Harding Lawson Associates

May 11, 1995

11295 012

Mr. Thomas Peacock
Alameda County Health Care Services
Department of Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502-6577

Blue Print Service Company Facility
1700 Jefferson Street
Oakland, California

Dear Mr. Peacock:

Harding Lawson Associates (HLA) received your Notice of Violation dated April 12, 1995 addressed to Blue Print Service Company (BPS) on May 5, 1995. You stated in your letter that you have not received any correspondence from BPS or HLA since June 21, 1994 and that there are several items that BPS must take care of concerning the cleanup of the 1700 Jefferson Street site.

HLA issued a semiannual report to your office on January 11, 1995. This report addressed the first two items in your Notice of Violation. The January 11, 1995 report presents groundwater monitoring data for all four wells at the site (Monitoring Well MW-2 was destroyed during construction of the present facility). The results presented in that report were from samples collected on June 29, 1994 and December 8, 1994.

More recently, HLA issued a quarterly report to you dated April 28, 1995 with groundwater monitoring results from April 3, 1995. HLA has been authorized by BPS to perform quarterly groundwater monitoring and reporting for 1995. The April 28, 1995 is the first quarterly report for 1995.

HLA has responded several times to Items 1. through 3. of your Notice of Violation in letters dated December 8, 1992, and March 9, 1994; in a Quarterly Report dated April 29, 1994, and in the report dated January 11, 1995. We are concerned that you are not receiving or not reviewing these letters and reports.

As you know, BPS has been issued a letter of commitment from the SWRCB Cleanup Fund. HLA is surprised that this Notice of Violation was issued and we are concerned that it may result in unwarranted delays by the SWRCB in issuing the committed funds to BPS. We believe that BPS has been in compliance with your directives (Item 6. of your April 12, 1995 letter) and are attaching copies of all previous correspondence referenced in this letter that address your concerns. A copy of this letter (without attachments) is being forwarded to the representatives that were issued copies of your Notice of Violation.

Please contact David Scrivner at (510) 687-9660 if you have any questions regarding the groundwater treatment system or groundwater monitoring at the 1700 Jefferson Street site.

Yours very truly,

HARDING LAWSON ASSOCIATES

David F. Scrivner, P.E.
Project Engineer

David R. Kleesattel, R.G.
Associate Geologist

Attachments: HLA Letter dated December 8, 1992
HLA Letter dated March 9, 1994
Quarterly Report dated April 29, 1994
Semiannual Report dated January 11, 1995
Quarterly Report dated April 28, 1995

DFS/DRK/mlw 034610M

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

Mr. Dave Deaner
SWRCB Division of Clean Water Program
2014 T Street, Suite 130
P.O. Box 944212
Sacramento, California 94244-2120

Mr. Gil Jensen
Alameda County District Attorney's Office
7677 Oakport Street, Room 400
Oakland, California 94621

Mr. Steve Morse
Regional Water Quality Control Board
2101 Webster Street, Suite 500
Oakland, California 94612

Mr. Bill Raynolds, Chief - files
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway
Alameda, California 94502-6577

December 8, 1992

11295-012

Alameda County Health Care Services Agency
Department of Environmental Health
Hazardous Materials Program
80 Swan Way, Room 200
Oakland, California 94621

Attention: Mr. Thomas Peacock
Supervising Hazardous Materials Specialist

Gentlemen:

Groundwater Remediation System
City Blue Production Facility
1700 Jefferson Street
Oakland, California

This letter responds to your letter, dated November 2, 1992 to Blue Print Service (BPS) Company. Your letter discussed site remediation and the groundwater treatment system at the BPS facility at 1700 Jefferson Street in Oakland, California.

BACKGROUND

The groundwater treatment system was constructed and began operating on June 1, 1992. Harding Lawson Associates (HLA) has been operating, monitoring, and maintaining the system since the startup date, in accordance with our proposal to BPS dated January 31, 1992.

Air and water samples from the treatment system were collected by HLA for chemical analysis daily for the first three days of operation; weekly for the first three weeks; and monthly thereafter. The monitoring wells are being sampled semi-annually. The samples were analyzed for total petroleum hydrocarbons as gasoline (TPH-G) and for benzene, toluene, ethyl benzene, and xylenes (BTEX). Quarterly reports presenting the analytical results were issued on July 17, 1992 and October 13, 1992. The Alameda County Health Care Services Agency (ACHCSA) is included on the distribution list for these reports. The next quarterly report is due January 15, 1993.

Your letter to BPS outlined four site remediation issues that you would like HLA to address. The first issue concerned quarterly monitoring of the onsite and offsite wells. You requested that quarterly monitoring be performed so that the site contamination may be properly evaluated. In a letter dated March 9, 1992, HLA submitted the

sampling schedule for the treatment system to the ACHCSA for comment and review. Our letter responded to questions by Mr. Paul M. Smith that were raised during a telephone conversation with HLA on February 20, 1992. In that letter we presented the sampling schedule and rationale and requested that the ACHCSA comment on the sampling schedule if they found it to be insufficient. We did not receive any comments from your office regarding the sampling program. We have followed the sampling program described above since the system began operating.

HLA has monitored product thicknesses in the onsite wells since the system began operating. The substantial amount of floating product in the onsite wells (several inches to several feet) has precluded sampling of these wells. The offsite monitoring well, MW-5, is the only well that does not contain floating product. The next scheduled sampling of the offsite monitoring well is in March 1993.

The second issue concerned high benzene levels in Monitoring Well MW-5, which is the only downgradient offsite monitoring well. MW-5 was last sampled on September 30, 1992. The laboratory analyses detected TPH-G at a concentration of 51 parts per million (ppm) and the BTEX compounds at concentrations of 13, 5.9, 1.4, and 2.6 ppm, respectively. These concentrations have decreased since the previous sampling event (referenced in your letter) performed on August 2, 1991. The laboratory analyses from the August 1991 event detected TPH-G at a concentration of 120 ppm and the BTEX compounds at concentrations of 20, 14, 1.9, and 4.9 ppm, respectively.

We are aware that the lateral extent of contamination has not been adequately defined. Negotiations with the City of Oakland for permits to install additional offsite wells in public right-of-ways has been unsuccessful. The city has denied our requests for such permits. We may pursue installing wells on private properties in the area after product recovery has been accomplished and final remediation to cleanup levels has begun.

The third issue concerned the lack of data on the capture area of the extraction wells and whether the capture area includes dissolved contaminants near Monitoring Well MW-5. The groundwater treatment system was primarily designed to remove the source of groundwater contamination (free product) from beneath the 1700 Jefferson Street site. The removal of the source has decreased contaminant concentrations in Monitoring Well MW-5 as documented above and in the quarterly reports. Final remediation of dissolved contaminants in groundwater will be considered after product removal has been accomplished. The treatment system may need to be modified at that time and may include soil-gas venting. Due to numerous documented groundwater contaminant plumes in the area, it may not be technically feasible to fully remediate dissolved concentrations in groundwater using the present pump-and-treat system.

The fourth issue concerned a release of gasoline from the system that solicited a response from the Oakland Fire Department. On October 24, 1992, the level control switches in the oil/water separator failed, resulting in overfilling of the recovered

product tank with gasoline and water. The recovered product tank overflowed into the BPS parking lot and into the street. The Oakland Fire Department was notified by an anonymous caller, who in turn contacted the manager of the BPS facility. The facility manager shut down the treatment system. HLA was notified of this incident on Monday, October 26, 1992 when an HLA technician visited the site for routine maintenance. The treatment system contractor determined that the level control switches had been fouled by a sludge buildup consisting of emulsified gasoline and water. The contractor cleaned the switches however the system has not yet been fully operational since that time. Modifications to the system to reduce the chance of a recurring failure are pending. HLA expects the system to be fully operational by January 1993.

HLA is preparing an operation manual that will include contingency plans for automatic shutdowns, accidental spills, leaks, and equipment failure. Presently, a contingency/information sheet is posted in the treatment system area. This sheet includes emergency shutdown procedures, emergency telephone numbers, and contacts at HLA and BPS.

Your office will be receiving the next quarterly report in January 1993. We hope this letter provides the information you request at this time. If you require additional information, please do not hesitate to contact either of the undersigned.

Yours very truly,

HARDING LAWSON ASSOCIATES

David F. Scrivner
Project Engineer

Cheryl Lee Nelson
Senior Hydrogeologist

DFS/CLN/dm/B13547-CT79

cc: Blue Print Services Company
149 Second Street
San Francisco, California 94105
Attention: Mr. Jeff Christoff

Harding Lawson Associates

March 9, 1994

11295-012

Mr. Thomas Peacock
Alameda County Health Care Services Agency
Department of Environmental Health
Hazardous Materials Program
80 Swan Way, Room 200
Oakland, California 94621

Groundwater Remediation
Blue Print Service Company Facility
1700 Jefferson Street
Oakland, California

Dear Mr. Peacock:

This letter responds to your notice of violation letter dated October 19, 1993. Your letter concerned groundwater remediation and groundwater monitoring at the Blue Print Service Company (BPS) facility at 1700 Jefferson Street (City Blue) in Oakland, California. In your letter you presented five comments to be considered. A copy of your letter is attached for reference.

Your first comment concerns groundwater sampling of the five monitoring wells for this site. The four onsite monitoring wells (MW-1, MW-1A, MW-3 and MW-4) all contain separate-phase gasoline (floating product). Product thicknesses were last measured in January 1994 and are tabulated along with past measurements in Table 1. We do not recommend that groundwater in these wells be sampled as long as they contain floating product as the product continues to act as a source for the dissolved hydrocarbon concentrations. We plan to resume sampling of onsite wells when they no longer contain floating product. In the meantime we will be monitoring product thicknesses, bailing floating product from MW-1 and MW-3 on a weekly basis, and sampling the groundwater entering the treatment system from extraction wells MW-1A and MW-4 on a monthly basis. The results of these activities will be presented in the next quarterly report in April 1994.

The offsite monitoring well, MW-5, was sampled on January 13, 1994. Prior to purging, MW-5 was checked for floating product with an electric interface probe and a PVC bailer. No floating product or sheen was detected. The analytical results for MW-5 show an increase in total petroleum hydrocarbons as gasoline (TPH-G), benzene, and toluene since the previous sampling event in March 1993. Over this period the groundwater treatment system was not in operation due to system upgrades. MW-5 was previously sampled in August 1991 and September 1992. The analytical results from the August 1991

and September 1992 sampling events show a dramatic decrease in TPH-G, benzene, and toluene concentrations over that period. We believe that this decrease may be due to the continuous operation of the groundwater treatment system within that period. The treatment system began operating in June 1992, three months before the September 1992 sampling. We plan to sample MW-5 on a quarterly basis in 1994 to measure the effect of the groundwater extraction and treatment system on this well.

The second comment concerned the lack of data on the capture area of the extraction wells and whether or not it includes the offsite well, MW-5. HLA presented the results of aquifer testing and a groundwater treatment cost feasibility study for this site in a report dated February 2, 1990. HLA performed slug tests on MW-3 and MW-5 to evaluate expected short-term and long-term flow rates from extraction wells. A hydraulic conductivity estimate of 1.48 feet/day was derived from a slug test performed on MW-3. Computer simulations indicated that pumping rates from the extraction wells would likely be less than 1 gallon per minute (gpm) per well and that long-term pumping rates will likely decrease to less than 0.25 gpm per well. Additional computer simulations indicated that these pumping rates will effectively capture groundwater in the vicinity of the former UST excavation. Actual pumping rates will be measured by HLA in this quarter and presented in the next quarterly report. We do not believe that MW-5 is within the capture area of the extraction wells. The groundwater treatment system was primarily designed to remove the source of groundwater contamination (floating product) from beneath the site. Final remediation of dissolved hydrocarbons in groundwater will be considered after product removal has been accomplished. Due to numerous documented groundwater contaminant plumes in the area, it may not be technically feasible to fully remediate dissolved concentrations in groundwater using the present pump-and-treat system.

The third comment was a request for BPS to submit a proposal for what to do to define and contain the plume. HLA previously pursued additional offsite wells in the public right-of-way but was denied the necessary permits by the City of Oakland. BPS and HLA would like to meet with you to discuss this issue. In the meantime we will contact the City of Oakland to determine if they have changed their policy regarding permits for monitoring wells in the public right-of-way.

In response to your fifth comment, HLA responded to your November 2, 1992 letter in a letter dated December 8, 1992. A copy of that letter is attached.

The groundwater treatment system resumed full time operation on March 3, 1994. We will be issuing our next quarterly report in April 1994 for the period of December 31, 1993 through March 31, 1994. After you have reviewed our quarterly report we would like to meet with you to discuss this project.

If you have any questions, please contact Mr. David Scrivner at (510)687-9660.

Yours very truly,

HARDING LAWSON ASSOCIATES

David F. Scrivner
Project Engineer

Cheryl Lee Nelson
Senior Environmental Scientist

DFS/prm/A14494-CT68

Attachments: Table 1. Product Thickness Measurements
October 19, 1993 Notice of Violation Letter
December 8, 1992 HLA Letter to Alameda County

cc: Blessy Torres
State of California
Underground Storage Tank Clean Up Fund Program
2014 T Street, Suite 130
P.O. Box 944212
Sacramento, California 94244-2120

Herbert Liberman
Blue Print Service Company
149 Second Street
San Francisco, California 94105

Table 1. Monitoring Well Product Thickness Measurements

Date	MW-1	MW-1A	MW-3	MW-4	MW-5
07/08/87	30	NA	0	NA	NA
07/12/89	21.6	18.6	0	25.2	0.4
06/18/92	34	NM	NM	NM	NM
07/02/92	18	NM	NM	NM	NM
07/23/92	10	NM	NM	NM	NM
08/18/92	10	NM	NM	NM	NM
09/30/92	NM	NM	4.1	NM	0
11/11/92	13	NM	2	NM	NM
01/29/93	25.2	NM	1.7	NM	NM
02/12/93	10.2	13	1.3	8.8	0
03/30/93	NM	NM	NM	NM	0.06
01/06/94	14.8	16.2	2.2	6.2	0

All measurements in inches.
NM = Not measured

April 29, 1994

11295 012

Mr. Jeff Christoff
Blue Print Service Company
149 Second Street
San Francisco, California 94105

Quarterly Report
January 1, 1994 through March 31, 1994
City Blue Groundwater Treatment System
1700 Jefferson Street
Oakland, California

Dear Mr. Christoff:

This letter presents the current status and discusses the results of groundwater sampling and analysis at the City Blue Production facility, 1700 Jefferson Street, Oakland, California for the period of January 1, 1994 through March 31, 1994.

BACKGROUND

Three underground storage tanks (USTs) were removed from the northwestern portion of the property in June 1987 (Plate 1). Monitoring wells were installed on the property to evaluate the distribution of petroleum hydrocarbons in the soil and groundwater and determine the direction of groundwater flow.

Separate-phase petroleum hydrocarbons (gasoline) were found floating on the surface of the groundwater in Monitoring Well MW-1. In January 1988, two additional monitoring wells (MW-1A and MW-4) were installed by HLA at the facility (Plate 1). One downgradient offsite monitoring well (MW-5) was installed by HLA in August 1988.

HLA performed additional investigations in 1989 and performed an aquifer testing and groundwater treatment feasibility study in 1990. The groundwater treatment feasibility study identified biodegradation as a feasible and cost-effective groundwater treatment method for the City Blue site.

From October 1987 to March 1991, BPS personnel purged gasoline from Monitoring Well MW-1 and kept a record of the well purging on a product skimming log. Gasoline was bailed from the well with a bailer between 15 and 20 times a month. Between October 1987 and March 1991, a total of approximately 2,300 gallons of gasoline was bailed from MW-1.

1855 Gateway Boulevard, Suite 500, Concord, CA 94520 510/687-9660 Fax 510/687-9673
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PROCESS DESCRIPTION

Groundwater containing elevated concentrations of petroleum hydrocarbons as gasoline and separate-phase gasoline is being collected from two onsite extraction wells, MW-1A and MW-4. The long-term average extraction flow rate is 0.7 to 0.8 gallons per minute (gpm). Air displacement pumps in the wells convey total fluids through aboveground and underground piping to the treatment system. The treatment system is comprised of the following three modules:

Pretreatment: The groundwater and separate phase gasoline are pumped from the extraction wells to an aboveground oil/water separator. The gasoline is separated from the water and flows to an aboveground recovered product tank. The gasoline is periodically pumped from the tank by BPS, mixed with fresh gasoline, and used in the BPS company vehicles.

Treatment: The water separated from the gasoline is pumped to a 3,000-gallon biotreatment tank where the water is mixed with nutrient and oxygen to stimulate the growth of microorganisms that degrade the hydrocarbons.

Post-treatment: When the contents of the biotreatment tank reach a designated high level, a batch discharge of approximately 500 gallons is pumped through sand filters to remove particulates (biomass). The filtered water flows through activated carbon drums to adsorb the remaining hydrocarbons. After passing through two activated carbon drums the treated water flows through a flow totalizer and is discharged to the sanitary sewer. Flow totalizer readings are recorded weekly and are presented in Table 3. At the current pumping rate of 0.7 to 0.8 gpm, an average of approximately 1,000 gallons of treated water is discharged to the sanitary sewer per day. Vapor from the bioreactor is passed through a vapor phase carbon adsorption unit before being released to the atmosphere.

The treatment system has been permitted by the Bay Area Air Quality Management District (BAAQMD), the East Bay Municipal Utilities District (EBMUD), and the Oakland Fire Department.

GROUNDWATER CAPTURE ZONE

HLA presented the results of aquifer testing and capture zone simulations in a report dated February 2, 1990. A hydraulic conductivity estimate of 1.48 feet/day was derived from a slug test performed in MW-3. Using the observed pumping rate of approximately 0.75 gpm, a natural groundwater gradient of 0.02 feet/foot between MW-3 and MW-1, an aquifer thickness of 5 feet, and a hydraulic conductivity of 1.5 feet/day, we have estimated the capture zone to extend as far as 150 feet downgradient of the extraction wells. This estimated capture zone would include MW-5, but may not be realistic due to subsurface heterogeneity and channeling of subsurface flow.

Using more conservative values, a pumping rate of 0.5 gpm and a hydraulic conductivity of 2.0 feet/day, we have estimated a capture zone that extends approximately 75 feet downgradient of the extraction wells. This capture zone estimate does not include MW-5, but does effectively capture groundwater and separate-phase gasoline in the vicinity of the former USTs.

TREATMENT SYSTEM STATUS

On October 24, 1992, a level control switch in the oil/water separator failed, resulting in overfilling of the recovered product tank with gasoline and water. The recovered product tank overflowed into the BPS parking lot and into the street. This incident was reported in the quarterly report dated January 20, 1993.

From June 1992 through October 1992, approximately 350 gallons of gasoline was recovered by the treatment system. This recovered gasoline was recycled by BPS as fuel for their delivery vehicles.

The treatment system was not fully operational from October 24, 1992 through February 1994. In the interim, HLA recommended modifications to improve the safety and maintenance features. The recommended modifications were submitted to BPS and the contractor expected to perform the modifications in April 1993. The contractor completed the recommended modifications to the treatment system in September 1993. From late December 1993 through February 1994, HLA made several mechanical and electrical repairs and adjustments to the treatment unit.

The groundwater treatment system resumed continuous operation on March 3, 1994. From March 3, 1994 through March 31, 1994, approximately 27,000 gallons of water were treated and discharged to the sanitary sewer. During the same period, approximately 170 gallons of gasoline were recovered.

In addition to monitoring separate-phase gasoline levels in the onsite wells, we have periodically purged MW-3 and MW-1 of water and gasoline. The wells are purged and monitored to assess if the gasoline in the well casings is stagnant or representative of the separate-phase level in the aquifer. This was done once in this quarter on March 30, 1994. Each well was purged until the well casings were emptied (purged dry). Approximately one gallon of gasoline and five gallons of water were purged from MW-1 and a trace of gasoline and five gallons of water were purged from MW-3.

SAMPLING AND ANALYSIS

In accordance with the sampling schedule submitted with the monitoring proposal and regulatory agency permit applications, HLA has sampled the treatment system effluent on a monthly basis and the offsite Monitoring Well MW-5 semiannually. The treatment system water samples were collected from the bioreactor effluent before carbon adsorption, and from the effluent side of the first carbon vessel, CB-1. In addition, samples of the bioreactor influent have been analyzed to determine the degradation efficiency of the bioreactor. The sampling locations are shown on Plate 2, Process Flow and Sampling Locations. Water samples were decanted from brass sampling ports into 40-milliliter

volatile organic analysis (VOA) vials. The water samples were stored in coolers on ice and submitted to Superior Precision Analytical Laboratory in San Francisco under chain-of-custody protocol for analysis. The samples were analyzed by EPA Test Method 8015 for total petroleum hydrocarbons as gasoline (TPHg) and EPA Test Method 8020 for benzene, toluene, ethyl benzene, and total xylenes (BTEX).

MW-5 was sampled on January 13, 1994. Before sampling, the water level was measured and approximately ten well casing volumes (12 gallons) were purged from the well. The groundwater in the well was sampled with a teflon bailer 20 minutes after purging. The two extraction wells MW-1A and MW-4, and monitoring wells MW-1 and MW-3 have separate-phase gasoline and have therefore not been sampled semiannually. The bioreactor influent water is a combination of water from MW-1A and MW-4 after passing through the oil/water separator. The results of the MW-5 monitoring are presented in Table 1 along with the treatment system analytical results. The separate-phase gasoline thicknesses as measured in the onsite wells is presented in Table 2.

Air samples were collected from the vapor phase carbon bed influent and effluent through the August 20, 1992 sampling. On March 30, 1994 the air emissions from the vapor phase carbon unit were measured for approximately five minutes with a photoionization detector at the roof of the facility where the air is vented to the atmosphere. We measured an average hydrocarbon concentration of 10 parts per million (ppm) at the discharge point. The air flow rate into the bioreactor to supply oxygen to the bacteria is 1 cubic foot per minute (cfm). This is the assumed flow rate through the vapor phase carbon unit to the atmosphere. At a flow rate of 1 cfm and a vapor concentration of 10 ppm, approximately 0.004 pounds per day of hydrocarbons are being released to the atmosphere.

In addition to sampling air and groundwater, the system is maintained and inspected at least twice weekly during normal operation.

ANALYTICAL RESULTS

A summary of the analytical results are presented in Table 1. The results indicate that no detectable concentrations of TPHg or BTEX have been discharged to the sanitary sewer. The bioreactor influent and effluent sample results indicate that, on average, the bioreactor treatment degrades approximately 90 percent of the TPHg and BTEX concentrations before post-treatment polishing by the carbon beds.

PROPOSED ACTIVITIES IN THE SECOND QUARTER OF 1994

During the next quarter we plan to; sample the offsite monitoring well MW-5 in mid-April; continue to monitor separate-phase gasoline levels in MW-1 and MW-3; continue to purge MW-1 and MW-3 as long as they contain separate-phase gasoline; and begin sampling any onsite wells when they no longer

April 29, 1994
11295 012
Mr. Jeff Christoff
Blue Print Service Company
Page 5

contain separate-phase gasoline. We expect to continue operation of the treatment system on a continuous basis through the next quarter with weekly maintenance and monthly sampling.

If you have any questions, please contact David Scrivner at (510) 687-9660.

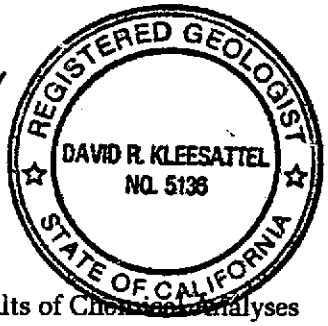
Yours very truly,

HARDING LAWSON ASSOCIATES

Cheryl Lee Nelson for

David F. Scrivner
Project Engineer

David R. Kleesattel, R.G.
Associate Geologist



DFS/DRK/pkp 034534P/L44

Attachments: Table 1 - Results of Chemical Analyses
Table 2 - Monitoring Well Product Thickness Measurements
Table 3 - Flow Totalizer Readings
Plate 1 - Site Plan
Plate 2 - Process Flow and Sampling Locations
Laboratory Reports and Chain-of-Custody Documents

cc: Mr. Thomas Peacock
Alameda County Health Care Services
Department of Environmental Health
Hazardous Materials Program
80 Swan Way, Room 200
Oakland, California 94621

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

Mr. Alexander V. Saschin
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, California 94109

LABORATORY REPORTS AND CHAIN-OF-CUSTODY RECORDS

Table 1. Results of Air and Groundwater Chemical Analysis
Groundwater Treatment System
1700 Jefferson Street
Oakland, California

Date/ Analytes	Bioreactor Influent (1)	Bioreactor Effluent (2)	First Carbon Bed Effluent (3)	Sanitary Sewer Influent (4)	Vapor Phase Carbon Effluent (Air) (5)	MW-5
August 1, 1991						
TPHg	NA	NA	NA	NA	NA	120,000
Benzene	NA	NA	NA	NA	NA	20,000
Toluene	NA	NA	NA	NA	NA	14,000
Ethylbenzene	NA	NA	NA	NA	NA	1,900
Xylene	NA	NA	NA	NA	NA	4,900
June 16, 1992						
TPHg	NA	3,300	ND <50	NA	ND <30,000	NA
Benzene	NA	220	ND <0.3	NA	ND <85	NA
Toluene	NA	460	ND <0.3	NA	ND <250	NA
Ethylbenzene	NA	35	ND <0.3	NA	ND <65	NA
Xylene	NA	290	ND <0.3	NA	ND <250	NA
June 17, 1992						
TPHg	NA	43,000	ND <50	NA	ND <30,000	NA
Benzene	NA	4,900	ND <0.3	NA	ND <85	NA
Toluene	NA	7,600	ND <0.3	NA	ND <250	NA
Ethylbenzene	NA	500	ND <0.3	NA	ND <65	NA
Xylene	NA	4,100	ND <0.3	NA	ND <250	NA
June 18, 1992						
TPHg	NA	4,300	ND <50	NA	ND <30,000	NA
Benzene	NA	20	ND <0.3	NA	160	NA
Toluene	NA	48	ND <0.3	NA	710	NA
Ethylbenzene	NA	3.6	ND <0.3	NA	89	NA
Xylene	NA	970	ND <0.3	NA	670	NA
June 19, 1992						
TPHg	180,000	1,600	ND <50	NA	ND	NA
Benzene	18,000	1.6	ND <0.3	NA	ND	NA
Toluene	31,000	5.0	ND <0.3	NA	ND	NA
Ethylbenzene	2,200	ND <0.3	ND <0.3	NA	ND	NA
Xylene	16,000	150	ND <0.3	NA	ND	NA

Table 1. (Continued)

Date/ Analytes	Bioreactor Influent (1)	Bioreactor Effluent (2)	First Carbon Bed Effluent (3)	Sanitary Sewer Influent (4)	Vapor Phase Carbon Effluent (Air) (5)	MW-5
June 24, 1992						
TPHg	NA	980	ND <50	NA	ND <30,000	NA
Benzene	NA	11	ND <0.3	NA	ND <85	NA
Toluene	NA	13	ND <0.3	NA	ND <250	NA
Ethylbenzene	NA	1.8	ND <0.3	NA	ND <65	NA
Xylene	NA	140	ND <0.3	NA	ND <250	NA
July 2, 1992						
TPHg	160,000	210	ND <50	NA	ND <30,000	NA
Benzene	14,000	1.4	ND <0.3	NA	ND <85	NA
Toluene	27,000	ND <0.3	ND <0.3	NA	ND <250	NA
Ethylbenzene	1,700	ND <0.3	ND <0.3	NA	ND <65	NA
Xylene	1,300	1.0	ND <0.3	NA	ND <250	NA
July 10, 1992						
TPHg	150,000	2,800	ND <50	NA	ND <30,000	NA
Benzene	14,000	41	ND <0.3	NA	ND <85	NA
Toluene	26,000	36	ND <0.3	NA	ND <250	NA
Ethylbenzene	1,700	2.2	ND <0.3	NA	ND <65	NA
Xylene	12,000	360	ND <0.3	NA	ND <250	NA
July 17, 1992						
TPHg	190,000	400	NA	NA	NA	NA
Benzene	22,000	21	NA	NA	NA	NA
Toluene	34,000	25	NA	NA	NA	NA
Ethylbenzene	2,100	0.8	NA	NA	NA	NA
Xylene	17,000	27	NA	NA	NA	NA
July 24, 1992						
TPHg	140,000	1,100	NA	NA	NA	NA
Benzene	13,000	15	NA	NA	NA	NA
Toluene	23,000	2.4	NA	NA	NA	NA
Ethylbenzene	1,700	ND <0.3	NA	NA	NA	NA
Xylene	12,000	200	NA	NA	NA	NA

Table 1. (Continued)

Date/ Analytes	Bioreactor Influent (1)	Bioreactor Effluent (2)	First Carbon Bed Effluent (3)	Sanitary Sewer Influent (4)	Vapor Phase Carbon Effluent (Air) (5)	MW-5
August 20, 1992						
TPHg	190,000	6,400	73	NA	ND <30,000	NA
Benzene	14,000	31	ND <0.3	NA	ND <85	NA
Toluene	24,000	14	ND <0.3	NA	ND <250	NA
Ethylbenzene	2,000	ND <6	ND <0.3	NA	ND <65	NA
Xylene	13,000	150	ND <0.3	NA	ND <250	NA
September 15, 1992						
TPHg	230,000	23,000	54	NA	ND <30,000	NA
Benzene	17,000	1,100	0.4	NA	ND <85	NA
Toluene	29,000	3,600	0.8	NA	ND <250	NA
Ethylbenzene	2,200	59	ND <0.3	NA	ND <65	NA
Xylene	15,000	1,100	0.6	NA	ND <250	NA
September 30, 1992						
TPHg	NA	NA	NA	NA	NA	51,000
Benzene	NA	NA	NA	NA	NA	13,000
Toluene	NA	NA	NA	NA	NA	5,900
Ethylbenzene	NA	NA	NA	NA	NA	1,400
Xylene	NA	NA	NA	NA	NA	2,600
March 30, 1993						
TPHg	NA	NA	NA	NA	NA	74,000
Benzene	NA	NA	NA	NA	NA	16,000
Toluene	NA	NA	NA	NA	NA	5,000
Ethylbenzene	NA	NA	NA	NA	NA	1,800
Xylene	NA	NA	NA	NA	NA	2,700
January 13, 1994						
TPHg	NA	NA	NA	NA	NA	80,000
Benzene	NA	NA	NA	NA	NA	19,000
Toluene	NA	NA	NA	NA	NA	8,200
Ethylbenzene	NA	NA	NA	NA	NA	1,400
Xylene	NA	NA	NA	NA	NA	2,700

Table 1. (Continued)

Date/ Analytes	Bioreactor Influent (1)	Bioreactor Effluent (2)	First Carbon Bed Effluent (3)	Sanitary Sewer Influent (4)	Vapor Phase Carbon Effluent (Air) (5)	MW-5
March 3, 1994						
TPHg	80,000	3900	NA	ND <50	NA	NA
Benzene	1,500	270	NA	ND <0.5	NA	NA
Toluene	9,200	370	NA	ND <0.5	NA	NA
Ethylbenzene	1,000	32	NA	ND <0.5	NA	NA
Xylene	14,000	840	NA	ND <0.5	NA	NA
March 4, 1994						
TPHg	58,000	5,600	NA	ND <50	NA	NA
Benzene	1,900	350	NA	ND <0.5	NA	NA
Toluene	8,700	210	NA	ND <0.5	NA	NA
Ethylbenzene	870	60	NA	ND <0.5	NA	NA
Xylene	11,000	970	NA	ND <0.5	NA	NA

(1) = Sample Location Identification Number (see Plate 2)
All concentrations in parts per billion (ppb)
ND = Not detected above the reporting limit
NA = Not analyzed

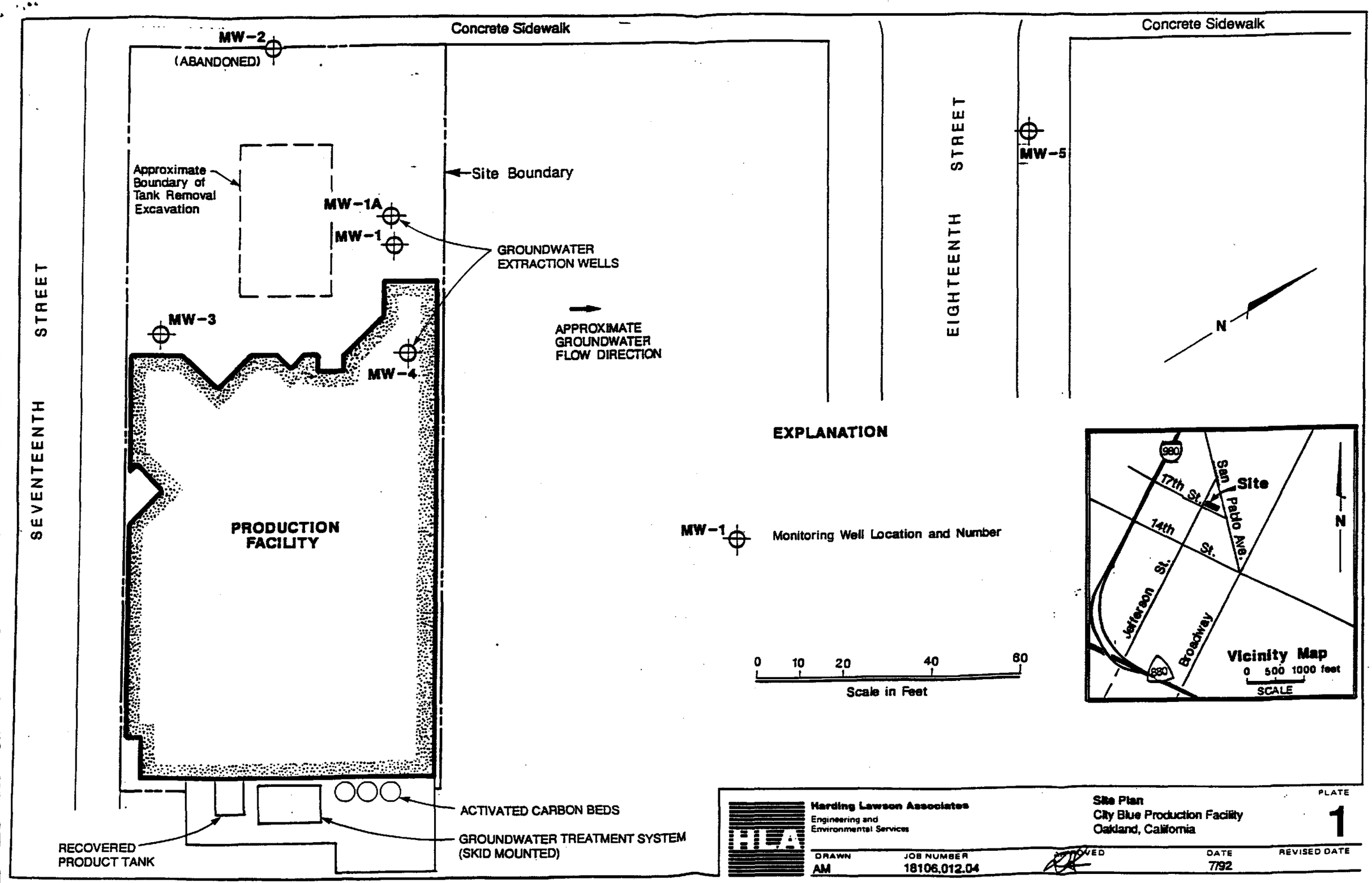
Table 2. Monitoring Well Product Thickness Measurements

Date	MW-1	MW-1A	MW-3	MW-4	MW-5
07/08/87	30	NA	0	NA	NA
07/12/89	21.6	18.6	0	25.2	0.4
06/18/92	34	NM	NM	NM	NM
07/02/92	18	NM	NM	NM	NM
07/23/92	10	NM	NM	NM	NM
08/18/92	10	NM	NM	NM	NM
09/30/92	NM	NM	4.1	NM	0
11/11/92	13	NM	2	NM	NM
01/29/93	25.2	NM	1.7	NM	NM
02/12/93	10.2	13	1.3	8.8	0
03/30/93	NM	NM	NM	NM	0.06
01/06/94	14.8	16.2	2.2	6.2	0
03/17/94	23.4	NM	2.4	NM	NM

All measurements in inches
NA = Not applicable, these wells not yet installed
NM = Not measured

Table 3. Flow Totalizer Readings
Discharge to Sanitary Sewer

Date	Flow Total to Sanitary Sewer (gallons)
06/16/92	1,000
06/17/92	2,957
06/18/92	4,011
06/19/92	5,650
06/24/92	6,830
07/02/92	13,040
07/10/92	14,470
07/24/92	19,450
09/15/92	51,190
10/15/92	70,370
10/23/92	75,470
03/04/94	77,866
03/15/94	89,800
03/30/94	104,690

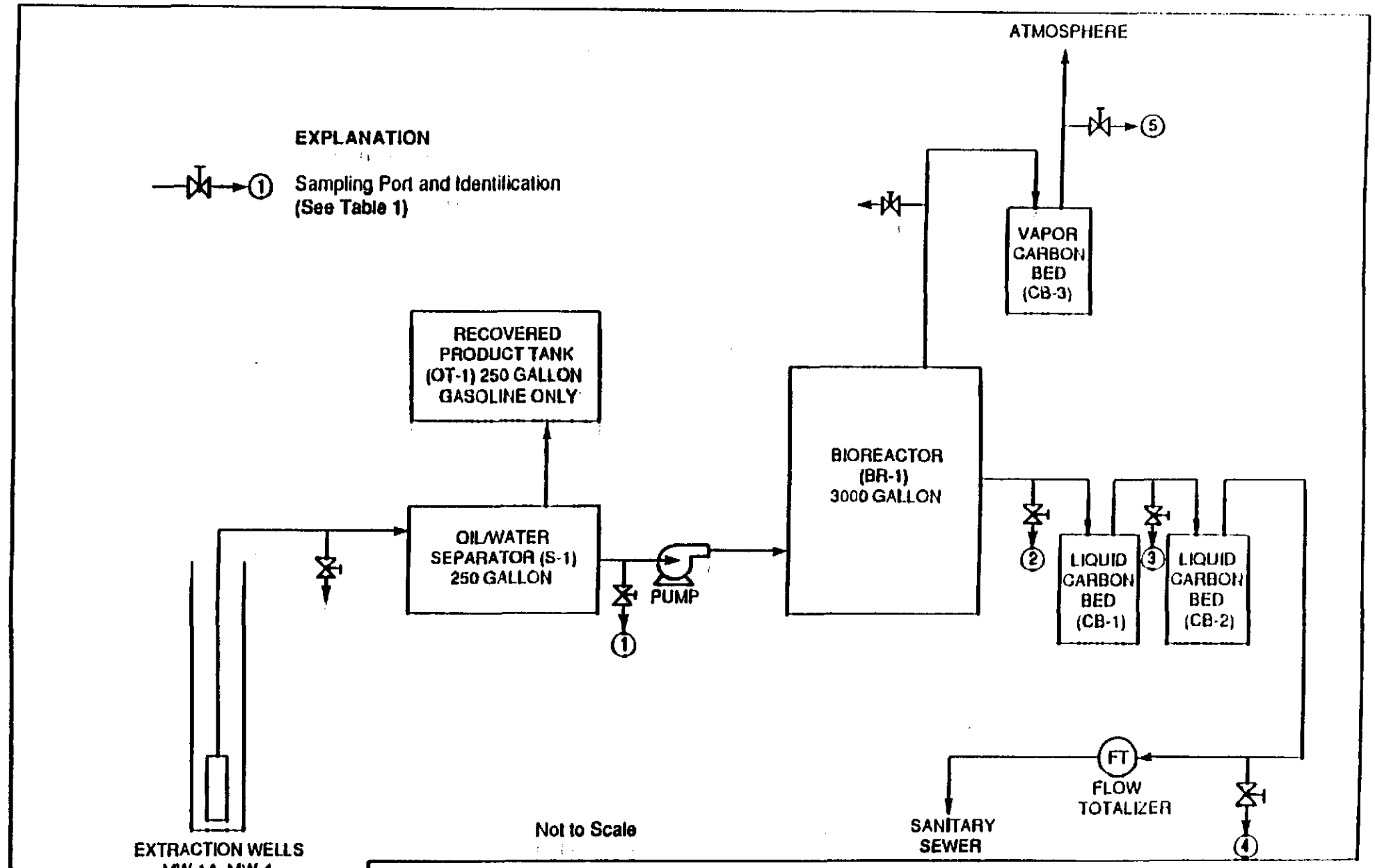


Harding Lawson Associates
Engineering and Environmental Services

Site Plan
City Blue Production Facility
Oakland, California

PLATE 1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
AM	18106.012.04		7/92	



Harding Lawson Associates
Engineering and Environmental Services

Process Flow and Sampling Locations
City Blue Groundwater Treatment System
1700 Jefferson Street
Oakland, California

PLATE **2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
AM	11295-012		4/93	

Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 • Martinez, California 94553 • (510) 229-1512 / fax (510) 229-1526

HARDING LAWSON ASSOCIATES
Attn: DAVID SCRIVNER

Project 11295-012
Reported 01/19/94

TOTAL PETROLEUM HYDROCARBONS

Lab #	Sample Identification	Sampled	Analyzed	Matrix
90942- 1	MW-5	01/13/94	01/18/94	Water

RESULTS OF ANALYSIS

Laboratory Number: 90942- 1

Gasoline:	80000
Benzene:	19000
Toluene:	8200
Ethyl Benzene:	1400
Total Xylenes:	2700
Concentration:	ug/L

Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 • Martinez, California 94553 • (510) 229-1512 / fax (510) 229-1526

C E R T I F I C A T E O F A N A L Y S I S

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS

QA/QC INFORMATION
SET: 90942

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT
ug/L = parts per billion (ppb)

OIL AND GREASE ANALYSIS By Standard Methods Method 5520F:
Minimum Detection Limit in Water: 5000ug/L

Modified EPA SW-846 Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Water: 50ug/L

EPA SW-846 Method 8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Water: 50ug/L

EPA SW-846 Method 8020/BTXE
Minimum Quantitation Limit in Water: 0.5ug/L

ANALYTE	MS/MSD RECOVERY	RPD	CONTROL LIMIT
Gasoline:	105/99	6%	70-130
Benzene:	114/108	5%	70-130
Toluene:	109/105	4%	70-130
Ethyl Benzene:	104/99	5%	70-130
Total Xylenes:	117/111	5%	70-130

Senior Chemist

Harding Lawson Associates
Marathon Plaza
303 Second Street, Suite 630 North
San Francisco, CA 94107
(415) 543-8422 • (415) 777-9706 Telecopy

CHAIN OF CUSTODY FORM

Lab: Superior

Samplers: Jim McCarty

Job Number: 11295-012

Name/Location: City Blue

Project Manager: Dave Scrivner

Recorder: _____ (Signature Required)

Unpreserved

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	VOA	SAMPLE NUMBER OR LAB NUMBER: ~~Yr~~	~~Wk~~	~~Seq~~	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES
	X							3	MW	-5		94	01	13		Note: Unpreserved VOAs, therefore reduced holding time.

ANALYSIS REQUESTED

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	ICP METALS	EPA 8015M/TPH	TPH-G/BTEX
						X

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

CHAIN OF CUSTODY RECORD

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RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
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Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

Harding Lawson Associates (SF)
Attn: Dave Scrivner

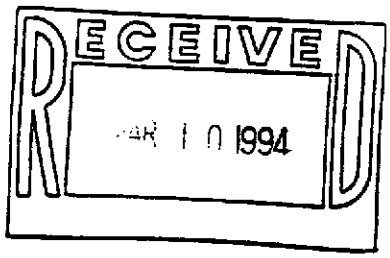
Project 11295-017
Reported 03/08/94

TOTAL PETROLEUM HYDROCARBONS

Lab #	Sample Identification	Sampled	Analyzed	Matrix
57739- 1	94030301	03/03/94	03/08/94	Water
57739- 2	94030305	03/03/94	03/07/94	Water
57739- 3	94030306	03/03/94	03/03/94	Water

RESULTS OF ANALYSIS

Laboratory Number:	57739- 1	57739- 2	57739- 3
Gasoline:	3900	80000	ND<50
Benzene:	270	1500	ND<0.5
Toluene:	370	9200	ND<0.5
Ethyl Benzene:	32	1000	ND<0.5
Total Xylenes:	840	14000	ND<0.5
Concentration:	ug/L	ug/L	ug/L



Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

C E R T I F I C A T E O F A N A L Y S I S

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS

QA/QC INFORMATION
SET: 57739

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT
ug/L = parts per billion (ppb)

OIL AND GREASE ANALYSIS By Standard Methods Method 5520F:
Minimum Detection Limit in Water: 5000ug/L

Modified EPA SW-846 Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Water: 50ug/L

EPA SW-846 Method 8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Water: 50ug/L

EPA SW-846 Method 8020/BTXE
Minimum Quantitation Limit in Water: 0.5ug/L

ANALYTE	MS/MSD RECOVERY	RPD	CONTROL LIMIT
Gasoline:	106/108	2%	60-134
Benzene:	91/96	5%	60-140
Toluene:	94/98	4%	75-125
Ethyl Benzene:	92/97	5%	75-125
Total Xylenes:	99/104	5%	75-125

3/8/94

Senior Chemist
Account Manager

HLA
Marathon Plaza
303 Second Street, Suite 630 North
San Francisco, CA 94107
(415) 543-8422 • (415) 777-9706 Telecopy

CHAIN OF CUSTODY FORM

Lab: Superior

Samplers:

Job Number: 11295-017

Name/Location: City Blue

Project Manager: David Scrivner

Recorder: (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
	X							3	9	40	30301	94	03	03	1500	Normal TAT
	X							3	9	40	30305	"			"	Normal TAT
	X							3	9	40	30306	"			"	24-Hr TAT

RUSH

ANALYSIS REQUESTED

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	ICP METALS	EPA 8015M/TPH	TPH-Gas/BTEX
						X
						X
						X

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
						Receipt Initial: KB
						Samples Stored in Ice. ✓ 7°
						Appropriate containers. ✓
						Samples preserved. ✓
						VOA's without headspace. ✓
						Comments:

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	RECEIVED FOR LAB BY: (Signature)	DATE/TIME 3/3/94 1546

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Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

Harding Lawson Associates (SF)
Attn: Dave Scrivner

Project 11295-017
Reported 03/08/94

TOTAL PETROLEUM HYDROCARBONS

Lab #	Sample Identification	Sampled	Analyzed	Matrix
57742- 1	94030401	03/04/94	03/07/94	Water
57742- 2	94030405	03/04/94	03/07/94	Water
57742- 3	94030406	03/04/94	03/07/94	Water

RESULTS OF ANALYSIS

Laboratory Number:	57742- 1	57742- 2	57742- 3
Gasoline:	5600	58000	ND<50
Benzene:	350	1900	ND<0.5
Toluene:	210	8700	ND<0.5
Ethyl Benzene:	60	870	ND<0.5
Total Xylenes:	970	11000	ND<0.5
Concentration:	ug/L	ug/L	ug/L

Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

C E R T I F I C A T E O F A N A L Y S I S

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS

QA/QC INFORMATION
SET: 57742

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT
ug/L = parts per billion (ppb)

OIL AND GREASE ANALYSIS By Standard Methods Method 5520F:
Minimum Detection Limit in Water: 5000ug/L

Modified EPA SW-846 Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Water: 50ug/L

EPA SW-846 Method 8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Water: 50ug/L

EPA SW-846 Method 8020/BTXE
Minimum Quantitation Limit in Water: 0.5ug/L

ANALYTE	MS/MSD RECOVERY	RPD	CONTROL LIMIT
Gasoline:	107/109	2%	60-134
Benzene:	99/105	6%	60-140
Toluene:	103/101	2%	75-125
Ethyl Benzene:	99/99	0%	75-125
Total Xylenes:	108/107	1%	75-125

3/8/94

Senior Chemist
Account Manager

3741

Harding Lawson Associates
160 Spear Street, Suite 1560
San Francisco, CA 94105
415 / 543-8422
415 / 777-9706 FAX

CHAIN OF CUSTODY FORM

Lab: Superior Analytical

Project Number: 11295-017
Name/Location: City Blue
Project Manager: Dave Scrivner

Samplers: Ron Reindl

Recorder: [signature]
(Signature Required)

ANALYSIS REQUESTED: EPA 601/8010 | EPA 602/8020 | EPA 624/8240 | EPA 625/8270 | ICP METALS | EPA 8015M/TPH | Gas / BTEX

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	HCl-VOAs	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/NOTES	Gas / BTEX
	X							X	94	03	0401	94	03	04	1500	3 VOAs	X
	X							X	94	03	0405	94	03	04	1500	"	X
	X							X	94	03	0406	94	03	04	1500	"	X

5 DAY TAT

Please initial: RR
Samples Stored in ice: Hand delivered
Appropriate containers: ✓
Samples preserved: ✓
VOA's without headspace: ✓
Comments:

wasn't stored w/ ice after sampling. Ron Reindl

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
[signature]		
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
		[signature]	3/4/94 350PM

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FILE COPY

Harding Lawson Associates

January 11, 1995

11295 012

Mr. Jeff Christoff
Blue Print Service Company
149 Second Street
San Francisco, California 94105

Semiannual Report
July 1, 1994 through December 31, 1994
Groundwater Monitoring and Remediation
1700 Jefferson Street
Oakland, California

Dear Mr. Christoff:

This letter presents the results of groundwater sampling and analysis at the Blue Print Service Company (BPS) City Blue Production facility at 1700 Jefferson Street in Oakland, California for the period of July 1, 1994 through December 31, 1994. The purpose of this letter is to provide a quantitative measurement of petroleum hydrocarbons in groundwater from a gasoline release at this site. Sampling and analysis of groundwater from monitoring wells at this site is required by the Alameda County Department of Environmental Health, Hazardous Materials Division (Alameda County).

BACKGROUND

Three underground storage tanks (USTs) were removed from the northwestern portion of the property in June 1987. Monitoring wells were installed on the property to evaluate the distribution of petroleum hydrocarbons in the soil and groundwater and to estimate the groundwater flow direction. Separate-phase petroleum hydrocarbons (gasoline) were found floating on the surface of the groundwater in Monitoring Well MW–1. In January 1988, two additional monitoring wells (MW–1A and MW–4) were installed by HLA at the facility. One downgradient offsite monitoring well (MW–5) was installed by HLA in August 1988 (Plate 1).

HLA performed additional investigations in 1989 and performed an aquifer testing and groundwater treatment feasibility study in 1990. The groundwater treatment feasibility study identified biodegradation as a feasible and cost-effective groundwater treatment method for the City Blue site. The treatment system began operation in June 1992.

From October 1987 to March 1991, BPS personnel purged gasoline from Monitoring Well MW-1 and kept a record of the well purging on a product skimming log. According to the product skimming log, gasoline was bailed from the well between October 1987 and March 1991, removing a total of approximately 2,300 gallons of gasoline.

PROCESS DESCRIPTION

Groundwater containing elevated concentrations of petroleum hydrocarbons as gasoline and separate-phase gasoline is being collected from two onsite extraction wells, MW–1A and MW–4. The long-term average extraction flow rate is 0.7 to 0.8 gallons per minute (gpm). Air displacement pumps in the wells convey total fluids through aboveground and underground piping to the treatment system. The treatment system is comprised of the following three modules:

Pretreatment: The groundwater and separate-phase gasoline are pumped from the extraction wells to an aboveground oil/water separator. The gasoline is separated from the water and flows to an aboveground recovered product tank. The gasoline is periodically pumped from the tank by BPS, mixed with fresh gasoline, and used in the BPS company vehicles.

Treatment: The water separated from the gasoline is pumped to a 3,000-gallon biotreatment tank where the water is mixed with nutrient and oxygen to stimulate the growth of microorganisms that degrade the hydrocarbons.

Post–treatment: When the contents of the biotreatment tank reach a designated high level, a batch discharge of approximately 500 gallons is pumped through sand filters and activated carbon drums. After passing through two activated carbon drums the treated water flows through a flow totalizer and is discharged to the sanitary sewer. Flow totalizer readings are presented in Table 2. Vapor from the bioreactor is passed through a vapor phase carbon adsorption unit before being released to the atmosphere.

The treatment system has been permitted by the Bay Area Air Quality Management District (BAAQMD), the East Bay Municipal Utilities District (EBMUD), and the Oakland Fire Department.

GROUNDWATER CAPTURE ZONE

HLA presented the results of aquifer testing and capture zone simulations in a report dated February 2, 1990. A hydraulic conductivity value of 1.48 feet/day was derived from a slug test performed in MW-3. Using the observed pumping rate of approximately 0.75 gpm, a natural groundwater gradient of 0.02 feet/foot between MW-3 and MW-1, an aquifer thickness of 5 feet, and a hydraulic conductivity of 1.5 feet/day, we have estimated the capture zone to extend as far as 150 feet downgradient of the extraction wells. This estimated capture zone would include MW-5. However, we believe that this estimated capture zone may not be obtainable because of subsurface heterogeneity and channeling of subsurface flow.

Using more conservative values, a pumping rate of 0.5 gpm and a hydraulic conductivity of 2.0 feet/day, we have estimated a capture zone that extends approximately 75 feet downgradient of the extraction wells. This estimated capture zone area does not encompass MW-5, but does provide for the capture of groundwater and separate-phase gasoline in the vicinity of the former USTs.

TREATMENT SYSTEM STATUS

From June 29, 1994 through December 27, 1994, 100,680 gallons have been extracted, treated and discharged to the sanitary sewer. A grand total of 267,350 gallons have been extracted and treated since the treatment system went into operation.

SAMPLING AND ANALYSIS

HLA sampled Wells MW-1A, MW-3, MW-4, and MW-5 on June 29, 1994 and December 8, 1994. Well MW-2 was damaged and abandoned during construction of the present BPS facility. HLA sampled the treatment system influent and effluent on September 29, 1994 and December 19, 1994.

Monitoring wells MW-3 and MW-5 were sampled after measuring the water levels, purging at least three well volumes from each, and measuring the pH, conductivity, and temperature of the purge water. Three 40–milliliter volatile organic analysis (VOA) vials of water was collected from each well with a Teflon bailer. MW-3 contained a sheen of separate-phase gasoline at the time of both sampling events. The offsite well, MW-5 has contained separate-phase gasoline in the past, a sheen of separate-phase was last detected in March 1993.

The two extraction wells, MW-1A and MW-4 were sampled from brass sampling ports in the flow line from the wells to the treatment system prior to the oil/water separator (Plate 2). Three 40-milliliter VOA vials were collected from each port.

The treatment system sampling locations are shown on Plate 2, Process Flow and Sampling Locations. The bioreactor influent water is a combination of water from the two extraction wells, MW-1A and MW-4 after passing through the oil/water separator. Water samples of the bioreactor influent were decanted from brass sampling ports into 40–milliliter VOA vials.

All of the water samples were stored in ice-chilled coolers and submitted to Superior Precision Analytical Laboratory in Martinez under chain–of–custody protocol for analysis. The samples were analyzed by EPA Test Method 8015 for total petroleum hydrocarbons as gasoline (TPHg) and EPA Test Method 8020 for benzene, toluene, ethylbenzene, and total xylenes (BTEX).

ANALYTICAL RESULTS

A summary of the analytical results are presented in Table 1. The concentrations of TPHg and xylenes detected in MW-3 increased dramatically between June and December. However, the groundwater samples collected from MW-3 in December contained separate-phase gasoline, and therefore, the analytical results cannot be compared with dissolved concentrations reported from previous sampling events.

The concentrations of TPHg and BTEX in the offsite well, MW-5, have decreased over this reporting period. The TPHg decreased from 64,000 micrograms per liter (μg/l) to 59,000 μg/l and the benzene decreased from 29,000 μg/l to 13,000 μg/l.

CONTINUED MONITORING

BPS has contracted HLA to perform quarterly groundwater monitoring and reporting in 1995. The next report will cover the period of January 1, 1995 through March 31, 1995, and will contain the results of sampling and analysis from monitoring wells MW-3, MW-5, and extraction wells MW-1A, and MW-4.

If you have any questions, please contact David Scrivner at (510) 687-9660.

Yours very truly,

HARDING LAWSON ASSOCIATES

David F. Scrivner, P.E.
Project Engineer

David R. Kleesattel, R.G.
Associate Geologist

DFS/DRK/pkp 034294M/ltr

Attachments: Table 1 - Groundwater Analytical Results
Table 2 - Flow Totalizer Readings
Plate 1 - Site Plan
Plate 2 - Process Flow and Sampling Locations
Laboratory Reports and Chain-of-Custody Documents

cc: Mr. Thomas Peacock
Alameda County Health Care Services Agency
Division of Hazardous Materials
Department of Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502

Mr. Alexander V. Saschin
Bay Area Air Quality Management
District 939 Ellis Street
San Francisco, California 94109

Table 1. Groundwater Analytical Results
Groundwater Monitoring Wells
1700 Jefferson Street
Oakland, California

Date/ Analytes	MW-1A	MW-3	MW-4	MW-5
August 1, 1991				
TPHg	350,000	74,000	86,000	120,000
Benzene	17,000	1,600	1,500	20,000
Toluene	31,000	4,600	6,200	14,000
Ethylbenzene	3,000	670	1,000	1,900
Xylenes	22,000	4,300	7,300	4,900
September 30, 1992				
TPHg	NA	NA	NA	51,000
Benzene	NA	NA	NA	13,000
Toluene	NA	NA	NA	5,900
Ethylbenzene	NA	NA	NA	1,400
Xylene	NA	NA	NA	2,600
March 30, 1993				
TPHg	NA	NA	NA	74,000
Benzene	NA	NA	NA	16,000
Toluene	NA	NA	NA	5,000
Ethylbenzene	NA	NA	NA	1,800
Xylene	NA	NA	NA	2,700
January 13, 1994				
TPHg	NA	NA	NA	80,000
Benzene	NA	NA	NA	19,000
Toluene	NA	NA	NA	8,200
Ethylbenzene	NA	NA	NA	1,400
Xylene	NA	NA	NA	2,700
April 13, 1994				
TPHg	170,000	NA	58,000	63,000
Benzene	17,000	NA	1,500	14,000
Toluene	31,000	NA	2,500	3,500
Ethylbenzene	2,100	NA	520	1,500
Xylene	14,000	NA	3,200	2,100

Table 1 (continued)

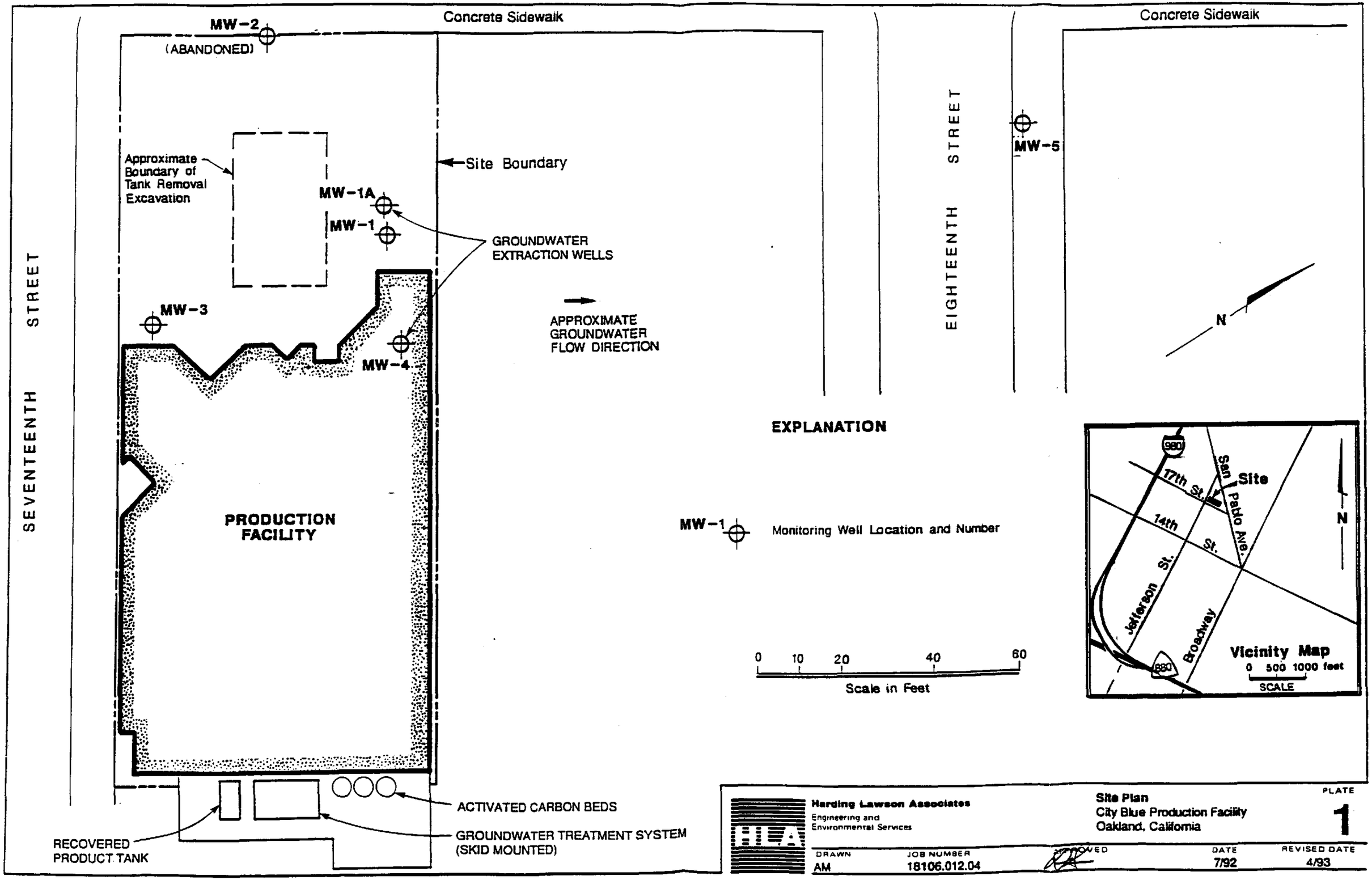
Date/ Analytes	MW-1A	MW-3	MW-4	MW-5
June 29, 1994				
TPHg	95,000	39,000	16,000	64,000
Benzene	16,000	3,200	1,300	29,000
Toluene	21,000	2,900	790	5,400
Ethylbenzene	1,500	580	51	2,800
Xylenes	12,000	4,300	3,400	4,500
December 8, 1994				
TPHg	190,000	4,600,000 *	92,000	59,000
Benzene	13,000	1,500	1,700	13,000
Toluene	21,000	4,200	4,100	3,800
Ethylbenzene	1,400	6,000	310	1,800
Xylenes	11,000	95,000	5,400	2,900

All concentrations presented in micrograms per liter (μg/l)

* This sample contained a visible amount of separate-phase gasoline.

Table 2. Flow Totalizer Readings
Discharge to Sanitary Sewer
1700 Jefferson Street
Oakland, California

Date	Flow Total to Sanitary Sewer (gallons)
06/16/92	1,000
06/17/92	2,957
07/02/92	13,040
07/10/92	14,470
07/24/92	19,450
09/15/92	51,190
10/15/92	70,370
10/23/92	75,470
03/04/94	77,866
03/15/94	89,800
03/30/94	104,690
04/13/94	118,760
05/11/94	123,180
05/23/94	133,280
06/07/94	149,640
06/29/94	166,670
07/11/94	178,500
07/27/94	187,940
08/24/94	196,180
09/23/94	196,698
10/13/94	217,782
10/30/94	227,996
11/15/94	236,789
12/08/94	260,048
12/27/94	267,350

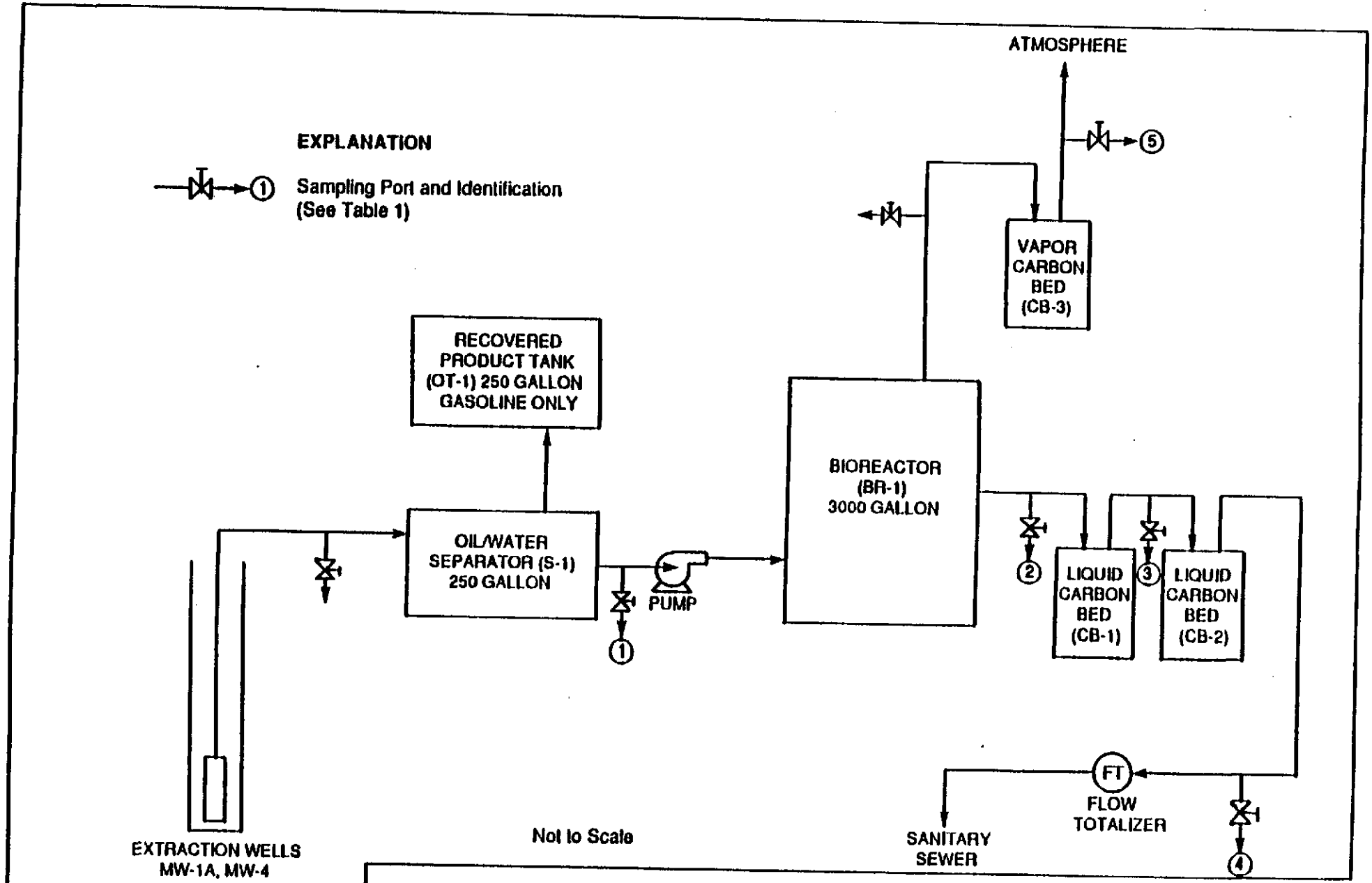


Harding Lawson Associates
Engineering and Environmental Services

Site Plan
City Blue Production Facility
Oakland, California

PLATE **1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
AM	18106.012.04		7/92	4/93



Harding Lawson Associates
Engineering and Environmental Services

Process Flow and Sampling Locations
City Blue Groundwater Treatment System
1700 Jefferson Street
Oakland, California

PLATE **2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
AM	11295-012		4/93	

Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 • Martinez, California 94553 • (510) 229-1512 / fax (510) 229-1526

HARDING ASSOC.

JUL 6 1994

Harding Lawson Associates
Attn: DAVE SCRIVNER

Project 11295-017
Reported 07/01/94

TOTAL PETROLEUM HYDROCARBONS

Lab #	Sample Identification	Sampled	Analyzed	Matrix
91980- 1	MW-5	06/29/94	06/30/94	Water
91980- 2	MW-3	06/29/94	06/30/94	Water
91980- 3	MW-1A	06/29/94	06/30/94	Water
91980- 4	MW-4	06/29/94	06/30/94	Water

RESULTS OF ANALYSIS

Laboratory Number:	91980- 1	91980- 2	91980- 3	91980- 4
Gasoline:	64000	39000	95000	16000
Benzene:	29000	3200	16000	1300
Toluene:	5400	2900	21000	790
Ethyl Benzene:	2800	580	1500	51
Total Xylenes:	4500	4300	12000	3400
Concentration:	ug/L	ug/L	ug/L	ug/L

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C E R T I F I C A T E O F A N A L Y S I S

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS

QA/QC INFORMATION
SET: 91980

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT
ug/L = parts per billion (ppb)

OIL AND GREASE ANALYSIS By Standard Methods Method 5520F:
Minimum Detection Limit in Water: 5000ug/L

Modified EPA SW-846 Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Water: 50ug/L

EPA SW-846 Method 8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Water: 50ug/L

EPA SW-846 Method 8020/BTXE
Minimum Quantitation Limit in Water: 0.5ug/L

ANALYTE	MS/MSD RECOVERY	RPD	CONTROL LIMIT
Gasoline:	92/96	4%	70-130
Benzene:	113/121	7%	70-130
Toluene:	116/127	9%	70-130
Ethyl Benzene:	104/113	8%	70-130
Total Xylenes:	115/127	10%	70-130

Senior Chemist

Harding Lawson Associates
1855 Gateway Boulevard, Suite 500
Concord, California 94520
(510) 687-9660 • FAX (510) 687-9673

9/1980 CHAIN OF CUSTODY FORM

Lab: Superior

Job Number: 11295-017
Name/Location: City Blue
Project Manager: Dave Scrivner

Samplers: Dave Scrivner
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	EPA 624/8240	EPA 625/8270	ICP METALS	EPA 8015M/TPH	TPH-G/BTEX
	X							3	MW	5		94	06	29		48-Hour TAT							X
	X							3	MW	3		94	06	29									X
	X							3	MW	1	A	94	06	29		2.0°C							X
	X							3	MW	4		94	06	29									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	RECEIVED FOR LAB BY: (Signature)	DATE/TIME 1:25
METHOD OF SHIPMENT		

Lab Copy White · Project Copy Yellow · Office Pink

DFS
HARDING ASSOC.
DEC 22 1994

Superior Precision Analytical, Inc.

A member of ESSCON Environmental Support Service Consortium

Harding Lawson Associates
Attn: DAVE SCRIVNER

Project 11295-017
Reported on December 16, 1994

Gasoline Range Petroleum Hydrocarbons and BTXE
by EPA SW-846 5030/8015M/8020
Gasoline Range quantitated as all compounds from C6-C10

Chronology

Laboratory Number 80230

Sample ID	Sampled	Received	Extract.	Analyzed	QC Batch	LAB #
mw-5	12/08/94	12/09/94	12/14/94	12/14/94	AL131.04	01
mw-3	12/08/94	12/09/94	12/14/94	12/14/94	AL131.04	02
mw-4	12/08/94	12/09/94	12/15/94	12/15/94	AL131.04	03
mw-1a	12/08/94	12/09/94	12/15/94	12/15/94	AL131.04	04

QC Samples

QC Batch #	QC Sample ID	Type	Ref.	Matrix	Extract.	Analyzed
AL131.04-01	Method Blank	MB		Water	12/13/94	12/13/94
AL131.04-02	Laboratory Spike	LS		Water	12/13/94	12/13/94
AL131.04-03	CPT-30	MS	80243-01	Water	12/13/94	12/13/94
AL131.04-04	CPT-30	MSD	80243-01	Water	12/13/94	12/13/94

Certified Laboratories

825 Arnold Dr., Suite 114
Martinez, California 94553
(510) 229-1512 / fax (510) 229-1526

1555 Burke St., Unit I
San Francisco, California 94124
(415) 647-2081 / fax (415) 821-7123

309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

Harding Lawson Associates
Attn: DAVE SCRIVNER

Project 11295-017
Reported on December 16, 1994

Gasoline Range Petroleum Hydrocarbons and BTXE
by EPA SW-846 5030/8015M/8020
Gasoline Range quantitated as all compounds from C6-C10

LAB ID	Sample ID	Matrix	Moisture
80230-01	mw-5	Water	-
80230-02	mw-3	Water	-
80230-03	mw-4	Water	-
80230-04	mw-1a	Water	-

R E S U L T S O F A N A L Y S I S

Compound	80230-01 Conc. ug/L	RL	80230-02 Conc. ug/L	RL	80230-03 Conc. ug/L	RL	80230-04 Conc. ug/L	RL
Gasoline_Range	59000	2500	4600000	25000	92000	2500	190000	10000
Benzene	13000	25	1500	250	1700	25	13000	100
Toluene	3800	25	4200	250	4100	25	21000	100
Ethyl Benzene	1800	25	6000	250	310	25	1400	100
Total Xylenes	2900	25	95000	250	5400	25	11000	100
>> Surrogate Recoveries (%) <<								
Trifluorotoluene (SS)	123		79		73		86	

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Gasoline Range Petroleum Hydrocarbons and BTXE
by EPA SW-846 5030/8015M/8020
Gasoline Range quantitated as all compounds from C6-C10

Quality Assurance and Control Data

Laboratory Number: 80230
Method Blank(s)

	AL131.04-01 Conc. ug/L	RL
Gasoline_Range	ND	50
Benzene	ND	0.5
Toluene	ND	0.5
Ethyl Benzene	ND	0.5
Total Xylenes	ND	0.5
>> Surrogate Recoveries (%) <<		
Trifluorotoluene (SS)	104	

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Gasoline Range Petroleum Hydrocarbons and BTXE
by EPA SW-846 5030/8015M/8020
Gasoline Range quantitated as all compounds from C6-C10

Quality Assurance and Control Data

Laboratory Number: 80230

Compound	Sample conc.	SPK Level	SPK Result	Recovery %	Limits %	RPD %
For Water Matrix (ug/L)						
AL131.04 02 / - Laboratory Control Spikes						
Gasoline_Range		320	311	97	65-135	
Benzene		20	17.1	86	65-135	
Toluene		20	20.5	103	65-135	
Ethyl Benzene		20	21.7	109	65-135	
Total Xylenes		60	66.6	111	65-135	
>> Surrogate Recoveries (%) <<						
Trifluorotoluene (SS)				99	50-150	
For Water Matrix (ug/L)						
AL131.04 03 / 04 - Sample Spiked: 80243 - 01						
Gasoline_Range	ND	320	254/296	79/93	65-135	16
Benzene	ND	20	14.4/15.6	72/78	65-135	8
Toluene	ND	20	17.1/18.4	86/92	65-135	7
Ethyl Benzene	ND	20	17.7/19.3	89/97	65-135	9
Total Xylenes	ND	60	53.8/59.1	90/99	65-135	10
>> Surrogate Recoveries (%) <<						
Trifluorotoluene (SS)				104/99	50-150	

Definitions:
ND = Not Detected
R = Reporting Limit
N = Not Analysed
RPD = Relative Percent Difference
ug/L = parts per billion (ppb)
mg/L = parts per million (ppm)

ug/kg = parts per billion (ppb)
mg/kg = parts per million (ppm)

Certified Laboratories

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[redacted]
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Concord, California 94520
(510) 687-9660 • FAX (510) 687-9673

CHAIN OF CUSTODY FORM

[redacted]

Lab: Superior

Job Number: 11295-017
Name/Location: City Blue
Project Manager: Dave Scrivner

Samplers: James 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	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	METALS	EPA 8015M/TPHg	EPA 8020/BTEX	EPA 8015M/TPHd,o
	X							3				MW-5	94	12	08	1235							X	X	
	X							3				MW-3				1355							X	X	
	X							3				MW-4				1400							X	X	
	X							3				MW-2A				1400							X	X	

Lab Number: Yr	Wk	Seq	Depth in Feet	COL MTD CD	QA Code	Miscellaneous
					3.8	Standard TAT

Please initial: N/A
Samples stored in ice
Appropriate containers
Samples preserved
VOA's without headspace
Comments:

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
James McCarty	James D.McLean	12-9 1010
James D McLean #555		

Dispatched by: (Signature) Date/Time

Received for Lab by: (Signature) Nicki Heath Date/Time 12/9/94

Method of Shipment: Cooler w/ blue ice

Sample Condition When Received by the Laboratory:

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

FILE COPY

Harding Lawson Associates

April 28, 1995

31531 1

Ms. Molly Ong
East Bay Municipal Utilities District
P.O. Box 24055
Oakland, California 94623-1055

Semiannual Report
October 1, 1994 through April 3, 1995
City Blue Groundwater Treatment System
1700 Jefferson Street
Oakland, California

Dear Ms. Ong:

This letter presents the current status and discusses the results of sampling and analysis of treated groundwater at the City Blue Production facility, 1700 Jefferson Street, Oakland, California for the period of October 1, 1994 through April 3, 1995.

This letter also presents quarterly sampling results from the groundwater monitoring and extraction wells for the period of January 1, 1995 through April 3, 1995. The quarterly results are provided for the Alameda County Health Care Services Agency.

BACKGROUND

Three underground storage tanks (USTs) were removed from the northwestern portion of the property in June 1987 (Plate 1). Monitoring wells were installed on the property to evaluate the distribution of petroleum hydrocarbons in the soil and groundwater and determine the direction of groundwater flow.

Separate-phase petroleum hydrocarbons (gasoline) were found floating on the surface of the groundwater in Monitoring Well MW-1. In January 1988, two additional monitoring wells (MW-1A and MW-4) were installed by HLA at the facility (Plate 1). One downgradient offsite monitoring well (MW-5) was installed by HLA in August 1988.

HLA performed additional investigations in 1989 and performed an aquifer testing and groundwater treatment feasibility study in 1990. The groundwater treatment feasibility study identified biodegradation as a feasible and cost-effective groundwater treatment method for the City Blue site.

From October 1987 to March 1991, Blue Print Service Company (BPS) personnel recovered gasoline from Monitoring Well MW-1 and kept a record of the gasoline recovery on a product skimming log. Gasoline was bailed from the well with a bailer between 15 and 20 times a month. Between October 1987 and March 1991, a total of approximately 2,300 gallons of gasoline was recovered from MW-1.

PROCESS DESCRIPTION

Groundwater containing elevated concentrations of petroleum hydrocarbons as gasoline and separate-phase gasoline is being collected from two onsite extraction wells, MW-1A and MW-4. The long-term combined extraction flow rate averages 0.7 to 0.8 gallons per minute (gpm). Air displacement pumps in the wells convey total fluids through aboveground and underground piping to the treatment system. The existing groundwater treatment system began operation in June 1992, and is comprised of the following three modules:

Pretreatment: The groundwater and separate phase gasoline are pumped from the extraction wells to an aboveground oil/water separator. The gasoline is separated from the water and flows to an aboveground recovered product tank. The gasoline is periodically pumped from the tank by BPS, mixed with fresh gasoline, and used in the BPS company vehicles.

Treatment: The water separated from the gasoline is pumped to a 3,000-gallon biotreatment tank where the water is mixed with nutrients and oxygen to stimulate the growth of microorganisms that degrade the hydrocarbons.

Post-treatment: When the contents of the biotreatment tank reach a designated high level, a batch discharge of approximately 500 gallons is pumped through sand filters to remove particulates (biomass). The filtered water flows through activated carbon drums to adsorb the remaining hydrocarbons. After passing through two activated carbon drums the treated water flows through a flow totalizer and is discharged to the sanitary sewer. Flow totalizer readings are recorded weekly and are presented in Table 3. At the combined pumping rate of 0.7 to 0.8 gpm, an average of approximately 1,000 gallons of treated water is discharged to the sanitary sewer per day. Vapor from the bioreactor is passed through a vapor phase carbon adsorption unit before being released to the atmosphere.

The treatment system has been permitted by the Bay Area Air Quality Management District (BAAQMD), the East Bay Municipal Utilities District (EBMUD), and the Oakland Fire Department.

TREATMENT SYSTEM STATUS

For the period of October 1, 1994 through March 31, 1995 the groundwater treatment system has discharged 86,961 gallons of treated water to the sanitary sewer. Over this period the average daily discharge flow rates have ranged from 172 gallons per day (gpd) to 1,060 gpd. The lower flow rates are caused by system down time associated with maintenance operations such as sand filter and carbon vessel backwashing.

For the months of February and March, there was no discharge of treated water while HLA obtained a permit from EBMUD for a one-time direct discharge of the bioreactor contents to remove excess sludge. On February 1, 1995, the extraction wells and the bioreactor effluent pump were turned off to allow for increased degradation of hydrocarbons in the bioreactor to below the sanitary sewer discharge limits. Before authorizing a batch discharge from the bioreactor, Ms. Molly Ong from EBMUD requested that the contents be analyzed for total petroleum hydrocarbons as gasoline (TPHg), benzene, toluene,

ethylbenzene, and total xylenes (BTEX), filtered chemical oxygen demand (CODf), total suspended solids (TSS), cadmium, chromium, copper, lead, nickel, and zinc.

The bioreactor was sampled on February 10, 1995. Benzene, toluene, and xylenes were detected above the discharge limit. The bioreactor was sampled again on February 28, 1995 and analyzed for BTEX only. None of the BTEX compounds were detected in the February 28, 1995 sample. Based on these results, Ms. Ong authorized the discharge with additional sampling requirements during the discharge. A copy of the discharge authorization with sampling requirements and the analytical results for the February 10, 1995 and February 28, 1995 samples are presented in Appendix A.

The bioreactor was drained and rinsed with tap water by HLA on March 17, 1995. As required, water samples were collected during the batch discharge. The laboratory report for the samples collected during discharge is also presented in Appendix A. Approximately 2,500 gallons of water with suspended sludge were discharged directly from the bioreactor to the sanitary sewer.

TREATMENT SYSTEM SAMPLING AND ANALYSIS

After rinsing the bioreactor, HLA refilled the tank with a combination of tap water and groundwater on March 18 and 19, 1995 and visually monitored for a build up of microorganisms. The bioreactor was sampled on April 3, 1995. The bioreactor sample was analyzed for TPHg and BTEX. The bioreactor sample contained TPHg at a concentration of 0.1 milligrams per liter (mg/l) and benzene at a concentration of 0.9 micrograms per liter (μg/l). The laboratory report for the April 3, 1995 biotank sample is presented with the treatment system laboratory reports in Appendix B. Discharge from the bioreactor, through the carbon vessels to the sanitary sewer resumed on April 3, 1995.

In accordance with the East Bay Municipal Utilities District (EBMUD) Wastewater Discharge Permit (Account No. 500-68191), HLA has sampled the treatment system effluent on a quarterly basis. The treatment system water samples were collected on December 19, 1994 from the bioreactor effluent before carbon adsorption, the effluent side of the first carbon vessel, CB-1, and the effluent side of the second carbon vessel, CB-2, before discharge to the sanitary sewer. Additional samples of the effluent from CB-1 and CB-2 were collected on January 5, 1995. The sampling locations are shown on Plate 2, Process Flow and Sampling Locations, and the analytical results are summarized in Table 1. The laboratory reports are presented in Appendix B.

Water samples were decanted from brass sampling ports into 40-milliliter volatile organic analysis (VOA) vials. The water samples were stored in coolers on ice and submitted to American Environmental Network Laboratory in Pleasant Hill, California under chain-of-custody protocol for analysis. The samples were analyzed by EPA Test Method 8015 for TPHg and EPA Test Method 8020 for BTEX.

TREATMENT SYSTEM ANALYTICAL RESULTS

A summary of the analytical results for samples collected from the treatment system flow are presented in Table 1. The results indicate that the carbon beds are no longer adsorbing all detectable concentrations of TPHg and BTEX. Detectable concentrations of benzene and toluene have been discharged to the sanitary sewer. However, the concentrations discharged to the sewer are well below

the discharge limits. The discharge to the sanitary sewer was last sampled by EBMUD on April 5, 1995. HLA has ordered replacement carbon vessels to be installed by May 5, 1995.

GROUNDWATER SAMPLING AND ANALYSIS

HLA sampled Wells MW-1A, MW-3, MW-4, and MW-5 on April 3, 1995. Well MW-2 was damaged and abandoned during construction of the present BPS facility.

Monitoring wells MW-3 and MW-5 were sampled after checking for separate-phase gasoline, measuring the water levels, purging at least three well volumes from each, and measuring the pH, conductivity, and temperature of the purge water. Three 40-milliliter VOA vials of water were collected from each well with a Teflon bailer. MW-3 contained a sheen of separate-phase gasoline.

The two extraction wells, MW-1A and MW-4, were sampled from brass sampling ports in the flow line from the wells to the treatment system prior to the oil/water separator (Plate 2). Three 40-milliliter VOA vials were collected from each port.

All of the water samples were stored in ice-chilled coolers and submitted to American Environmental Network Laboratory in Pleasant Hill, California under chain-of-custody protocol for analysis. The samples were analyzed by EPA Test Method 8015 for TPHg and EPA Test Method 8020 for BTEX.

The analytical results are summarized in Table 2, along with past results. The laboratory report is presented in Appendix C.

If you have any questions, please contact David Scrivner at (510) 687-9660.

Yours very truly,

HARDING LAWSON ASSOCIATES

David F. Scrivner, P.E.
Civil Engineer

for David R. Kleesattel, R.G.
Associate Geologist

DFS/DRK/ly 035193P

Attachments: Table 1 - Groundwater Treatment System Analytical Results
Table 2 - Groundwater Analytical Results
Table 3 - Flow Totalizer Readings
Table 4 - Monitoring Well Product Thickness Measurements
Plate 1 - Site Plan
Plate 2 - Process Flow and Sampling Locations
Appendix A - Bioreactor Discharge Authorization and Laboratory Reports
Appendix B - Treatment System Sample Laboratory Reports
Appendix C - Groundwater Sample Laboratory Reports

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

Mr. Thomas F. Peacock
Alameda County Health Care Services Agency
Division of Hazardous Materials
Department of Environmental Health
1131 Harbor Bay Parkway, 2nd Floor

Table 1. Groundwater Treatment System Analytical Results
1700 Jefferson Street
Oakland, California

Date/ Analytes	Bioreactor Influent (1)	Bioreactor Effluent (2)	First Carbon Bed Effluent (3)	Sanitary Sewer Influent (4)	Vapor Phase Carbon Effluent (Air) (5)
June 16, 1992					
TPHg	NA	3,300	ND <50	NA	ND <30,000
Benzene	NA	220	ND <0.3	NA	ND <85
Toluene	NA	460	ND <0.3	NA	ND <250
Ethylbenzene	NA	35	ND <0.3	NA	ND <65
Xylene	NA	290	ND <0.3	NA	ND <250
June 19, 1992					
TPHg	180,000	1,600	ND <50	NA	ND
Benzene	18,000	1.6	ND <0.3	NA	ND
Toluene	31,000	5.0	ND <0.3	NA	ND
Ethylbenzene	2,200	ND <0.3	ND <0.3	NA	ND
Xylene	16,000	150	ND <0.3	NA	ND
July 2, 1992					
TPHg	160,000	210	ND <50	NA	ND <30,000
Benzene	14,000	1.4	ND <0.3	NA	ND <85
Toluene	27,000	ND <0.3	ND <0.3	NA	ND <250
Ethylbenzene	1,700	ND <0.3	ND <0.3	NA	ND <65
Xylene	1,300	1.0	ND <0.3	NA	ND <250
August 20, 1992					
TPHg	190,000	6,400	73	NA	ND <30,000
Benzene	14,000	31	ND <0.3	NA	ND <85
Toluene	24,000	14	ND <0.3	NA	ND <250
Ethylbenzene	2,000	ND <6	ND <0.3	NA	ND <65
Xylene	13,000	150	ND <0.3	NA	ND <250
September 15, 1992					
TPHg	230,000	23,000	54	NA	ND <30,000
Benzene	17,000	1,100	0.4	NA	ND <85
Toluene	29,000	3,600	0.8	NA	ND <250
Ethylbenzene	2,200	59	ND <0.3	NA	ND <65
Xylene	15,000	1,100	0.6	NA	ND <250

Table 1. (Continued)

Date/ Analytes	Bioreactor Influent (1)	Bioreactor Effluent (2)	First Carbon Bed Effluent (3)	Sanitary Sewer Influent (4)	Vapor Phase Carbon Effluent (Air) (5)
March 3, 1994					
TPHg	80,000	3900	NA	ND <50	NA
Benzene	1,500	270	NA	ND <0.5	NA
Toluene	9,200	370	NA	ND <0.5	NA
Ethylbenzene	1,000	32	NA	ND <0.5	NA
Xylene	14,000	840	NA	ND <0.5	NA
April 7, 1994					
TPHg	79,000	280	ND <50	NA	NA
Benzene	8,300	16	3.7	NA	NA
Toluene	19,000	4.2	ND <0.5	NA	NA
Ethylbenzene	990	ND <0.5	ND <0.5	NA	NA
Xylene	9,300	1.9	ND <0.5	NA	NA
May 13, 1994					
TPHg	220,000	610	ND <50	NA	NA
Benzene	12,000	45	ND <0.5	NA	NA
Toluene	23,000	7.1	ND <0.5	NA	NA
Ethylbenzene	1,700	0.8	ND <0.5	NA	NA
Xylene	17,000	11	ND <0.5	NA	NA
September 29, 1994					
TPHg	96,000	760	NA	ND <50	NA
Benzene	8,000	4.9	NA	ND <0.5	NA
Toluene	16,000	7.8	NA	ND <0.5	NA
Ethylbenzene	ND <250	ND <2.5	NA	ND <0.5	NA
Xylene	9,000	8.7	NA	ND <0.5	NA
December 19, 1994					
TPHg	NA	5,500	590	ND <50	NA
Benzene	NA	140	60	1.0	NA
Toluene	NA	100	14	0.5	NA
Ethylbenzene	NA	ND<5	ND<0.5	ND <0.5	NA
Xylene	NA	1,600	100	ND <0.5	NA

Table 1. (Continued)

Date/ Analytes	Bioreactor Influent (1)	Bioreactor Effluent (2)	First Carbon Bed Effluent (3)	Sanitary Sewer Influent (4)	Vapor Phase Carbon Effluent (Air) (5)
January 5, 1995					
TPHg	NA	NA	200	ND <50	NA
Benzene	NA	NA	17	0.7	NA
Toluene	NA	NA	3	ND<0.5	NA
Ethylbenzene	NA	NA	ND<0.5	ND<0.5	NA
Xylene	NA	NA	3	ND<0.5	NA

(1) = Sample Location Identification Number (see Plate 2)
All concentrations in parts per billion (ppb)
TPHg = total petroleum hydrocarbons as gasoline
ND = Not detected above the reporting limit
NA = Not analyzed

Table 2. Groundwater Analytical Results
Groundwater Monitoring Wells
1700 Jefferson Street
Oakland, California

Date/ Analytes	MW-1A	MW-3	MW-4	MW-5
August 1, 1991				
TPHg	350,000	74,000	86,000	120,000
Benzene	17,000	1,600	1,500	20,000
Toluene	31,000	4,600	6,200	14,000
Ethylbenzene	3,000	670	1,000	1,900
Xylenes	22,000	4,300	7,300	4,900
September 30, 1992				
TPHg	NA	NA	NA	51,000
Benzene	NA	NA	NA	13,000
Toluene	NA	NA	NA	5,900
Ethylbenzene	NA	NA	NA	1,400
Xylene	NA	NA	NA	2,600
March 30, 1993				
TPHg	NA	NA	NA	74,000
Benzene	NA	NA	NA	16,000
Toluene	NA	NA	NA	5,000
Ethylbenzene	NA	NA	NA	1,800
Xylene	NA	NA	NA	2,700
January 13, 1994				
TPHg	NA	NA	NA	80,000
Benzene	NA	NA	NA	19,000
Toluene	NA	NA	NA	8,200
Ethylbenzene	NA	NA	NA	1,400
Xylene	NA	NA	NA	2,700
April 13, 1994				
TPHg	170,000	NA	58,000	63,000
Benzene	17,000	NA	1,500	14,000
Toluene	31,000	NA	2,500	3,500
Ethylbenzene	2,100	NA	520	1,500
Xylene	14,000	NA	3,200	2,100

Table 2. (Continued)

Date/ Analytes	MW-1A	MW-3	MW-4	MW-5
June 29, 1994				
TPHg	95,000	39,000	16,000	64,000
Benzene	16,000	3,200	1,300	29,000
Toluene	21,000	2,900	790	5,400
Ethylbenzene	1,500	580	51	2,800
Xylenes	12,000	4,300	3,400	4,500
December 8, 1994				
TPHg	190,000	4,600,000 *	92,000	59,000
Benzene	13,000	1,500	1,700	13,000
Toluene	21,000	4,200	4,100	3,800
Ethylbenzene	1,400	6,000	310	1,800
Xylenes	11,000	95,000	5,400	2,900
April 3, 1995				
TPHg	67,000	51,000	35,000	51,000
Benzene	11,000	1,100	1,200	15,000
Toluene	13,000	2,300	3,400	2,200
Ethylbenzene	910	580	280	2,800
Xylenes	9,800	4,800	5,800	4,500

All concentrations presented in micrograms per liter (µg/l)
* = This sample contained a visible amount of separate-phase gasoline.
TPHg = Total petroleum hydrocarbons as gasoline
NA = Not analyzed

Table 3. Flow Totalizer Readings
Discharge to Sanitary Sewer
1700 Jefferson Street
Oakland, California

Date	Flow Total to Sanitary Sewer (gallons)
06/16/92	1,000
06/17/92	2,957
07/02/92	13,040
07/10/92	14,470
07/24/92	19,450
09/15/92	51,190
10/15/92	70,370
10/23/92	75,470
03/04/94	77,866
03/15/94	89,800
03/30/94	104,690
04/13/94	118,760
05/11/94	123,180
05/23/94	133,280
06/07/94	149,640
06/29/94	166,670
07/11/94	178,500
07/27/94	187,940
08/24/94	196,180
09/23/94	196,698
10/13/94	217,782
10/30/94	227,996
11/15/94	236,789
12/08/94	260,048
12/27/94	267,350
01/03/95	274,770
01/16/95	277,003
02/11/95	291,743

Table 4. Monitoring Well Product Thickness Measurements

Date	MW-1	MW-1A	MW-3	MW-4	MW-5
07/08/87	30	NA	0	NA	NA
07/12/89	21.6	18.6	0	25.2	0.4
06/18/92	34	NM	NM	NM	NM
07/02/92	18	NM	NM	NM	NM
07/23/92	10	NM	NM	NM	NM
08/18/92	10	NM	NM	NM	NM
09/30/92	NM	NM	4.1	NM	0
11/11/92	13	NM	2	NM	NM
01/29/93	25.2	NM	1.7	NM	NM
02/12/93	10.2	13	1.3	8.8	0
03/30/93	NM	NM	NM	NM	0.06
01/06/94	14.8	16.2	2.2	6.2	0
03/17/94	23.4	NM	2.4	NM	NM
04/07/94	14.2	NM	1.8	NM	0
04/13/94	12	NM	1.0	NM	0
05/13/94	1.7	NM	1.2	NM	0
06/17/94	0	NM	0	NM	0
06/29/94	NM	NM	0.25	NM	0
07/11/94	4.5	NM	1.0	NM	NM
12/08/94	NM	NM	0.25	NM	0
04/03/95	0	NM	Sheen	NM	0

All measurements in inches
NA = Not applicable, these wells not yet installed
NM = Not measured

Concrete Sidewalk

MW-2
(ABANDONED)

Approximate Boundary of Tank Removal Excavation

Site Boundary

MW-1A

MW-1

GROUNDWATER EXTRACTION WELLS

MW-3

MW-4

APPROXIMATE GROUNDWATER FLOW DIRECTION

SEVENTEENTH STREET

PRODUCTION FACILITY

ACTIVATED CARBON BEDS

GROUNDWATER TREATMENT SYSTEM (SKID MOUNTED)

RECOVERED PRODUCT TANK

EIGHTEENTH STREET

Concrete Sidewalk

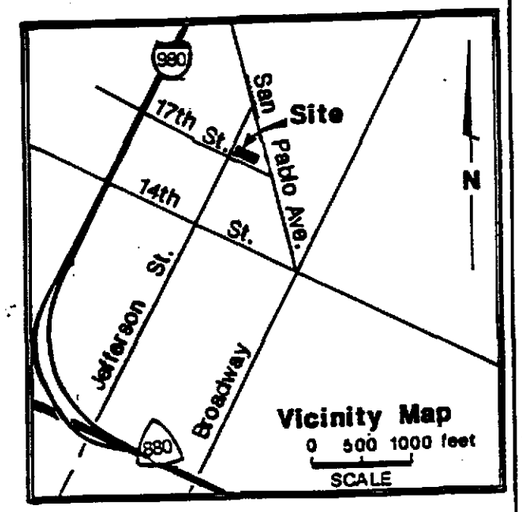
MW-5

N

EXPLANATION

MW-1 ⊕ Monitoring Well Location and Number

0 10 20 40 60
Scale in Feet

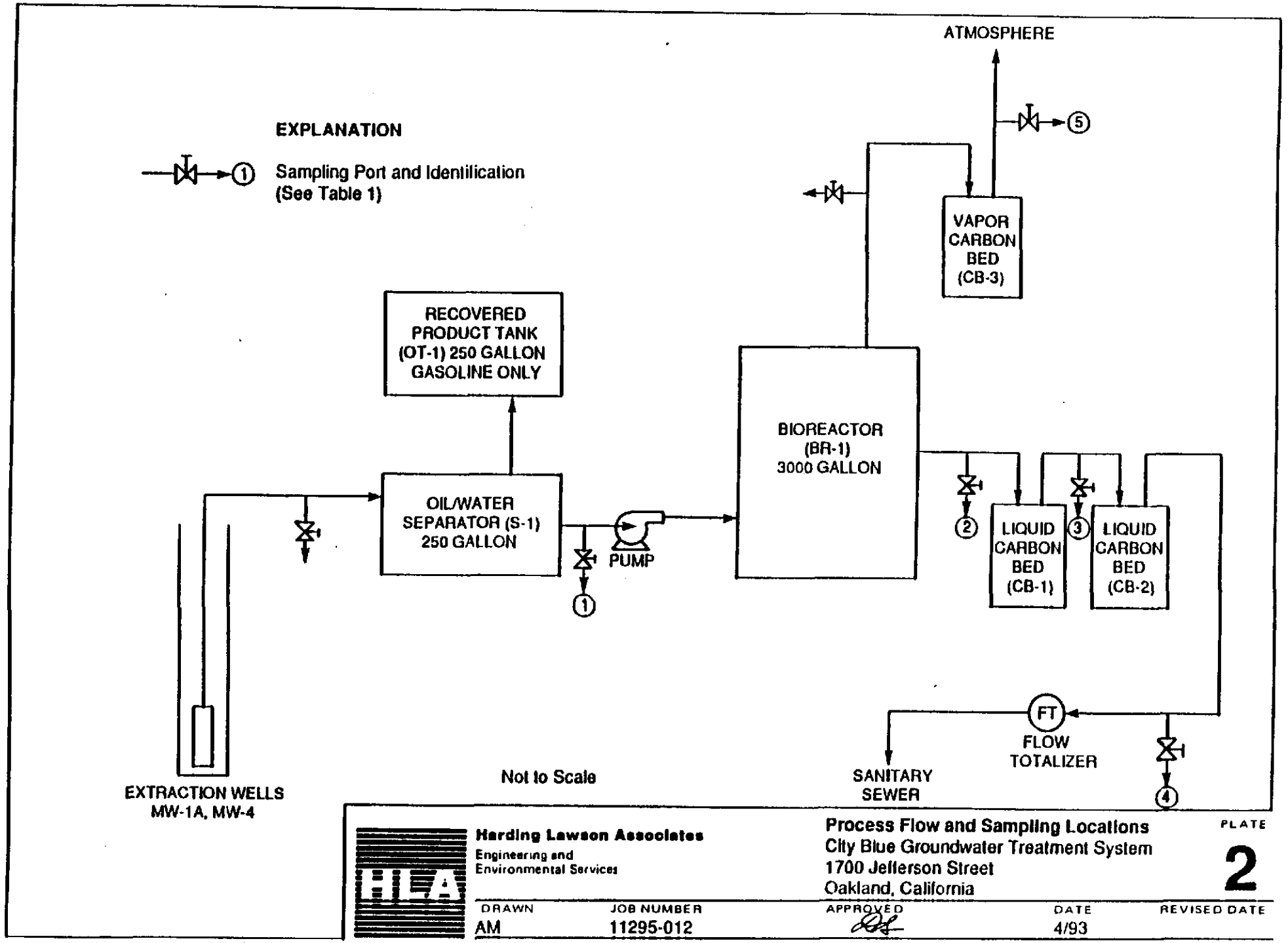


Harding Lawson Associates
Engineering and Environmental Services

Site Plan
City Blue Production Facility
Oakland, California

PLATE 1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
AM	18106.012.04		7/92	



Harding Lawson Associates
Engineering and Environmental Services

Process Flow and Sampling Locations
City Blue Groundwater Treatment System
1700 Jefferson Street
Oakland, California

PLATE **2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
AM	11295-012		4/93	

EAST BAY
MUNICIPAL UTILITY DISTRICT

MICHAEL J. WALLIS
DIRECTOR OF WASTEWATER

March 9, 1995

Mr. David Scrivner
Harding Lawson Associates
1855 Gateway Boulevard, Suite 500
Concord, CA 94520

Dear Mr. Scrivner:

Re: Blue Print Service Company, Account No. 500-68191
1700 Jefferson Street, Oakland, CA 94612

East Bay Municipal Utility District reviewed the laboratory results for the samples collected on February 10, 1995 and February 28, 1995 at the bioreactor tank from the groundwater treatment system at Blue Print Service Company located at 1700 Jefferson Street in Oakland.

Discharge from the bioreactor tank to the sanitary sewer is approved. Blue Print Service Company shall obtain a representative grab sample of the wastewater discharge midway during the discharge period into the sanitary sewer, analyze for the following parameters and submit a discharge report due on **April 30, 1995:**

Parameter	Sample Type	Analytical Method
BTEX	grab	EPA 8020
CODF	composite *	EPA 410.4
TSS	composite *	EPA 160.2
pH	grab	EPA 150.1

* Composite of 4 grab samples collected at 10 minute intervals.

The discharge report shall include the analytical test results, the total volume of the discharge, and the date and time the discharge began and ended.

If you have any questions, please contact me at 287-1618.

Sincerely,

Molly Ong

MOLLY ONG
Wastewater Control Representative
Source Control Division MS702

MKO:mko

[permit]bluprt_correspond.wp

cc: Jeff Christoff, Blue Print Service Company
149 Second Street, San Francisco, CA 94105

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172 AIHA Accreditation: 11134

HARDING LAWSON ASSOCIATES
1855 GATEWAY BLVD. STE. 500
CONCORD, CA 94520

ATTN: DAVE SCRIVNER
CLIENT PROJ. ID: 11295.012
CLIENT PROJ. NAME: CITY BLUE
C.O.C. NUMBER: 306

REPORT DATE: 03/01/95
DATE(S) SAMPLED: 02/10/95
DATE RECEIVED: 02/10/95
AEN WORK ORDER: 9502140

PROJECT SUMMARY:

On February 10, 1995, this laboratory received 1 water sample(s).

Client requested sample(s) be analyzed for inorganic and organic parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

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

Larry Klein
Laboratory Director

HARDING LAWSON ASSOCIATES

SAMPLE ID: 950210B1
AEN LAB NO: 9502140-01
AEN WORK ORDER: 9502140
CLIENT PROJ. ID: 11295.012

DATE SAMPLED: 02/10/95
DATE RECEIVED: 02/10/95
REPORT DATE: 03/01/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	14 *	0.5	ug/L	02/14/95
Toluene	108-88-3	8 *	0.5	ug/L	02/14/95
Ethylbenzene	100-41-4	ND	0.5	ug/L	02/14/95
Xylenes, Total	1330-20-7	25 *	2	ug/L	02/14/95
Purgeable HCs as Gasoline	5030/GCFID	0.5 *	0.05	mg/L	02/14/95
#Sample Filtration	934-AH FILT.	-		Filtr Date	02/10/95
Filtered COD	EPA 410.4	330 *	20	mg as O2/L	02/21/95
Total Suspended Solids	EPA 160.2	120 *	2	mg/L	02/14/95
#Digestion/ICP	EPA 200.0	-		Prep Date	02/13/95
Cadmium	EPA 200.7	ND	0.005	mg/L	02/14/95
Chromium	EPA 200.7	ND	0.01	mg/L	02/14/95
Copper	EPA 200.7	ND	0.01	mg/L	02/14/95
Lead	EPA 200.7	ND	0.04	mg/L	02/14/95
Nickel	EPA 200.7	0.02 *	0.01	mg/L	02/14/95
Zinc	EPA 200.7	0.02 *	0.01	mg/L	02/14/95

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

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9502140

CLIENT PROJECT ID: 11295.012

Quality Control and Project Summary

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

Definitions

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

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

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

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

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

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

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

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9502140
INSTRUMENT: H
MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery Fluorobenzene
02/14/95	950210B1	01	103
QC Limits:			92-109

DATE ANALYZED: 02/13/95
SAMPLE SPIKED: 9502088-02
INSTRUMENT: H

Matrix Spike Recovery Summary

Analyte	Spike Added (ug/L)	Average Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
Benzene	18.2	102	5	85-109	17
Toluene	52.8	102	4	87-111	16
Hydrocarbons as Gasoline	500	105	2	66-117	19

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

QUALITY CONTROL DATA

AEN JOB NO: 9502140
DATE(S) ANALYZED: 02/14-21/95
MATRIX: WATER

Method Spike Recovery Summary

Analyte	Inst./ Method	Spike Added (mg/L)	Average Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
Cd, Cadmium	ICP/200.7	0.05	103	9	78-119	10
Cr, Chromium	ICP/200.7	0.10	106	3	87-117	8
Cu, Copper	ICP/200.7	0.125	102	4	85-113	6
Ni, Nickel	ICP/200.7	0.25	104	3	88-116	6
Pb, Lead	ICP/200.7	0.50	104	2	87-119	7
Zn, Zinc	ICP/200.7	0.25	104	3	87-117	7
COD	NOVASPEC/410.4	1000	106	2	80-120	15

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

*** END OF REPORT ***

[redacted] 500
Concord, California 94520
(510) 687-9660 • FAX (510) 687-9673

[redacted]

D-3, s-1   C-1, S-3   R-[redacted]B

No 306

Lab: AEN 9502140

Job Number: 1295.012

Name/Location: City Blue

Project Manager: Dave Scrivner

Samplers: 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				2		1	3		95	02	1 08 1	95	02	10	1515	01 A-F

ANALYSIS REQUESTED

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	METALS 200.7 ICP *	EPA 8015M/TPHg	EPA 8020/BTEX	EPA 8015M/TPHd,o	TSS **	COD **
				X	X	X		X	X

Lab Number: Yr	Wk	Seq	Depth in Feet	Col Mtd CD	QA Code	Miscellaneous
						Std TAT
						*Cd, Cr, Ni, Pb, Zn, Cu
						** To be filtered

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
James McCarty		
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
		Lori L. Pruitt	2/10/95 1636

METHOD OF SHIPMENT: cooler with ice

SAMPLE CONDITION WHEN RECEIVED BY THE LABORATORY

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

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172 AIHA Accreditation: 1113

HARDING LAWSON ASSOCIATES
1855 GATEWAY BLVD. STE. 500
CONCORD, CA 94520

ATTN: DAVE SCRIVNER
CLIENT PROJ. ID: 11295
CLIENT PROJ. NAME: CITY BLUE
C.O.C. NUMBER: 308

REPORT DATE: 03/13/95
DATE(S) SAMPLED: ~~03~~ 02/28/95
DATE RECEIVED: 03/01/95
AEN WORK ORDER: 9503001

PROJECT SUMMARY:

On March 1, 1995, this laboratory received 1 water sample(s).

Client requested sample(s) be analyzed for organic parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

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

Larry Klein
Laboratory Director

HARDING LAWSON ASSOCIATES

SAMPLE ID: 950228B2
AEN LAB NO: 9503001-01
AEN WORK ORDER: 9503001
CLIENT PROJ. ID: 11295

DATE SAMPLED: ~~03~~ 02/28/95
DATE RECEIVED: 03/01/95
REPORT DATE: 03/13/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	03/03/95
Toluene	108-88-3	ND	0.5	ug/L	03/03/95
Ethylbenzene	100-41-4	ND	0.5	ug/L	03/03/95
Xylenes, total	1330-20-7	ND	2	ug/L	03/03/95

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

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9503001

CLIENT PROJECT ID: 11295

Quality Control and Project Summary

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

Definitions

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

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

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

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

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

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

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

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9503001
INSTRUMENT: H
MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery Fluorobenzene
03/03/95	950228B2	01	101
QC Limits:			92-109

DATE ANALYZED: 03/01/95
SAMPLE SPIKED: 9502224-07
INSTRUMENT: H

Matrix Spike Recovery Summary

Analyte	Spike Added (ug/L)	Average Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
Benzene	36	110	2	85-109	17
Toluene	106	101	2	87-111	16
Hydrocarbons as Gasoline	1000	101	3	66-117	19

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

*** END OF REPORT ***

Harding Lawson Associates
1855 Gateway Boulevard, Suite 500
Concord, California 94520
(510) 687-9660 • FAX (510) 687-9673

CHAIN OF CUSTODY FORM

Lab: AEN 9503001

Samplers: James McCarty

Job Number: 11295

Name/Location: City Bluey Oakland

Project Manager: Dave Scrivner

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	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	METALS	EPA 8015M/TPHg	EPA 8020/BTEX	EPA 8015M/TPHd,o
	X							3		95	02	28BZ	95	02	28		Bio – Reactor 01A-C							X	

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
						48 hr. TAT

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
James McCarty		3-1-95 09:20
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
		3-1-95 9:40
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) Lynn Gillespie	DATE/TIME 3-1-95 0940

METHOD OF SHIPMENT: cooler with ice

SAMPLE CONDITION WHEN RECEIVED BY THE LABORATORY

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

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172 AIHA Accreditation: 11134

HARDING LAWSON ASSOCIATES
1855 GATEWAY BLVD. STE. 500
CONCORD, CA 94520

ATTN: DAVE SCRIVNER
CLIENT PROJ. ID: 11295.012
CLIENT PROJ. NAME: CITY BLUE
C.O.C. NUMBER: 375

REPORT DATE: 03/30/95
DATE(S) SAMPLED: 03/17/95
DATE RECEIVED: 03/17/95
AEN WORK ORDER: 9503302

PROJECT SUMMARY:

On March 17, 1995, this laboratory received 4 water sample(s).

Client requested one grab sample be analyzed for inorganic and organic parameters, and all grab samples be composited for additional inorganic analysis. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

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

Larry Klein
Laboratory Director

HARDING LAWSON ASSOCIATES

SAMPLE ID: 950317DC - GRAB
AEN LAB NO: 9503302-01
AEN WORK ORDER: 9503302
CLIENT PROJ. ID: 11295.012

DATE SAMPLED: 03/17/95
DATE RECEIVED: 03/17/95
REPORT DATE: 03/30/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
EPA 8020 for BTEX	**EPA 8020**				
Benzene	71-43-2	ND	0.5	ug/L	03/25/95
Toluene	108-88-3	ND	0.5	ug/L	03/25/95
Ethylbenzene	100-41-4	ND	0.5	ug/L	03/25/95
Xylenes, total	1330-20-7	ND	2	ug/L	03/25/95
pH	**EPA 150.1**	9.0		S.U.	03/17/95

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

HARDING LAWSON ASSOCIATES

SAMPLE ID: 950317DC - COMPOSITE
AEN LAB NO: 9503302-02
AEN WORK ORDER: 9503302
CLIENT PROJ. ID: 11295.012

DATE SAMPLED: 03/17/95
DATE RECEIVED: 03/17/95
REPORT DATE: 03/30/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Sample Filtration	934-AH FILT.	-		Filtr Date	03/17/95
Filtered COD	EPA 410.4	210 *	20	mg as O2/L	03/21/95
Total Suspended Solids	EPA 160.2	13 *	2	mg/L	03/24/95

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

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9503302

CLIENT PROJECT ID: 11295.012

Quality Control and Project Summary

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

Definitions

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

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

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

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

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

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

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

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

METHOD: EPA 8020

AEN JOB NO: 9503302
INSTRUMENT: F
MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery Fluorobenzene
03/25/95	950317DC-GRAB	01	97
QC Limits:			92-109

DATE ANALYZED: 03/24/95
SAMPLE SPIKED: LCS
INSTRUMENT: F

Laboratory Control Sample

Analyte	Spike Added (ug/L)	Percent Recovery	QC Limits Percent Recovery
Benzene	18.6	93	63-117
Toluene	52.9	94	67-114

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

QUALITY CONTROL DATA

AEN JOB NO: 9503302
DATE ANALYZED: 03/21/95
MATRIX: WATER

Method Spike Recovery Summary

Analyte/Test	Inst./ Method	Spike Added (mg/L)	Average Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
COD	NOVASPEC/410.4	1000	91	2	80-120	15

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

*** END OF REPORT ***

[redacted]ding [redacted]n A[redacted]es [redacted] [redacted]AIN OF [redacted]STUDY FORM [redacted] No. 375

[redacted] Gateway Boulevard, Suite 500
Concord, California 94520
(510) 687-9660 • FAX (510) 687-9673

Lab: AEN # 9503302

Job Number: 11295.012
Name/Location: City Blue
Project Manager: Dave Scrivner

Samplers: James 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			(8)	2		7	3		95	03	17DC	95	03	17	1115	01ABC - BTEX; 01D - pH; 02A - TSS; 02B - CODF
	X				2					95	03	17DC	↓			1125	Composite samples for TSS and CODF
	X				2					95	03	17DC				1135	
	X				2					95	03	17DC				1145	

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	PH EPA 150.1	TSS EPA 160.2	CODF EPA 410.4
						X		X	X	X
									X	X
									X	X
									X	X

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
						Note: BTEX analysis not composite. DSH
						pH analysis not composite - DSH

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
James McCarty		
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
		Denise Harrington	3/17/95 1510

METHOD OF SHIPMENT: cooler with ice

SAMPLE CONDITION WHEN RECEIVED BY THE LABORATORY

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

Superior Precision Analytical, Inc.
A member of ESSCON Environmental Support Service Consortium

Harding Lawson Associates
Attn: DAVE SCRIVNER

Project 11295-017
Reported on December 28, 1994

Gasoline Range Petroleum Hydrocarbons and BTXE
by EPA SW-846 5030/8015M/8020
Gasoline Range quantitated as all compounds from C6-C10

Chronology

Laboratory Number 80305

Sample ID	Sampled	Received	Extract.	Analyzed	QC Batch	LAB #
94121901	12/19/94	12/19/94	12/27/94	12/27/94	AL231.04	01
94121902	12/19/94	12/19/94	12/27/94	12/27/94	AL231.04	02
94121906	12/19/94	12/19/94	12/27/94	12/27/94	AL231.04	03

QC Samples

QC Batch #	QC Sample ID	Type	Ref.	Matrix	Extract.	Analyzed
AL231.04-01	Method Blank	MB		Water	12/23/94	12/23/94
AL231.04-02	B-3	MS	80314-02	Water	12/23/94	12/23/94
AL231.04-03	B-3	MSD	80314-02	Water	12/23/94	12/23/94

Certified Laboratories

825 Arnold Dr., Suite 114
Martinez, California 94553
(510) 229-1512 / fax (510) 229-1526

1555 Burke St., Unit I
San Francisco, California 94124
(415) 647-2081 / fax (415) 821-7123

309 S. Cloverdale St., Suite B-24
Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

Erding Lawson Associates
Attn: DAVE SCRIVNER

Project 11295-017
Reported on December 28, 1994

Gasoline Range Petroleum Hydrocarbons and BTXE
by EPA SW-846 5030/8015M/8020
Gasoline Range quantitated as all compounds from C6-C10

LAB ID	Sample ID	Matrix	Moisture
80305-01	94121901	Water	-
80305-02	94121902	Water	-
80305-03	94121906	Water	-

R E S U L T S O F A N A L Y S I S

Compound	80305-01 Conc. ug/L	RL	80305-02 Conc. ug/L	RL	80305-03 Conc. ug/L	RL
Gasoline_Range	5500	500	590	50	ND	50
Benzene	140	5.0	60	0.5	1.0	0.5
Toluene	100	5.0	14	0.5	0.5	0.5
Ethyl Benzene	ND	5.0	ND	0.5	ND	0.5
Total Xylenes	1600	5.0	100	0.5	ND	0.5
Surrogate Recoveries (%) <<						
Trifluorotoluene (SS)	102		107		105	

Certified Laboratories

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Seattle, Washington 98108
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Gasoline Range Petroleum Hydrocarbons and BTXE
by EPA SW-846 5030/8015M/8020
Gasoline Range quantitated as all compounds from C6-C10

Quality Assurance and Control Data

Laboratory Number: 80305
Method Blank(s)

	AL231.04-01 Conc.	 RL
	ug/L	
Gasoline_Range	ND	50
Benzene	ND	0.5
Toluene	ND	0.5
Ethyl Benzene	ND	0.5
Total Xylenes	ND	0.5
>> Surrogate Recoveries (%) <<		
Trifluorotoluene (SS)	95	

Certified Laboratories

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Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

Gasoline Range Petroleum Hydrocarbons and BTXE
by EPA SW-846 5030/8015M/8020
Gasoline Range quantitated as all compounds from C6-C10

Quality Assurance and Control Data

Laboratory Number: 80305

Compound	Sample conc.	SPK Level	SPK Result	Recovery %	Limits %	RPD %
For Water Matrix (ug/L) AL231.04 02 / 03 - Sample Spiked: 80314 - 02						
Gasoline_Range	ND	320	299/21.8	93/109	65-135	16
Benzene	ND	20	20.6/23.2	103/116	65-135	12
Toluene	ND	20	21.9/22.7	110/114	65-135	4
Ethyl Benzene	ND	20	21.4/69.4	107/116	65-135	8
Total Xylenes	ND	60	65.6	109	65-135	
>> Surrogate Recoveries (%) <<						
Trifluorotoluene (SS)				101	50-150	

Definitions:
ND = Not Detected
RL = Reporting Limit
NA = Not Analysed
RPD = Relative Percent Difference
ug/L = parts per billion (ppb)
mg/L = parts per million (ppm)
ug/kg = parts per billion (ppb)
mg/kg = parts per million (ppm)

Certified Laboratories

825 Arnold Dr., Suite 114
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Seattle, Washington 98108
(206) 763-2992 / fax (206) 763-8429

[redacted]rding[redacted]son A[redacted]ates [redacted] **CHAIN OF CUSTODY FORM** № [redacted] 2[redacted]

1355 Galeway Boulevard, Suite 500
Concord, California 94520
(510) 687-9660 • FAX (510) 687-9673

80305

Lab: Superior

Job Number: 11295-017

Name/Location: City Blue

Project Manager: Dave Scrivner

Samplers: 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	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	METALS	EPA 8015M/TPHg	EPA 8020/BTEX	EPA 8015M/TPHd,o
	X							3		94	12	1901	94	12	19								X	X	
	X							3		94	12	1902	94	12	19								X	X	
	X							3		94	12	1906	94	12	19								X	X	

Received: Sm 5182
Samples stored in ice ✓
Appropriate containers ✓
Samples preserved ✓
VOA's without headspace ✓
Comments:

Lab Number: Yr	Wk	Seq	Depth in Feet	Col Mtd CD	QA Code	Miscellaneous
						Std TAT

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
James McCarty	R Yang - 701	12/19/94 12:45
R Yang - 701		

Dispatched by: (Signature)	Date/Time	Received for lab by: (Signature)	Date/Time
		[signature]	12-19-94 13:10

METHOD OF SHIPMENT: Cooler w/ blue ice

SAMPLE CONDITION WHEN RECEIVED BY THE LABORATORY

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

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172 AIHA Accreditation: 11134

HARDING LAWSON ASSOCIATES
1855 GATEWAY BLVD. STE. 500
CONCORD, CA 94520

ATTN: DAVE SCRIVNER
CLIENT PROJ. ID: 11295-017
CLIENT PROJ. NAME: CITY BLUE
C.O.C. NUMBER: 230

REPORT DATE: 01/17/95
DATE(S) SAMPLED: 01/05/95
DATE RECEIVED: 01/05/95
AEN WORK ORDER: 9501021

PROJECT SUMMARY:

On January 5, 1995, this laboratory received 2 water sample(s).

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

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

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

Cheryl McMillan for
Larry Klein
Laboratory Director

HARDING LAWSON ASSOCIATES

SAMPLE ID: 95010502
AEN LAB NO: 9501021-01
AEN WORK ORDER: 9501021
CLIENT PROJ. ID: 11295-017

DATE SAMPLED: 01/05/95
DATE RECEIVED: 01/05/95
REPORT DATE: 01/17/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	17 *	0.5	ug/L	01/12/95
Toluene	108-88-3	3 *	0.5	ug/L	01/12/95
Ethylbenzene	100-41-4	ND	0.5	ug/L	01/12/95
Xylenes, Total	1330-20-7	3 *	2	ug/L	01/12/95
Purgeable HCs as Gasoline	5030/GCFID	0.2 *	0.05	mg/L	01/12/95

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

HARDING LAWSON ASSOCIATES

SAMPLE ID: 95010506
AEN LAB NO: 9501021-02
AEN WORK ORDER: 9501021
CLIENT PROJ. ID: 11295-017

DATE SAMPLED: 01/05/95
DATE RECEIVED: 01/05/95
REPORT DATE: 01/17/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	0.7 *	0.5	ug/L	01/12/95
Toluene	108-88-3	ND	0.5	ug/L	01/12/95
Ethylbenzene	100-41-4	ND	0.5	ug/L	01/12/95
Xylenes, Total	1330-20-7	ND	2	ug/L	01/12/95
Purgeable HCs as Gasoline	5030/GCFID	ND	0.05	mg/L	01/12/95

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

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9501021

CLIENT PROJECT ID: 11295-017

Quality Control and Project Summary

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

Definitions

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

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

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

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

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

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

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

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9501021
INSTRUMENT: F
MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery Fluorobenzene
01/12/95	95010502	01	98
01/12/95	95010506	02	97
QC Limits:			92-109

DATE ANALYZED: 01/03/95
SAMPLE SPIKED: 9501001-01
INSTRUMENT: F

Matrix Spike Recovery Summary

Analyte	Spike Added (ug/L)	Average Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
Benzene	19.2	89	10	85-109	17
Toluene	52.2	97	11	87-111	16
Hydrocarbons as Gasoline	500	108	9	66-117	19

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

*** END OF REPORT ***

[redacted] Laboratory Associates
1855 Gateway Boulevard, Suite 500
Concord, California 94520
(510) 687-9660 • FAX (510) 687-9673

CHAIN OF CUSTODY FORM

[redacted] NO. 230

Lab: AEN

Samplers: Jim McCarty

Job Number: 11295-017

Name/Location: City Blue

Project Manager: Dave Scrivner

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	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	METALS	EPA 8015M/TPHg	EPA 8020/BTEX	EPA 8015M/TPHd.o
	X							3		95	01	0502	95	01	05		01A-C						X	X	
	X							3		95	01	0506	95	01	05		02A-C						X	X	

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

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
James McCarty	Emily Hunt	1/5/95 11:20
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

METHOD OF SHIPMENT: cooler w/ blue ice

SAMPLE CONDITION WHEN RECEIVED BY THE LABORATORY:

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

HARDING LAWSON ASSOCIATES

SAMPLE ID: BIO-TANK
AEN LAB NO: 9504031-05
AEN WORK ORDER: 9504031
CLIENT PROJ. ID: 11295.012

DATE SAMPLED: 04/03/95
DATE RECEIVED: 04/04/95
REPORT DATE: 04/14/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	0.9 *	0.5	ug/L	04/12/95
Toluene	108-88-3	1 *	0.5	ug/L	04/12/95
Ethylbenzene	100-41-4	ND	0.5	ug/L	04/12/95
Xylenes, Total	1330-20-7	5 *	2	ug/L	04/12/95
Purgeable HCs as Gasoline	5030/GCFID	0.1 *	0.05	mg/L	04/12/95

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

Harding Lawson Associates
1855 Gateway Boulevard, Suite 500
Concord, California 94520
(510) 687-9660 • FAX (510) 687-9673

CHAIN OF CUSTODY FORM

Lab: AEN 9504030

Samplers: James McCarty

Job Number: 11295.012

Name/Location: City Blue

Project Manager: Dave Scrivner

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				MW-3	95	04	03		01A-C
	X							3				MW-5					02A-C
	X							3				MW-4					03A-C
	X							3				MW-4A					04A-C
	X							3		BIO-		TANK					05A-C

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
					X	X	
					X	X	
					X	X	
					X	X	
					X	X	

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
						4/14/95 Sample id correction per D. Scrivner for 04A-C

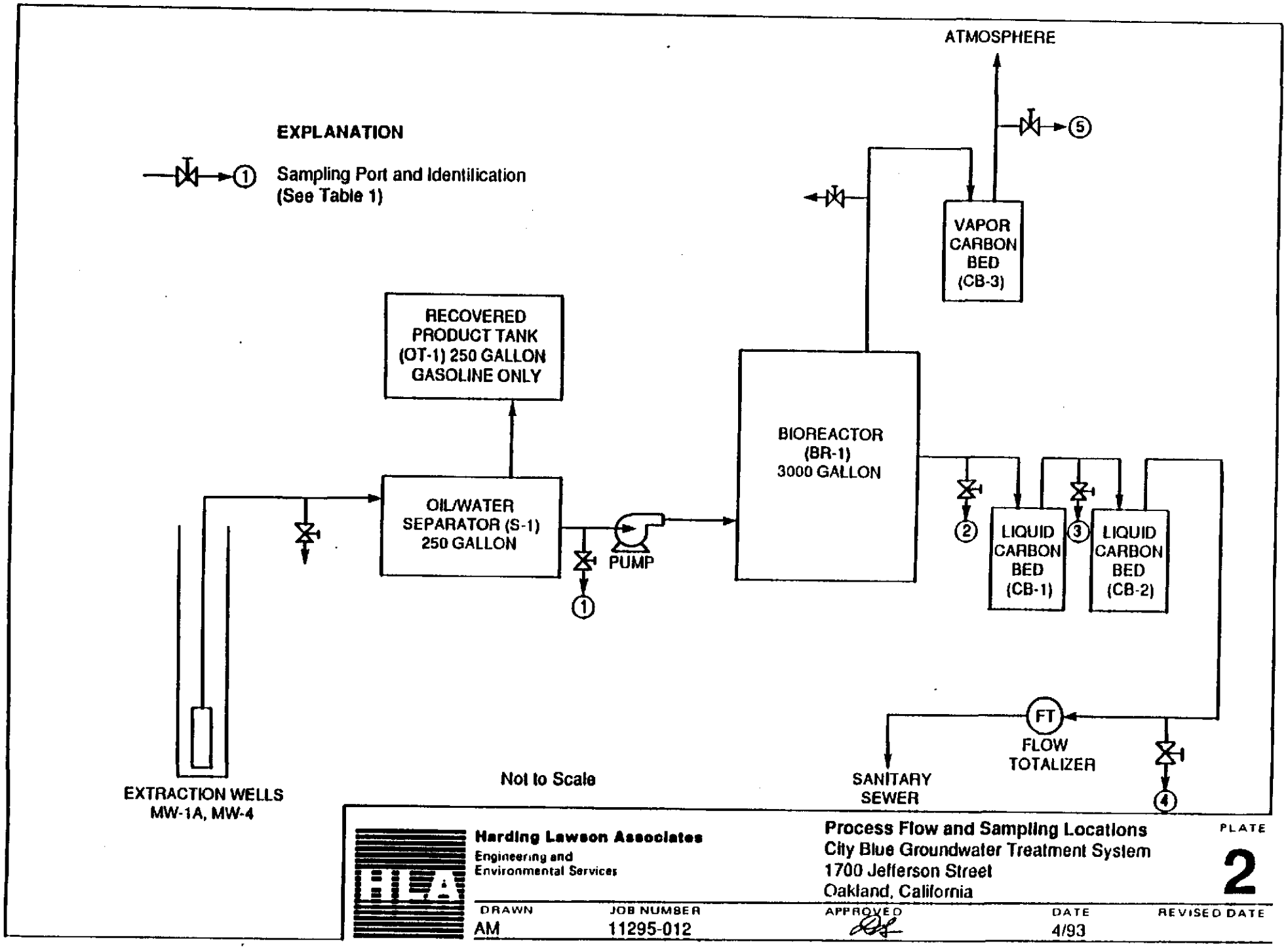
CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) James McCarty	RECEIVED BY: (Signature)	DATE/TIME 4-4-95 10:15
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME 4-4-95 13:2[illegible]
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) Gina Gillespie	DATE/TIME 4-4-95 1320

METHOD OF SHIPMENT: cooler with ice

SAMPLE CONDITION WHEN RECEIVED BY THE LABORATORY

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



Harding Lawson Associates
Engineering and Environmental Services

Process Flow and Sampling Locations
City Blue Groundwater Treatment System
1700 Jefferson Street
Oakland, California

PLATE 2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
AM	11295-012		4/93	

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172
AIHA Accreditation: 11134

HARDING LAWSON ASSOCIATES
1855 GATEWAY BLVD. STE. 500
CONCORD, CA 94520

ATTN: DAVE SCRIVNER
CLIENT PROJ. ID: 11295.012
CLIENT PROJ. NAME: CITY BLUE
C.O.C. NUMBER: 395

REPORT DATE: 04/14/95
DATE(S) SAMPLED: 04/03/95
DATE RECEIVED: 04/04/95
AEN WORK ORDER: 9504031

PROJECT SUMMARY:

On April 4, 1995, this laboratory received 5 water sample(s).

Client requested sample(s) be analyzed for organic parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

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

Larry Klein
Laboratory Director

HARDING LAWSON ASSOCIATES

SAMPLE ID: MW-3
AEN LAB NO: 9504031-01
AEN WORK ORDER: 9504031
CLIENT PROJ. ID: 11295.012

DATE SAMPLED: 04/03/95
DATE RECEIVED: 04/04/95
REPORT DATE: 04/14/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	1,100 *	50	ug/L	04/08/95
Toluene	108-88-3	2,300 *	50	ug/L	04/08/95
Ethylbenzene	100-41-4	580 *	50	ug/L	04/08/95
Xylenes, Total	1330-20-7	4,800 *	200	ug/L	04/08/95
Purgeable HCs as Gasoline	5030/GCFID	51 *	5	mg/L	04/08/95

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

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

HARDING LAWSON ASSOCIATES

SAMPLE ID: MW-5
AEN LAB NO: 9504031-02
AEN WORK ORDER: 9504031
CLIENT PROJ. ID: 11295.012

DATE SAMPLED: 04/03/95
DATE RECEIVED: 04/04/95
REPORT DATE: 04/14/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	**EPA 8020**				
Benzene	71-43-2	15,000 *	50	ug/L	04/08/95
Toluene	108-88-3	2,200 *	50	ug/L	04/08/95
Ethylbenzene	100-41-4	1,800 *	50	ug/L	04/08/95
Xylenes, Total	1330-20-7	2,100 *	200	ug/L	04/08/95
Purgeable HCs as Gasoline	5030/GCFID	51 *	5	mg/L	04/08/95

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

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

HARDING LAWSON ASSOCIATES

SAMPLE ID: MW-4
AEN LAB NO: 9504031-03
AEN WORK ORDER: 9504031
CLIENT PROJ. ID: 11295.012

DATE SAMPLED: 04/03/95
DATE RECEIVED: 04/04/95
REPORT DATE: 04/14/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	**EPA 8020**				
Benzene	71-43-2	1,200 *	50	ug/L	04/08/95
Toluene	108-88-3	3,400 *	50	ug/L	04/08/95
Ethylbenzene	100-41-4	280 *	50	ug/L	04/08/95
Xylenes, Total	1330-20-7	5,800 *	200	ug/L	04/08/95
Purgeable HCs as Gasoline	5030/GCFID	35 *	5	mg/L	04/08/95

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

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

HARDING LAWSON ASSOCIATES

SAMPLE ID: MW-1A
AEN LAB NO: 9504031-04
AEN WORK ORDER: 9504031
CLIENT PROJ. ID: 11295.012

DATE SAMPLED: 04/03/95
DATE RECEIVED: 04/04/95
REPORT DATE: 04/14/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	11,000 *	50	ug/L	04/08/95
Toluene	108-88-3	13,000 *	50	ug/L	04/08/95
Ethylbenzene	100-41-4	910 *	50	ug/L	04/08/95
Xylenes, Total	1330-20-7	9,800 *	200	ug/L	04/08/95
Purgeable HCs as Gasoline	5030/GCFID	67 *	5	mg/L	04/08/95

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

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

HARDING LAWSON ASSOCIATES

SAMPLE ID: BIO-TANK
AEN LAB NO: 9504031-05
AEN WORK ORDER: 9504031
CLIENT PROJ. ID: 11295.012

DATE SAMPLED: 04/03/95
DATE RECEIVED: 04/04/95
REPORT DATE: 04/14/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	0.9 *	0.5	ug/L	04/12/95
Toluene	108-88-3	1 *	0.5	ug/L	04/12/95
Ethylbenzene	100-41-4	ND	0.5	ug/L	04/12/95
Xylenes, Total	1330-20-7	5 *	2	ug/L	04/12/95
Purgeable HCs as Gasoline	5030/GCFID	0.1 *	0.05	mg/L	04/12/95

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

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9504031

CLIENT PROJECT ID: 11295.012

Quality Control and Project Summary

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

Definitions

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

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

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

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

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

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

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

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9504031
INSTRUMENT: H
MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery Fluorobenzene
04/08/95	MW-3	01	104
04/08/95	MW-5	02	103
04/08/95	MW-4	03	104
04/08/95	MW-1A	04	102
04/12/95	BIO-TANK	05	101
QC Limits:			92-109

DATE ANALYZED: 04/07/95
SAMPLE SPIKED: 9504030-04
INSTRUMENT: H

Matrix Spike Recovery Summary

Analyte	Spike Added (ug/L)	Average Percent Recovery	RPD	QC Limits Percent Recovery	QC Limits RPD
Benzene	18.2	104	4	85-109	17
Toluene	52.8	102	5	87-111	16
Hydrocarbons as Gasoline	500	94	4	66-117	19

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

*** END OF REPORT ***

Harding Lawson Associates
1855 Gateway Boulevard, Suite 500
Concord, California 94520
(510) 687-9660 • FAX (510) 687-9673

CHAIN OF CUSTODY FORM

Lab: AEN 9504030

Samplers: James McCarty

Job Number: 11295.012

Name/Location: City Blue

Project Manager: Dave Scrivner

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				MW-3	95	04	03		01A-C
	X							3				MW-5					02A-C
	X							3				MW-4					03A-C
	X							3				MW-4A					04A-C
	X							3		BIO-TANK							05A-C

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
					X	X	
					X	X	
					X	X	
					X	X	
					X	X	

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
						4/14/95 Sample id correction per D. Scrivner for C4A-C

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) James McCarty	RECEIVED BY: (Signature)	DATE/TIME 4-4-95 10:15
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME 4-4-95 12:20
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) Gina Gillespie	DATE/TIME 4-4-95 1220

METHOD OF SHIPMENT: cooler with ice

SAMPLE CONDITION WHEN RECEIVED BY THE LABORATORY

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