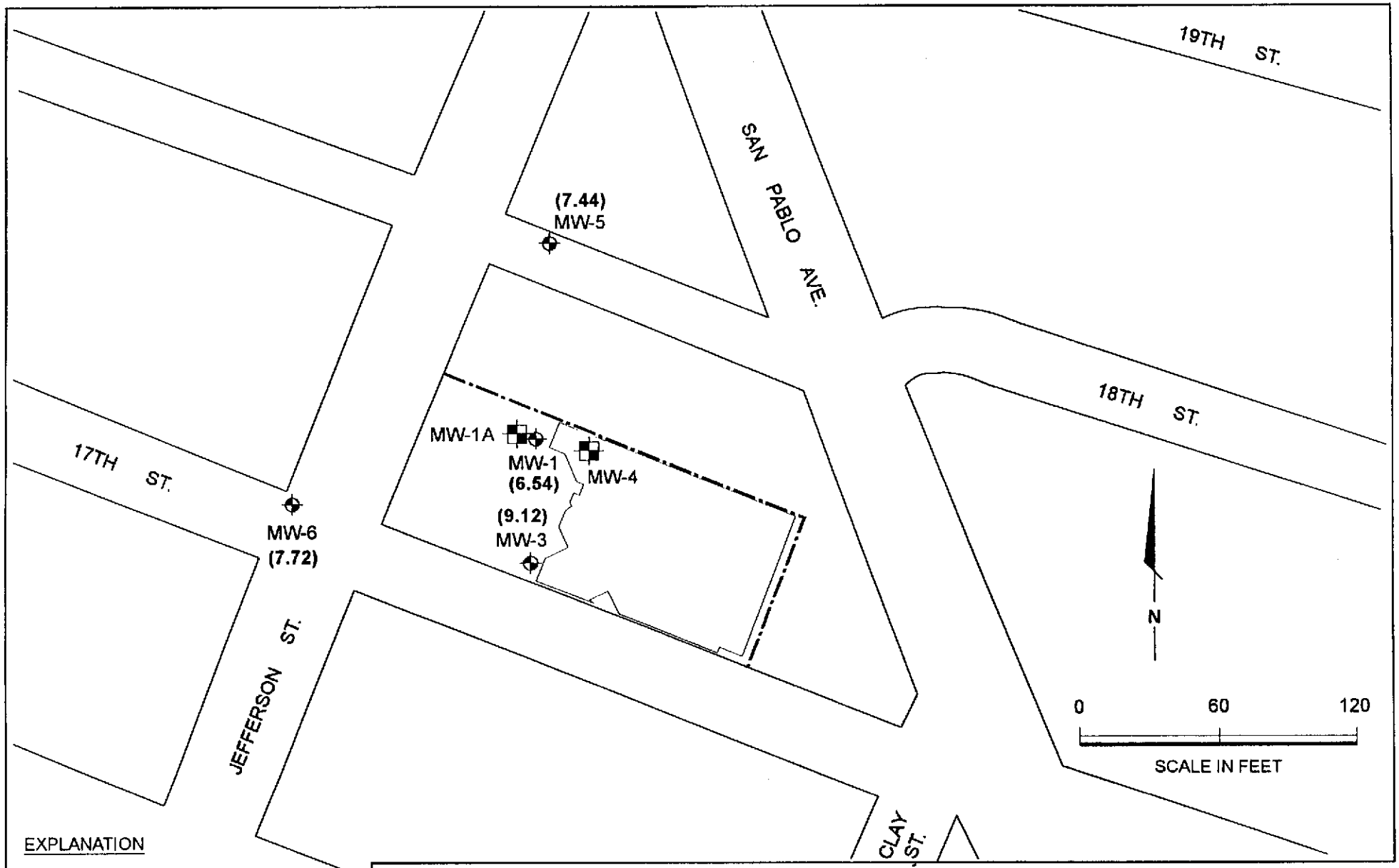
Date/Analytes	Bioreactor *Influent*	Bioreactor Effluent	First Carbon Bed Effluent	Second Carbon Bed Effluent	Third* Carbon Bed Effluent
10-Mar-99					
TPHg	8.5	1.4	NA	NA	ND(0.05)
Benzene	1,400	19	NA	NA	ND(0.30)
Toluene	910	13	NA	NA	ND(0.30)
Ethylbenzene	20	0.69	NA	NA	ND(0.30)
Xylene	1,700	38	NA	NA	ND(0.60)

TPHg = total petroleum hydrocarbons as gasoline
TPHg concentrations presented in milligrams per liter (mg/l)
Benzene, Toluene, Ethylbenzene, and Xylenes concentrations presented in micrograms per liter (µg/l)
ND = Not detected above the reporting limit in parenthesis
NA = Not analyzed

Table 3. Groundwater Monitoring Analytical Results
Blue Print Service Facility
1700 Jefferson Street
Oakland, California

	Date Sampled																							
TPHg (mg/l)	8/1/91	9/30/92	3/30/93	1/13/94	4/13/94	6/29/94	12/8/94	4/3/95	6/27/95	9/19/95	12/13/95	3/6/96	6/11/96	9/19/96	12/23/96	3/27/97	6/4/97	9/26/97	12/23/97	3/31/98	6/18/98	8/28/98	12/2/98	3/10/99
MW-1	FP	FP	FP	FP	FP	FP	FP	NA	NA	NA	NA	NA	FP	FP	FP	FP	68	59	41	44	32	26	26	26
MW-1A	350	FP	FP	FP	170	95	190	67	53	52	62	200	140	100	FP	66	54	73	68	51	50	15	41	9.9
MW-3	74	FP	FP	FP	FP	39	4,600	51	20	6.2	19	7	16	6	FP	FP	85	47	32	32	16	17	3.2	9.6
MW-4	88	FP	FP	FP	58	16	92	35	13	14	11	110	260	95	FP	37	24	41	48	NA	25	48	10	11
MW-5	120	51	74	80	63	64	59	51	41	50	45	51	48	48	45	44	35	36	39	48	17	16	15	23
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	FP	FP	FP	FP	FP	NA	NA	NA	NA	NA	FP	FP	FP	FP	2,200	6,000	6,800	8,300	1,100	8,600	9,200	8,200
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	FP	12,000	11,000	10,000	10,000	9,100	11,000	1,100	8,500	2,300
MW-3	1,600	FP	FP	FP	FP	3,200	1,500	1,100	270	70	220	120	170	45	FP	FP	8,500	610	640	690	180	84	39	86
MW-4	1,500	FP	FP	FP	1,500	1,300	1,700	1,200	1,300	2,200	630	2,800	6,600	9,900	FP	2,600	2,600	2,900	6,000	NA	2,000	9,700	1,700	2,900
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	12,000	11,000	8,900	7,900	13,000	10,000	9,500	5,400	8,400	14,000
MW-6	--	--	--	--	--	--	--	--	--	--	--	--	ND(0.5)	ND(0.5)	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)
Toluene (µg/l)																								
MW-1	FP	FP	FP	FP	FP	FP	FP	NA	NA	NA	NA	NA	FP	FP	FP	14,000	4,500	3,000	3,000	3,700	3,800	2,300	4,300	5,900
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	FP	15,000	12,000	16,000	16,000	11,000	15,000	830	11,000	1,900
MW-3	4,600	FP	FP	FP	FP	2,900	4,200	2,300	550	140	480	170	270	30	FP	FP	13,000	6,000	5,300	3,800	1,500	1,100	85	540
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	FP	6,900	3,200	5,000	11,000	NA	460	11,000	610	2,100
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	2,200	1,100	560	270	500	400	310	160	120	300
MW-6	--	--	--	--	--	--	--	--	--	--	--	--	ND(0.5)	ND(0.5)	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)
Ethylbenzene (µg/l)																								
MW-1	FP	FP	FP	FP	FP	FP	FP	NA	NA	NA	NA	NA	FP	FP	FP	FP	1,500	1,800	1,400	1,100	550	730	820	870
MW-1A	3,000	FP	FP	FP	2,100	1,500	1,400	910	500	710	790	2,700	2,800	2,100	FP	1,400	1,000	1,400	1,400	1,100	870	31	720	1,600
MW-3	670	FP	FP	FP	FP	580	6,000	580	190	68	140	49	68	15	FP	FP	2,400	930	800	870	490	430	25	250
MW-4	1,000	FP	FP	FP	520	51	310	280	77	110	14	780	3,700	2,000	FP	540	140	350	580	NA	ND(15)	890	ND(15)	88
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	2,700	1,900	1,500	1,500	1,900	2,000	420	1,100	1,500	1,800
MW-6	--	--	--	--	--	--	--	--	--	--	--	--	ND(0.5)	ND(0.5)	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)
Xylenes (µg/l)																								
MW-1	FP	FP	FP	FP	FP	FP	FP	NA	NA	NA	NA	NA	FP	FP	FP	FP	11,000	8,600	6,600	4,300	3,000	2,100	2,800	3,500
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	FP	100	7,200	8,500	12,000	6,800	5,800	3,000	6,700	2,300
MW-3	4,300	FP	FP	FP	FP	4,300	95,000	4,800	1,700	500	1,700	440	1,500	300	FP	FP	16,000	5,900	5,900	5,200	3,700	3,800	360	2,300
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	FP	5,500	3,500	4,800	8,200	NA	6,400	5,000	2,300	1,600
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	6,500	2,800	1,700	1,300	1,700	2,200	850	900	840	1,100
MW-6	--	--	--	--	--	--	--	--	--	--	--	--	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(0.60)	ND(0.60)	ND(0.60)	ND(0.60)
MTBE (µg/l)																								
MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	FP	FP	ND(500)	ND(500)	300	420	ND(50)	ND(50)	ND(50)	ND(50)
MW-1A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,800	ND(500)	ND(500)	1,900	300	ND(50)	ND(50)	ND(50)	ND(50)
MW-3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	FP	FP	ND(500)	ND(100)	ND(300)	350	ND(25)	ND(50)	ND(50)	ND(25)
MW-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,400	ND(300)	ND(500)	270	NA	ND(50)	ND(50)	ND(50)	ND(25)
MW-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	600	300	ND(100)	ND(500)	ND(1000)	350	ND(10)	ND(50)	ND(50)	ND(50)
MW-6	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	ND(5)	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 did not exist at date indicated



EXPLANATION

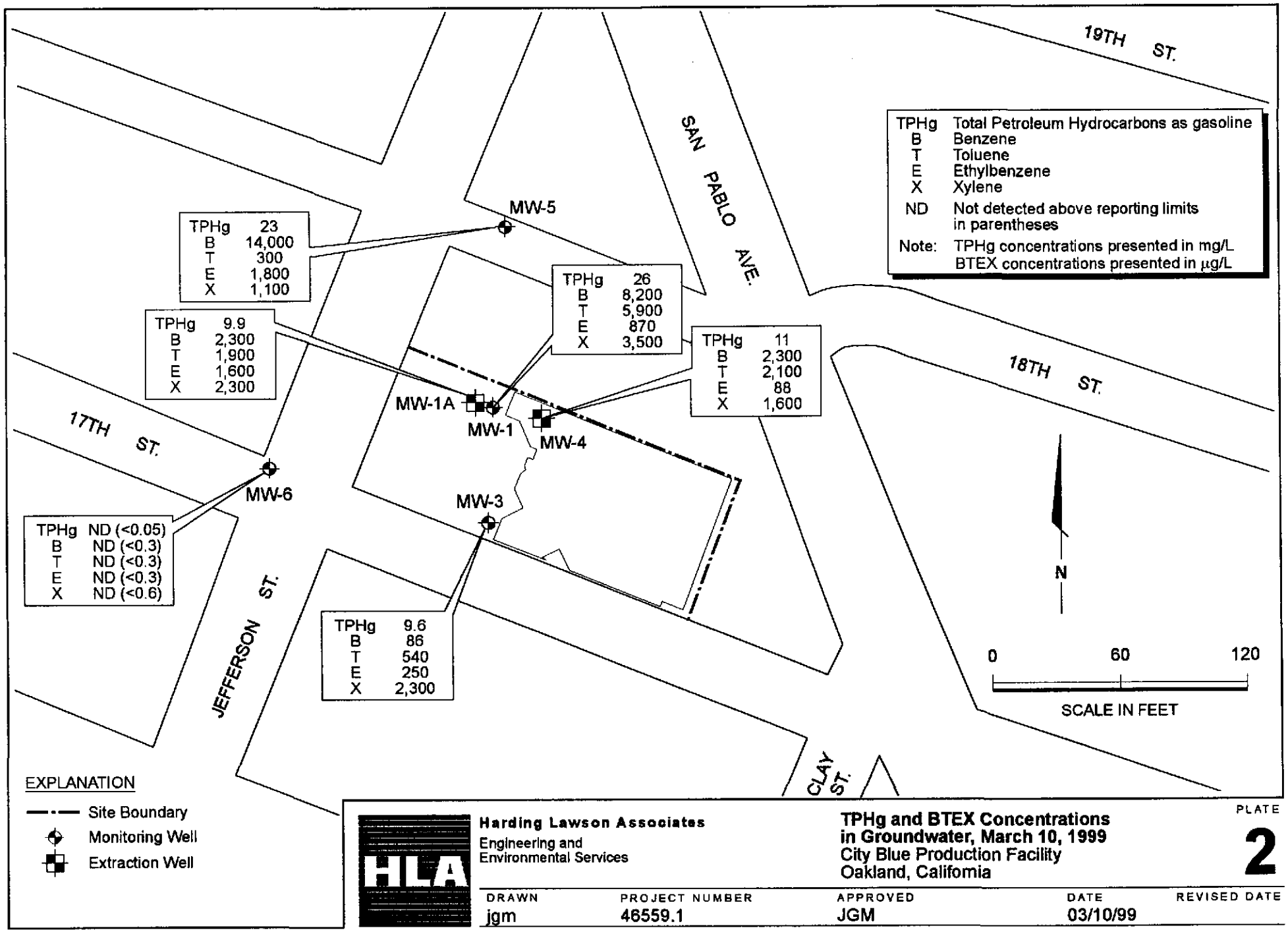
- Site Boundary
- Monitoring Well
- Extraction Well
- (9.12) Groundwater Elevation (in feet based on City of Oakland datum)

Harding Lawson Associates
Engineering and Environmental Services

Groundwater Surface Elevations
March 10, 1999
City Blue Production Facility
Oakland, California

PLATE **1**

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
jgm	46559.1	JGM	03/10/99	



Harding Lawson Associates
Engineering and Environmental Services

TPHg and BTEX Concentrations in Groundwater, March 10, 1999
City Blue Production Facility
Oakland, California

PLATE **2**

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
jgm	46559.1	JGM	03/10/99	

APPENDIX A

LABORATORY REPORTS

CLS Labs

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

03/16/99

Attention: **Jim McCarty**

Reference: **Analytical Results**

Project Name: **City Blue GW Mon**
Project No.: **46449-1**
Date Received: **03/11/99**
Chain Of Custody: **2119**

CLS ID No.: **R0687**
CLS Job No.: **820687**

The following analyses were performed on the above referenced project:

No. of Samples	*Turnaround Time*	*Analysis Description*
6	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

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

CHAIN OF CUSTODY FORM

12687

Lab: Nº 2119

Samplers: JGM

Job Number: 46449-1

Name/Location: City Blue GW Mon

Project Manager: Jim McCarty

Recorder: James McCart (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	X	MW-1			9	9	0	3 1 0	0935	
										MW-1A							0949	
										MW-3							0905	
										MW-4							0950	
										MW-5							0810	
										MW-6							0727	

ANALYSIS REQUESTED	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	METALS	EPA 8015M/TPHg	EPA 8020/BTEX + MTBE	EPA 8015M/TPHd.o
						X	X	
						X	X	
						X	X	
						X	X	
						X	X	
						X	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
James McCart		3/11/94 1230
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
	3/11/94	1230

METHOD OF SHIPMENT

SAMPLE CONDITION WHEN RECEIVED BY THE LABORATORY

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

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 GW Mon**

Date Sampled: **03/10/99**
Date Received: **03/11/99**
Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **MW-1**

Project No.: **46449-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0687-1A**
Job No.: **820687**
COC Log No.: **2119**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (ug/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	1000	113

Sample: **MW-1**

Analyte	CAS No.	Results (ug/L)	Rep. Limit (ug/L)	Dilution (factor)
Methyl t-butyl ether	1634-04-4	ND	50	50
Benzene	71-43-2	8200	150	250
Toluene	108-88-3	5900	150	250
Ethylbenzene	100-41-4	870	15	50
Xylenes, total	1330-20-7	3500	30	50

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 GW Mon**

Date Sampled: **03/10/99**
Date Received: **03/11/99**
Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **MW-1A**

Project No.: **46449-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0687-2A**
Job No.: **820687**
COC Log No.: **2119**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (ug/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	1000	104

Sample: **MW-1A**

Analyte	CAS No.	Results (ug/L)	Rep. Limit (ug/L)	Dilution (factor)
Methyl t-butyl ether	1634-04-4	ND	50	50
Benzene	71-43-2	2300	15	50
Toluene	108-88-3	1900	15	50
Ethylbenzene	100-41-4	1600	15	50
Xylenes, total	1330-20-7	2300	30	50

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 GW Mon**

Date Sampled: **03/10/99**
Date Received: **03/11/99**
Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **MW-3**

Project No.: **46449-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0687-3A**
Job No.: **820687**
COC Log No.: **2119**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (ug/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	500	117

Sample: **MW-3**

Analyte	CAS No.	Results (ug/L)	Rep. Limit (ug/L)	Dilution (factor)
Methyl t-butyl ether	1634-04-4	ND	25	25
Benzene	71-43-2	86	7.5	25
Toluene	108-88-3	540	7.5	25
Ethylbenzene	100-41-4	250	7.5	25
Xylenes, total	1330-20-7	2300	15	25

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 GW Mon**

Date Sampled: **03/10/99**
Date Received: **03/11/99**
Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **MW-4**

Project No.: **46449-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0687-4A**
Job No.: **820687**
COC Log No.: **2119**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (ug/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	500	103

Sample: **MW-4**

Analyte	CAS No.	Results (ug/L)	Rep. Limit (ug/L)	Dilution (factor)
Methyl t-butyl ether	1634-04-4	ND	25	25
Benzene	71-43-2	2300	75	250
Toluene	108-88-3	2100	75	250
Ethylbenzene	100-41-4	88	7.5	25
Xylenes, total	1330-20-7	1600	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 GW Mon**

Date Sampled: **03/10/99**
Date Received: **03/11/99**
Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **MW-5**

Project No.: **46449-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0687-5A**
Job No.: **820687**
COC Log No.: **2119**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (ug/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	1000	118

Sample: **MW-5**

Analyte	CAS No.	Results (ug/L)	Rep. Limit (ug/L)	Dilution (factor)
Methyl t-butyl ether	1634-04-4	ND	50	50
Benzene	71-43-2	14000	300	1000
Toluene	108-88-3	300	15	50
Ethylbenzene	100-41-4	1800	15	50
Xylenes, total	1330-20-7	1100	30	50

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 GW Mon**

Date Sampled: **03/10/99**
Date Received: **03/11/99**
Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **MW-6**

Project No.: **46449-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0687-6A**
Job No.: **820687**
COC Log No.: **2119**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (ug/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	20.0	114

Sample: **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 GW Mon**

Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**

Project No.: **46449-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **RO687**
Job No.: **820687**
COC Log No.: **2119**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

MB SURROGATE

Analyte	CAS No.	Surr Conc. (ug/L)	MB Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	20.0	116

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 GW Mon**

Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**

Project No.: **46449-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0687**
Job No.: **820687**
COC Log No.: **2119**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

MS SURROGATE

Analyte	CAS No.	MS Surr. Conc. (ug/L)	MS Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	20.0	106

MATRIX SPIKE

Analyte	CAS No.	MS Conc. (ug/L)	MS Recovery (percent)
Benzene	71-43-2	20.0	103
Toluene	108-88-3	20.0	100
Ethylbenzene	100-41-4	20.0	100
Xylenes, total	1330-20-7	60.0	104

MSD SURROGATE

Analyte	CAS No.	Surr. Conc. (ug/L)	MSD Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	20.0	106

MATRIX SPIKE DUPLICATE

Analyte	CAS No.	MSD Conc. (ug/L)	MSD Recovery (percent)
Benzene	71-43-2	20.0	105
Toluene	108-88-3	20.0	101
Ethylbenzene	100-41-4	20.0	100
Xylenes, total	1330-20-7	60.0	106

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 GW Mon**

Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**

Project No.: **46449-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0687**
Job No.: **820687**
COC Log No.: **2119**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

RELATIVE % DIFFERENCE(cont.)

Analyte	CAS No.	Relative Percent Difference (percent)
Benzene	71-43-2	2
Toluene	108-88-3	1
Ethylbenzene	100-41-4	0
Xylenes, total	1330-20-7	2

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 GW Mon**

Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**

Project No.: **46449-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **RO687**
Job No.: **820687**
COC Log No.: **2119**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

LCS SURROGATE

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

LAB CONTROL SAMPLE

Analyte	CAS No.	LCS Conc. (ug/L)	LCS Recovery (percent)
Benzene	71-43-2	20.0	92
Toluene	108-88-3	20.0	88
Ethylbenzene	100-41-4	20.0	97
Xylenes, total	1330-20-7	60.0	99

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 GW Mon**

Date Sampled: **03/10/99**
Date Received: **03/11/99**
Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **MW-1**

Project No.: **46449-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0687-1A**
Job No.: **820687**
COC Log No.: **2119**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (mg/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	1.00	70 MA

Sample: **MW-1**

Analyte	CAS No.	Results (mg/L)	Rep. Limit (mg/L)	Dilution (factor)
TPH as Gasoline	N/A	26	2.5	50

MA = Recovery data is outside standard QC limits due to matrix interference. LCS recovery data validates methodology.

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 GW Mon**

Date Sampled: **03/10/99**
Date Received: **03/11/99**
Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **MW-1A**

Project No.: **46449-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0687-2A**
Job No.: **820687**
COC Log No.: **2119**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (mg/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	1.00	79

Sample: **MW-1A**

Analyte	CAS No.	Results (mg/L)	Rep. Limit (mg/L)	Dilution (factor)
TPH as Gasoline	N/A	9.9	2.5	50

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 GW Mon**

Date Sampled: **03/10/99**
Date Received: **03/11/99**
Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **MW-3**

Project No.: **46449-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0687-3A**
Job No.: **820687**
COC Log No.: **2119**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (mg/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	0.500	76

Sample: **MW-3**

Analyte	CAS No.	Results (mg/L)	Rep. Limit (mg/L)	Dilution (factor)
TPH as Gasoline	N/A	9.6	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 GW Mon**

Date Sampled: **03/10/99**
Date Received: **03/11/99**
Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **MW-4**

Project No.: **46449-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0687-4A**
Job No.: **820687**
COC Log No.: **2119**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (mg/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	0.500	76

Sample: **MW-4**

Analyte	CAS No.	Results (mg/L)	Rep. Limit (mg/L)	Dilution (factor)
TPH as Gasoline	N/A	11	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 GW Mon**

Date Sampled: **03/10/99**
Date Received: **03/11/99**
Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **MW-5**

Project No.: **46449-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0687-5A**
Job No.: **820687**
COC Log No.: **2119**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (mg/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	1.00	103

Sample: **MW-5**

Analyte	CAS No.	Results (mg/L)	Rep. Limit (mg/L)	Dilution (factor)
TPH as Gasoline	N/A	23	2.5	50

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 GW Mon**

Date Sampled: **03/10/99**
Date Received: **03/11/99**
Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **MW-6**

Project No.: **46449-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0687-6A**
Job No.: **820687**
COC Log No.: **2119**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (mg/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	0.0200	73

Sample: **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 GW Mon**

Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**

Project No.: **46449-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0687**
Job No.: **820687**
COC Log No.: **2119**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

MB SURROGATE

Analyte	CAS No.	Surr Conc. (mg/L)	MB Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	0.0200	89

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

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

CHAIN OF CUSTODY FORM

20686

Lab: Nº 2118

Samplers: JGM

Job Number: 42577-1

Name/Location: City Blue Ox #1

Project Manager: Jim McCarty

Recorder: James McCarty (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	X	Bio-Eff			99	03	10	0946	
	↓							↓	↓	Step-Eff						1000	
	↓							↓	↓	Sys-Eff						0945	

ANALYSIS REQUESTED	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	METALS	EPA 8015M/TPHg	EPA 8020/BTEX	EPA 8015M/TPHd.o	EPA 8020 MTBE
						X	X		X
						X	X		X
						X	X		X

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

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) James McCarty	RECEIVED BY: (Signature)	DATE/TIME 3/11/99 12:30
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 3/11/99 FW

METHOD OF SHIPMENT

SAMPLE CONDITION WHEN RECEIVED BY THE LABORATORY

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

CLS Labs

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

03/16/99

Attention: **Jim McCarty**

Reference: **Analytical Results**

Project Name: **City Blue O&M**
Project No.: **42577-1**
Date Received: **03/11/99**
Chain Of Custody: **2118**

CLS ID No.: **R0686**
CLS Job No.: **820686**

The following analyses were performed on the above referenced project:

No. of Samples	*Turnaround Time*	*Analysis Description*
3	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 O&M**

Date Sampled: **03/10/99**
Date Received: **03/11/99**
Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **Bio-Eff**

Project No.: **42577-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0686-1A**
Job No.: **820686**
COC Log No.: **2118**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (mg/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	0.0200	56 MA

BIO-EFF

Analyte	CAS No.	Results (mg/L)	Rep. Limit (mg/L)	Dilution (factor)
TPH as Gasoline	N/A	1.4	0.050	1.0

MA = Recovery data is outside standard QC limits due to matrix interference. LCS recovery data validates methodology.

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 O&M**

Date Sampled: **03/10/99**
Date Received: **03/11/99**
Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **Sep-Eff**

Project No.: **42577-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0686-2A**
Job No.: **820686**
COC Log No.: **2118**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (mg/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	0.200	6 MA

SEP-EFF

Analyte	CAS No.	Results (mg/L)	Rep. Limit (mg/L)	Dilution (factor)
TPH as Gasoline	N/A	8.5	0.50	10

MA = Recovery data is outside standard QC limits due to matrix interference. LCS recovery data validates methodology.

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 O&M**

Date Sampled: **03/10/99**
Date Received: **03/11/99**
Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **Sys-Eff**

Project No.: **42577-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0686-3A**
Job No.: **820686**
COC Log No.: **2118**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (mg/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	0.0200	84

SYS-EFF

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 O&M**

Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**

Project No.: **42577-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0686**
Job No.: **820686**
COC Log No.: **2118**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

MB SURROGATE

Analyte	CAS No.	Surr Conc. (mg/L)	MB Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	0.0200	89

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 O&M**

Date Sampled: **03/10/99**
Date Received: **03/11/99**
Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **Bio-Eff**

Project No.: **42577-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0686-1A**
Job No.: **820686**
COC Log No.: **2118**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (ug/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	20.0	102

BIO-EFF

Analyte	CAS No.	Results (ug/L)	Rep. Limit (ug/L)	Dilution (factor)
Methyl t-butyl ether	1634-04-4	1.5	1.0	1.0
Benzene	71-43-2	19	0.30	1.0
Toluene	108-88-3	13	0.30	1.0
Ethylbenzene	100-41-4	0.69	0.30	1.0
Xylenes, total	1330-20-7	38	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 O&M**

Date Sampled: **03/10/99**
Date Received: **03/11/99**
Date Extracted: **03/12/99**
Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **Sep-Eff**

Project No.: **42577-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0686-2A**
Job No.: **820686**
COC Log No.: **2118**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (ug/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	199	101

SEP-EFF

Analyte	CAS No.	Results (ug/L)	Rep. Limit (ug/L)	Dilution (factor)
Methyl t-butyl ether	1634-04-4	ND	10	10
Benzene	71-43-2	1400	30	100
Toluene	108-88-3	910	30	100
Ethylbenzene	100-41-4	20	3.0	10
Xylenes, total	1330-20-7	1700	60	100

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 O&M**

Date Sampled: **03/10/99**
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Date Analyzed: **03/12/99**
Date Reported: **03/16/99**
Client ID No.: **Sys-Eff**

Project No.: **42577-1**
Contact: **Jim McCarty**
Phone: **(510)451-1001**

Lab Contact: **James Liang**
Lab ID No.: **R0686-3A**
Job No.: **820686**
COC Log No.: **2118**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

SURROGATE

Analyte	CAS No.	Surr Conc. (ug/L)	Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	20.0	117

SYS-EFF

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**
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383 4th Street, Third Floor
Oakland, CA 94607

Project: **City Blue O&M**

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Lab Contact: **James Liang**
Lab ID No.: **R0686**
Job No.: **820686**
COC Log No.: **2118**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

MB SURROGATE

Analyte	CAS No.	Surr Conc. (ug/L)	MB Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	20.0	116

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
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Project No.: **42577-1**
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Lab Contact: **James Liang**
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Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

MS SURROGATE

Analyte	CAS No.	MS Surr. Conc. (ug/L)	MS Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	20.0	106

MATRIX SPIKE

Analyte	CAS No.	MS Conc. (ug/L)	MS Recovery (percent)
Benzene	71-43-2	20.0	103
Toluene	108-88-3	20.0	100
Ethylbenzene	100-41-4	20.0	100
Xylenes, total	1330-20-7	60.0	104

MSD SURROGATE

Analyte	CAS No.	Surr. Conc. (ug/L)	MSD Surrogate Recovery (percent)
o-Chlorotoluene	95-49-8	20.0	106

MATRIX SPIKE DUPLICATE

Analyte	CAS No.	MSD Conc. (ug/L)	MSD Recovery (percent)
Benzene	71-43-2	20.0	105
Toluene	108-88-3	20.0	101
Ethylbenzene	100-41-4	20.0	100
Xylenes, total	1330-20-7	60.0	106

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
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Oakland, CA 94607

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Lab Contact: **James Liang**
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COC Log No.: **2118**
Batch No.: **25046**
Instrument ID: **GC007**
Analyst ID: **SCOTTF**
Matrix: **WATER**

RELATIVE % DIFFERENCE(cont.)

Analyte	CAS No.	Relative Percent Difference (percent)
Benzene	71-43-2	2
Toluene	108-88-3	1
Ethylbenzene	100-41-4	0
Xylenes, total	1330-20-7	2

CLS Labs

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

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Batch No.: **25046**
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Analyst ID: **SCOTTF**
Matrix: **WATER**

LCS SURROGATE

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

LAB CONTROL SAMPLE

Analyte	CAS No.	LCS Conc. (ug/L)	LCS Recovery (percent)
Benzene	71-43-2	20.0	92
Toluene	108-88-3	20.0	88
Ethylbenzene	100-41-4	20.0	97
Xylenes, total	1330-20-7	60.0	99