SIT 2.1

PACIFIC TESTING LABORATORIES

COPY

EXECUTIVE OFFICES
3257 16th Ave W • Seattle WA 98119
(206) 282-0666 • FAX (206) 282-0710

EASTSIDE DIVISION
11824 North Creek Parkway N #101 • Bothell WA 98011
206 485-4244 • 451-8436 • FAX (206) 485-4611

TACOMA DIVISION
2402 Pacific Highway E • Tacoma WA 98424
(206) 922-9299 • FAX (206) 922-6543

PENINSULA DIVISION
10725 Silverdale Way N W #105 • Silverdale WA 98383
206 698-6650 • FAX (206) 698-6648

FILED
MAY 26 1993

RECEIVED
MAY 28 1993
DEPT. OF ECOLOGY

May 25, 1993
Certificate No. 9304-6610

Mr. Harry Rubin
U.S. BANK - TRUST REAL ESTATE
1414 Fourth Avenue
P.O. Box 720
Seattle, WA 98111-0720

Subject: Ground Water Monitoring Well Installation and Analysis

Dear Mr. Rubin:

Pacific Testing Laboratories is pleased to submit for your review the following report detailing site activities and data results of ground water monitoring well installation and analysis at the former Sahlberg Equipment location, 5950 Fourth Avenue South, Seattle, Washington.

Thank you for using Pacific Testing Laboratories. If you have any questions, or if we can be of further assistance to you, please contact us at (206) 282-0666.

Reviewed by: Frank T. Jarnot, P.E., Chief Engineer FTJ FTJ FTJ

Sincerely,

Robert P Shopbell

Robert P. Shopbell,
Environmental Scientist

RPS/hlw

Enclosure

cc: Ms. Mary O'Herron, Washington State Department of Ecology

EXECUTIVE SUMMARY

Pacific Testing Laboratories installed a total of two (2) ground water monitoring wells at the former Sahlberg Equipment location, 5950 Fourth Avenue South, Seattle, Washington, on May 7, 1993. On the same day we abandoned one monitoring well, previously installed.

Subsequent analysis of ground water samples indicated that, with the exception of total xylenes and chlorobenzene, contaminant concentrations have decreased from previous sampling events.

Based upon these results, Pacific Testing Laboratories recommends further sampling and analysis prior to pursuing active ground water remediation.

PREVIOUS REPORTS

For this report Pacific Testing Laboratories utilized data obtained and summarized in the following reports:

> Pacific Testing Laboratories Certificate Number Report 9212-6600.7, "Site Characterization and Soil Remediation at Sahlberg Equipment, Inc. Property, Seattle, Washington." March 15, 1993.
>
> RZA AGRA, Inc. Report W-7497-1, "Environmental Site Assessment, Sahlberg Equipment Facility, 5950 Fourth Avenue South, Seattle, Washington." June 4, 1992.
>
> Rittenhouse-Zeman & Associates, "Level I Environmental Site Assessment, Sahlberg Equipment, Inc. Property, 5950 4th Avenue South, Seattle, Washington." April 5, 1991.

SITE BACKGROUND

The subject site formerly contained Sahlberg Equipment, Inc., a heavy machinery equipment sales company. Some machinery service was previously performed on the site.

Petroleum hydrocarbon contamination was discovered in soil as well as ground water. Chlorobenzene concentrations in ground water were found to be in excess of WDOE Method B calculated clean-up levels.

Soil remediation, by landfill disposal, was performed, as detailed in Pacific Testing Laboratories Certificate Number Report 9212-6600.7, dated March 15, 1993.

SITE BACKGROUND, CONTINUED

Ground water sampling events in January of 1993, indicated elevated concentrations of petroleum hydrocarbons. This sampling event was performed to obtain current information of ground water conditions regarding petroleum hydrocarbons, chlorinated volatile organic compounds, as well as volatile organic compounds.

MONITORING WELL ABANDONMENT

Monitoring well MW-B, installed in January of 1993, was abandoned in place, based upon ground water sample results, reported in Pacific Testing Laboratories Certificate Number Report 9212-6600.7. This well was abandoned by the removal of the two inch diameter polyvinyl chloride (PVC) pipe, and filling with a bentonite seal. The well was then capped with concrete.

MONITORING WELL CONSTRUCTION

During soil remediation performed in early 1993, ground water monitoring wells MW-1 and MW-2, installed by RZA AGRA in spring of 1992, were inadvertently destroyed. Pacific Testing Laboratories installed two new wells in the approximate location as the previous wells. Pacific Testing Laboratories labeled each well the same as RZA AGRA.

It was determined ground water was located between four and five feet below grade, thus, each monitoring well was placed to fifteen feet below grade. Each well was constructed of two inch diameter PVC pipe. The bottom ten feet of each well was slotted PVC pipe to allow infiltration of ground water. Sand was placed within three feet of grade around the PVC pipe to act as a filter media. Two feet of bentonite seal was placed on top of the sand. Each well was capped with one foot of concrete, and a flush mount monument was placed to allow access to each well.

All equipment that came into contact with potentially contaminated ground water was decontaminated prior to the installation of subsequent wells.

SAMPLING METHODOLOGY

Pacific Testing Laboratories mobilized our B-65 drill rig to the subject site to install ground water monitoring wells.

Ground water samples MW-1 and MW-2 were obtained on May 11, 1993. A minimum of three well volumes was removed from each monitoring well immediately prior to obtaining the ground water sample. Wells were purged utilizing a stainless steel bailer. Prior to obtaining each sample, the bailer was decontaminated to assure a representative sample was obtained. The bailer was then decontaminated a second time to eliminate cross contamination. Purge water from each well was placed in 55 gallon storage drums to await future disposal.

Each ground water sample was placed in an appropriate previously labeled glass sampling jar, and transported to the laboratory in an ice filled cooler.

ANALYTICAL METHODOLOGY

Previous reports indicated elevated TPH concentrations in the diesel range. Method Washington Total Petroleum Hydrocarbon - Diesel (WTPH-D) was utilized to quantify petroleum hydrocarbons in the diesel range. Additionally, elevated concentrations of chlorinated volatile organics, as well as volatile organics, were reported in ground water samples previously obtained. United States Environmental Protection Agency (EPA) Method 8010 and 8020 was utilized to quantify concentrations of chlorinated volatile organics and volatile organics, respectively.

Previous ground water samples were analyzed utilizing WTPH-D and Method 8020 and reported in Pacific Testing Laboratories Certificate Number Report 9212-6600.7. This analysis was reported on January 27, 1993.

RZA AGRA's report W-7497-1 analyzed ground water samples utilizing WTPH-D and Method 8240/8260 and reported on May 19, 1992.

Pacific Testing Laboratories utilized Friedman & Bruya, Inc. to perform the analysis for this sampling event, dated May 14, 1993.

Table 1 summarizes analytical results of ground water sample MW-1 of the current report, dated May 14, 1993, the report dated January 27, 1993 and the report dated May 19, 1992.

Table 2 summarizes analytical results of ground water sample MW-2 of the current report, dated May 14, 1993, the report dated January 27, 1993 and the report dated May 19, 1992.

ANALYTICAL METHODOLOGY, CONTINUED

WDOE limits reported are Method A Clean-up Levels, except where noted.

The complete laboratory report, dated May 14, 1993, is located in Appendix A.

ANALYTICAL RESULTS

Table 1.
MW-1 Results, in parts per billion

Analyte	Test Date 5/19/92	Test Date 1/27/93	Test Date 5/14/93	WDOE Limit
WTPH-D	3,000	1,800	1,000	1,000
Benzene	<2	N.T.	4	5
Trichloro-ethylene	<2	N.T.	0.5	4*
Toluene	<2	N.T.	23	40
Ethylbenzene	<2	N.T.	26	30
Xylenes	2.3	N.T.	110	20
Chlorobenzene	<2	N.T.	830	160*

* = Calculated Method B clean-up level
N.T. = Not Tested
< = less than

ANALYTICAL RESULTS, CONTINUED

Table 2.
MW-2 Results, in parts per Billion

Analyte	Test Date 5/19/92	Test Date 1/27/93	Test Date 5/14/93	WDOE Limit
WTPH-D	6,300	8,300	1,000	1,000
Benzene	<4	<1	3	5
Trichloro-ethylene	<4	N.T.	0.5	4*
Toluene	380	<25	21	30
Ethylbenzene	200	<10	26	30
Xylenes	1,000	<15	110	20
Chlorobenzene	1,200	N.T.	860	160*

* = Calculated Method B clean-up level
N.T. = Not Tested
< = less than

CONCLUSIONS AND RECOMMENDATIONS

Based upon analytical results of ground water obtained from monitoring wells MW-A and MW-B, Pacific Testing Laboratories concludes that diesel range petroleum hydrocarbons are currently at or below WDOE Method A Clean-up levels. Petroleum hydrocarbon concentrations in ground water samples obtained over the past year have steadily decreased.

Pacific Testing Laboratories does not recommend active petroleum hydrocarbon remediation of ground water at this time. Pacific Testing Laboratories does recommend at a minimum one additional compliance sampling event for petroleum hydrocarbon concentrations, for verification purposes.

Analytical results indicate that concentrations of trichloroethylene are decreasing over the past year. The first sampling event (May 19, 1992) did not indicate trichloroethylene concentrations in excess of WDOE Method B clean-up levels. The latest sampling event (May 14, 1993), reported even lower concentrations. Pacific Testing Laboratories does not recommend active trichloroethylene remediation.

CONCLUSIONS AND RECOMMENDATIONS, CONTINUED

Analytical results of ground water samples indicate that benzene, toluene and ethylbenzene are each below WDOE Method A clean-up levels. In ground water obtained from MW-2, each compound has increased in concentration since the second sampling event (January 27, 1993), but significantly decreased since the first sampling event. In ground water obtained from MW-1, concentrations of each compound have increased from below detection limits in the first sampling event, to detectable, but below WDOE Method A clean-up levels. Since previous analytical results did not indicate detectable concentrations of benzene, toluene, and ethylbenzene in ground water obtained from MW-1, and concentrations of each compound were below detection limits during the second sampling event in ground water obtained from MW-2, Pacific Testing Laboratories concludes that benzene, toluene and ethylbenzene are coming from off-site sources. Rittenhouse-Zeman reported a number of leaking underground storage tanks in their Level I Site Assessment, dated April 5, 1991. Any one of these could be a source of these three compounds.

Based upon analytical data accumulated over the past year, Pacific Testing Laboratories recommends further sampling of ground water to monitor benzene, toluene and ethylbenzene concentrations in both MW-1 and MW-2. This data will be used to establish a pattern regarding contaminant concentrations over time.

Analytical results indicate concentrations of total xylenes in both ground water samples above WDOE Method A clean-up levels. Ground water obtained from MW-1 reported below clean-up levels in the first sampling event. The most recent sampling event indicates elevated concentrations of total xylenes. Ground water obtained from MW-2 indicated relatively high total xylene concentrations in the first sampling event, below detection levels in the second sampling event, and above Method A clean-up concentrations in the most recent sampling event. Pacific Testing Laboratories concludes, as with benzene, toluene and ethylbenzene, total xylenes are coming from an off-site source. A potential source could be any one of the documented leaking underground storage tanks, identified by Rittenhouse Zeman.

Analytical results indicate chlorobenzene concentrations are above WDOE Method B clean-up concentrations. The first sampling event reported chlorobenzene concentrations in ground water obtained from MW-1 at below detection limits. The latest sampling event reports chlorobenzene over WDOE Method B clean-up concentrations. Analytical results of ground water obtained from MW-2 have reported above WDOE Method B clean-up concentrations, in both the first and the latest sampling event. Chlorobenzene concentrations have decreased between each sampling event.

CONCLUSIONS AND RECOMMENDATIONS, CONTINUED

Since there is a history of chlorobenzene in ground water samples obtained from MW-2, and increased chlorobenzene concentrations in ground water obtained from MW-1, conclusions regarding the potential source are premature. Further analysis is required for Pacific Testing Laboratories to conclude a potential source.

Pacific Testing Laboratories recommends scheduled ground water sampling and analysis for benzene, toluene, ethylbenzene, total xylenes and chlorobenzene. This information will monitor benzene, toluene and ethylbenzene concentrations, and assist in the discovery of a source for total xylenes and well as chlorobenzene.

Pacific Testing Laboratories recommends ground water sampling and analysis every quarter for a minimum of one (1) year. Pacific Testing Laboratories will be happy to provide you with a detailed scope of work and cost proposal for a year contract, at your request.

LIMITATIONS

This report has been prepared to aid in the evaluation of the site. Our conclusions and recommendations have been prepared in accordance with generally accepted professional engineering principles and practices. We make no other warranty, either expressed or implied. Our conclusions are based on results of field explorations in a limited portion of the subject site, and on our interpretation of analytical results. If conditions are encountered that appear different from those described in this report, we must be notified so we may review and verify or modify our recommendations.

APPENDIX A

LABORATORY REPORT

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

AMENDED 5/17/93

Date of Report: May 14, 1993
Date Received: May 11, 1993
Project: 9304-6610, Sahlberg, PO #26778
Date Extracts Analyzed: May 11, 1993

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR VOLATILE ORGANIC COMPOUNDS USING EPA METHODS 8010 AND 8020

Samples Processed Using Method 5030 per Washington DOE Guidelines

Results Reported as µg/L (ppb)

Sample ID	MW-1	MW-2
Analyte:		
1,1-Dichloroethylene	<1	<1
Methylene Chloride	<1	<1
t-Dichloroethylene	<1	<1
1,1-Dichloroethane	<1	<1
Chloroform	<0.1	<0.1
1,1,1-Trichloroethane	<0.1	<0.1
Carbon Tetrachloride	<0.1	<0.1
Benzene	4	3
Trichloroethylene	0.5	0.5
Toluene	23	21
Tetrachloroethylene	<0.1	<0.1
Ethylbenzene	26	26
Total Xylenes	110	110
Chlorobenzene	830	860
1,2-Dichlorobenzene	140	120
Surrogate Standard % Recovery	112%	110%

FRIEDMAN & BRUYA, INC

ENVIRONMENTAL CHEMISTS

AMENDED 5/17/93

Date of Report: May 14, 1993
Date Received: May 11, 1993
Project: 9304-6610, Sahlberg, PO #26778
Date Extracts Analyzed: May 11, 1993

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR VOLATILE ORGANIC COMPOUNDS USING EPA METHODS 8010 AND 8020

Samples Processed Using Method 5030 per Washington DOE Guidelines

Results Reported as µg/L (ppb)
Quality Assurance

Sample #	Blank
Analyte:	
1,1-Dichloroethylene	<1
Methylene Chloride	<1
t-Dichloroethylene	<1
1,1-Dichloroethane	<1
Chloroform	<0.1
1,1,1-Trichloroethane	<0.1
Carbon Tetrachloride	<0.1
Benzene	<1
Trichloroethylene	<0.1
Toluene	<1
Tetrachloroethylene	<0.1
Ethylbenzene	<1
Total Xylenes	<2
Chlorobenzene	<1
1,2-Dichlorobenzene	<1
Surrogate Standard % Recovery	95%

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

AMENDED 5/17/93

Date of Report: May 14, 1993
Date Received: May 11, 1993
Project: 9304-6610, Sahlberg, PO #26778
Date Extracts Analyzed: May 11, 1993

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR VOLATILE ORGANIC COMPOUNDS USING EPA METHODS 8010 AND 8020
Samples Processed Using Method 5030
Results Reported as % Recovery
Quality Assurance

Sample #	MW-2 Matrix Spike % Recovery	MW-2 Matrix Spike Duplicate % Recovery	Spike Level
Analyte:			
1,1-Dichloroethylene	91%	89%	100
Methylene Chloride	130%	120%	100
t-Dichloroethylene	91%	88%	100
1,1-Dichloroethane	106%	102%	100
Chloroform	91%	88%	100
1,1,1-Trichloroethane	113%	110%	100
Carbon Tetrachloride	84%	108%	100
Benzene	92%	92%	100
Trichloroethylene	91%	91%	100
Toluene	89%	86%	100
Tetrachloroethylene	84%	85%	100
Ethylbenzene	86%	82%	100
Total Xylenes	96%	93%	100
Chlorobenzene	na	na	na
1,2-Dichlorobenzene	na	na	na
Surrogate Standard % Recovery	111%	107%	

[na] The analyte indicated was not added to the matrix spike sample.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

AMENDED 5/17/93

Date of Report: May 14, 1993
Date Received: May 11, 1993
Project: 9304-6610, Sahlberg, PO #26778
Date Extracts Analyzed: May 11, 1993

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR VOLATILE ORGANIC COMPOUNDS USING EPA METHODS 8010 AND 8020

Samples Processed Using Method 5030 per Washington DOE Guidelines

Results Reported as % Recovery
Quality Assurance

Sample #	Spike Blank	Spike Level
Analyte:		
1,1-Dichloroethylene	94%	100
Methylene Chloride	92%	100
t-Dichloroethylene	90%	100
1,1-Dichloroethane	94%	100
Chloroform	93%	100
1,1,1-Trichloroethane	96%	100
Carbon Tetrachloride	92%	100
Benzene	98%	100
Trichloroethylene	100%	100
Toluene	95%	100
Tetrachloroethylene	93%	100
Ethylbenzene	96%	100
Total Xylenes	103%	100
Chlorobenzene	[na]	[na]
1,2-Dichlorobenzene	[na]	[na]
Surrogate Standard % Recovery	113%	

[na] The analyte indicated was not added to the matrix spike sample.

FRIEDMAN & BRUYA, INC.
ENVIRONMENTAL CHEMISTS

Date of Report: May 14, 1993
Date Received: May 11, 1993
Project: 9304-6610, Sahlberg, PO #26778
Date Samples Extracted: May 12, 1993
Date Extracts Analyzed: May 12, 1993

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL BY GC/FID (Modified 8015)
Samples Processed Using Method 3510 per Washington DOE Guidelines
Results Reported as µg/L (ppb)

Sample #	Diesel	Internal Standard (% Recovery)
MW-1	<200	102%
MW-2	1,000	110%
Quality Assurance		
Tap Water Blank	<200	67%
Tap Water (Matrix Spike) % Recovery	88%	111%
Tap Water (Matrix Spike Duplicate) % Recovery	82%	109%
Spike Level	5,000	

FRIEDMAN & BRUYA, INC.
ENVIRONMENTAL CHEMISTS

Date of Report: May 14, 1993
Date Received: May 11, 1993
Project: 9304-6610, Sahlberg, PO #26778
Date Extracts Analyzed: May 11, 1993

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR VOLATILE ORGANIC COMPOUNDS USING EPA METHODS 8010 AND 8020

Samples Processed Using Method 5030 per Washington DOE Guidelines

Results Reported as µg/L (ppb)

Sample ID	MW-1	MW-2
Analyte:		
1,1-Dichloroethylene	<1	<1
Methylene Chloride	<1	<1
t-Dichloroethylene	<1	<1
1,1-Dichloroethane	<1	<1
Chloroform	<0.1	<0.1
1,1,1-Trichloroethane	<0.1	<0.1
Carbon Tetrachloride	<0.1	<0.1
Benzene	4	3
Trichloroethylene	0.5	0.5
Toluene	23	21
Tetrachloroethylene	<0.1	<0.1
Ethylbenzene	26	26
Total Xylenes	110	110
Surrogate Standard % Recovery	112%	110%

FRIEDMAN & BRUYA, INC
ENVIRONMENTAL CHEMISTS

Date of Report: May 14, 1993
Date Received: May 11, 1993
Project: 9304-6610, Sahlberg, PO #26778
Date Extracts Analyzed: May 11, 1993

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR VOLATILE ORGANIC COMPOUNDS USING EPA METHODS 8010 AND 8020

Samples Processed Using Method 5030 per Washington DOE Guidelines

Results Reported as µg/L (ppb)
Quality Assurance

Sample #	Blank
Analyte:	
1,1-Dichloroethylene	<1
Methylene Chloride	<1
t-Dichloroethylene	<1
1,1-Dichloroethane	<1
Chloroform	<0.1
1,1,1-Trichloroethane	<0.1
Carbon Tetrachloride	<0.1
Benzene	<1
Trichloroethylene	<0.1
Toluene	<1
Tetrachloroethylene	<0.1
Ethylbenzene	<1
Total Xylenes	<2
Surrogate Standard % Recovery	95%

FRIEDMAN & BRUYA, INC

ENVIRONMENTAL CHEMISTS

Date of Report: May 14, 1993
Date Received: May 11, 1993
Project: 9304-6610, Sahlberg, PO #26778
Date Extracts Analyzed: May 11, 1993

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR VOLATILE ORGANIC COMPOUNDS USING EPA METHODS 8010 AND 8020

Samples Processed Using Method 5030 per Washington DOE Guidelines
Results Reported as % Recovery
Quality Assurance

Sample #	MW-2 Matrix Spike % Recovery	MW-2 Matrix Spike Duplicate % Recovery	Spike Level
Analyte:			
1,1-Dichloroethylene	91%	89%	100
Methylene Chloride	130%	120%	100
t-Dichloroethylene	91%	88%	100
1,1-Dichloroethane	106%	102%	100
Chloroform	91%	88%	100
1,1,1-Trichloroethane	113%	110%	100
Carbon Tetrachloride	84%	108%	100
Benzene	92%	92%	100
Trichloroethylene	91%	91%	100
Toluene	89%	86%	100
Tetrachloroethylene	84%	85%	100
Ethylbenzene	86%	82%	100
Total Xylenes	96%	93%	100
Surrogate Standard % Recovery	111%	107%	

Date of Report: May 14, 1993
Date Received: May 11, 1993
Project: 9304-6610, Sahlberg, PO #26778
Date Extracts Analyzed: May 11, 1993

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR VOLATILE ORGANIC COMPOUNDS USING EPA METHODS 8010 AND 8020

Samples Processed Using Method 5030 per Washington DOE Guidelines

Results Reported as % Recovery
Quality Assurance

Sample #	Spike Blank	Spike Level
Analyte:		
1,1-Dichloroethylene	94%	100
Methylene Chloride	92%	100
t-Dichloroethylene	90%	100
1,1-Dichloroethane	94%	100
Chloroform	93%	100
1,1,1-Trichloroethane	96%	100
Carbon Tetrachloride	92%	100
Benzene	98%	100
Trichloroethylene	100%	100
Toluene	95%	100
Tetrachloroethylene	93%	100
Ethylbenzene	96%	100
Total Xylenes	103%	100
Surrogate Standard % Recovery	113%	

PACIFIC TESTING LABORATORIES

CHAIN OF [redacted] ...ificate Number 9304-6610

Client name	US Bank	Job number	
Project name	Sahlberg	P.O. Number	26778
Project manager	RPS	Sampler(s)	RPS

ANALYSIS REQUIRED

No. 1471

Sample number	Date sampled	Time sampled	Type: Composite or Grab	Sample description	Number of containers	6010	8020	WTPH-D	Hazardous sample / Special handling required	Remarks
MW-1	5/11		G		1			X		39927
MW-2	"		G		5	X	X	X		39928-32

	Signature	Company	Date	Time
Relinquished by	Darren Thompson / DARREN THOMPSON	PTL	5/11/93	12:40
Received by	Mark Z Perin / Mark Z Perin	FOI	5/11/93	12:40
Relinquished by				
Received by				
Relinquished by				
Received by				