

**Groundwater Sampling and
Limited Subsurface Exploration
for Northwest Wire Rope &
Equipment
Tacoma, Washington**

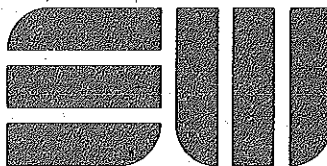
June 1996

Northwest Wire Rope and Equipment, Inc.
2301 Lincoln Avenue
Tacoma, Washington 98401

File Name Northwest Wire Rope
(101295)
County Pierce

File Type TCP

Your Name LG



SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

400 N. 34th St. • Suite 100
P.O. Box 300303
Seattle, Washington 98103
206 • 632 • 8020

June 27, 1996

Mr. Ron Kline
Northwest Wire Rope & Equipment, Inc.
2301 Lincoln Avenue
P.O. Box 1806
Tacoma, Washington 98401

**RE: GROUNDWATER SAMPLING AND LIMITED SUBSURFACE EXPLORATION
FOR NORTHWEST WIRE ROPE & EQUIPMENT, TACOMA, WASHINGTON**

Dear Mr. Kline:

Shannon & Wilson, Inc., has completed groundwater sampling of three existing monitoring wells and an additional subsurface exploration at the Northwest Wire Rope and Equipment, Inc. (NWRE) facility located at 2301 Lincoln Avenue in Tacoma, Washington (Figure 1). The additional subsurface exploration consisted of four soil borings located on the north side of the office and warehouse building (Figure 2). This letter report presents a summary of analytical results associated with these activities.

BACKGROUND

CEcon Corporation conducted an underground storage tank (UST) site assessment from October 23 through 27, 1991. A 600-gallon gasoline UST located south of the office and warehouse building on the site was removed on October 23, 1991. Four soil samples were collected from the excavation sidewalls and analyzed for Washington (State) Total Petroleum Hydrocarbon as Gasoline (WTPH-G). Results of the analyses indicated that the samples collected from the east, west, and south excavation walls contained less than 1.0 part per million (ppm) petroleum as gasoline. The soil sample collected from the north wall of the excavation, approximately 7.6 feet south of the adjacent building structure, contained 330 ppm of petroleum hydrocarbons as gasoline, exceeding the 100 ppm Model Toxics Control Act (MTCA) Method A cleanup level.

On May 1, 1992, three monitoring wells were installed around the excavation to evaluate groundwater contamination. The approximate locations of the wells are shown in Figure 3.

These monitoring wells had been sampled in six previous events. Analytical results are summarized in Table 1. At the time of the last sampling event (January 7, 1994), none of the sample results exceeded the current MTCA Method A cleanup levels.

A petroleum spill is reported to have occurred several years ago from a buried pipeline in a right-of-way along the northeast side of the property. Soils were excavated from the spill area at that time by the pipeline owner, U.S. Oil, and no remaining contamination was known to exist. In part, the purpose of the current investigation was to evaluate possible contamination in this area.

SOIL BORINGS

On June 5, 1996, four soil borings (labeled B-4 through B-7 and shown in Figure 2) were advanced by Holt Drilling using a hollow-stem auger (HSA) drill rig. Two of the borings (B-4 and B-5) were located to evaluate potential contamination from the former U.S. Oil pipeline release. Boring B-6 was randomly located to check for petroleum contamination in the yard, and boring B-7 was located on the opposite side of the office/warehouse building from the former UST to check for potential migration beneath the building. Appendix A contains the soil logs for each boring.

Boring B-4 was advanced to a depth of 14 feet. Borings B-5, B-6, and B-7 were advanced to a depth of 11.5 feet. From the ground surface to a depth of approximately 2 feet, soils generally consisted of a loose, brown, sandy gravel. From approximately 2 to 7.5 feet below ground surface (bgs), soils generally consisted of loose or very loose, brown or black, fine sand. From 7.5 to 11.5 feet bgs, soils generally consisted of soft to very soft, black or green peat, or peaty clay. From 11.5 to 14 feet bgs, soils generally consisted of soft, gray, silty clay, with a trace of gray fine sand with numerous organics (peat) interbedded (2 inches) with gray, silty fine. Water was encountered in the borings at 1.5 to 2.0 feet bgs. No hydrocarbon odor was noted in any of the borings.

Soil samples were obtained at 2.5-foot intervals from the existing ground level. Soil samples were screened visually and with a photoionization detector (PID) for the presence of detectable volatile organic compounds (VOCs). No obvious contamination was detected in this screening. Samples from 2.5 to 6.2 feet bgs were chosen for laboratory analyses.

One sample from each boring was submitted for laboratory analysis based on either its proximity to the groundwater interface (anticipating floating hydrocarbons), or based on relatively elevated PID readings. The samples were analyzed by OnSite Environmental, Inc. (Redmond, Washington) for Washington Total Petroleum Hydrocarbons—Hydrocarbon Identification (WTPH-HCID). Appendix B contains the analytical laboratory report. Analytical results of the submitted samples did not indicate the presence of petroleum hydrocarbons above the laboratory reporting limit. Sample number, sample depth, sample PID reading, and analytical results are shown in Table 2.

GROUNDWATER SAMPLING

On June 5, 1996, groundwater samples were collected from the three existing monitoring wells at the locations shown on Figure 3. The analytical requirements for each sample were identified based on the historical contamination in the wells and previous requests from the Tacoma-Pierce County Health Department (TPCHD), as shown in the following table. TPCHD had previously authorized abandoning MW001 and MW002, but since the wells had not yet been abandoned, they were sampled again as further assurance that contamination is not present.

ANALYTICAL REQUIREMENTS FOR WELL SAMPLES

Location	Required Analyses
MW-001	WTPH-G w/BTEX
MW-002	Lead
MW-003	WTPH-G

Laboratory analyses of groundwater samples indicate that levels of WTPH-G; benzene, toluene, ethylbenzene, and xylenes (BTEX); and lead are below the MTCA Method A groundwater cleanup levels. WTPH-G was detected at 410 parts per billion (ppb) in MW001 and at 310 ppb in MW003. Toluene was detected at 1.8 ppb in the sample from MW001. All other analytes were below the laboratory reporting limit. Sample results for all sample events are shown in Table 1.

GROUNDWATER LEVELS

In conjunction with the groundwater sampling, the water levels in the monitoring wells were also measured. Depth to the groundwater ranged from approximately 5 feet to 8 feet from the top of the well casing (Table 3). Water levels in MW001 and MW002 were similar to previous levels, but the water level in MW003 was anomalously higher. The groundwater flow direction during this event was to the northwest based on the measured depths to water in the wells. Historically, the flow direction has been to the north.

CONCLUSIONS

The analytical results for groundwater samples collected indicated that petroleum hydrocarbons and lead in the groundwater did not exceed levels set forth by MTCA Method A groundwater cleanup levels. In addition, petroleum hydrocarbons were not detected in any of the soil samples collected from the four borings advanced at the site. Low levels of petroleum hydrocarbon compounds were detected in the monitoring wells on site, but none of the detected concentrations exceeds regulatory cleanup levels.

We understand that this work was performed in anticipation of a property transfer. It is our opinion that this investigation represents a reasonable attempt to evaluate contamination at suspect locations based on our knowledge of past site uses. A copy of this report will be forwarded to the TPCHD and the Washington (State) Department of Ecology. We will again request that TPCHD issue a letter of no further action regarding the contamination related to the UST release.

CLOSURE

The findings we have presented within this letter report are based on limited research at the facility. They should not be construed as a definite statement regarding reported conditions. Shannon and Wilson, Inc., performed this work phase within our best judgment to adequately describe site conditions at the facility.

Mr. Ron Kline
Northwest Wire Rope and Equipment, Inc.
June 27, 1996
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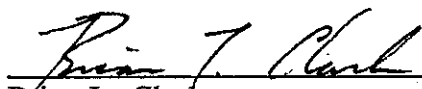
The data presented should be considered representative at the time of our observations. Changes in the conditions of the property can occur with time from both natural processes and human activities. In addition, changes in governmental codes, regulations, or law may occur. Because of such changes beyond our control, our observations and recommendations applicable to this facility may need to be revised wholly or in part.

This letter report was prepared for the exclusive use of NWRE, and in no way guarantees that an agency or its staff will reach the same conclusions as Shannon & Wilson, Inc.

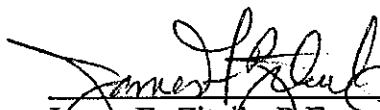
If you have any questions about this letter report, please contact us at (206) 632-8020.

Sincerely,

SHANNON & WILSON, INC.



Brian L. Clark
Environmental Engineer

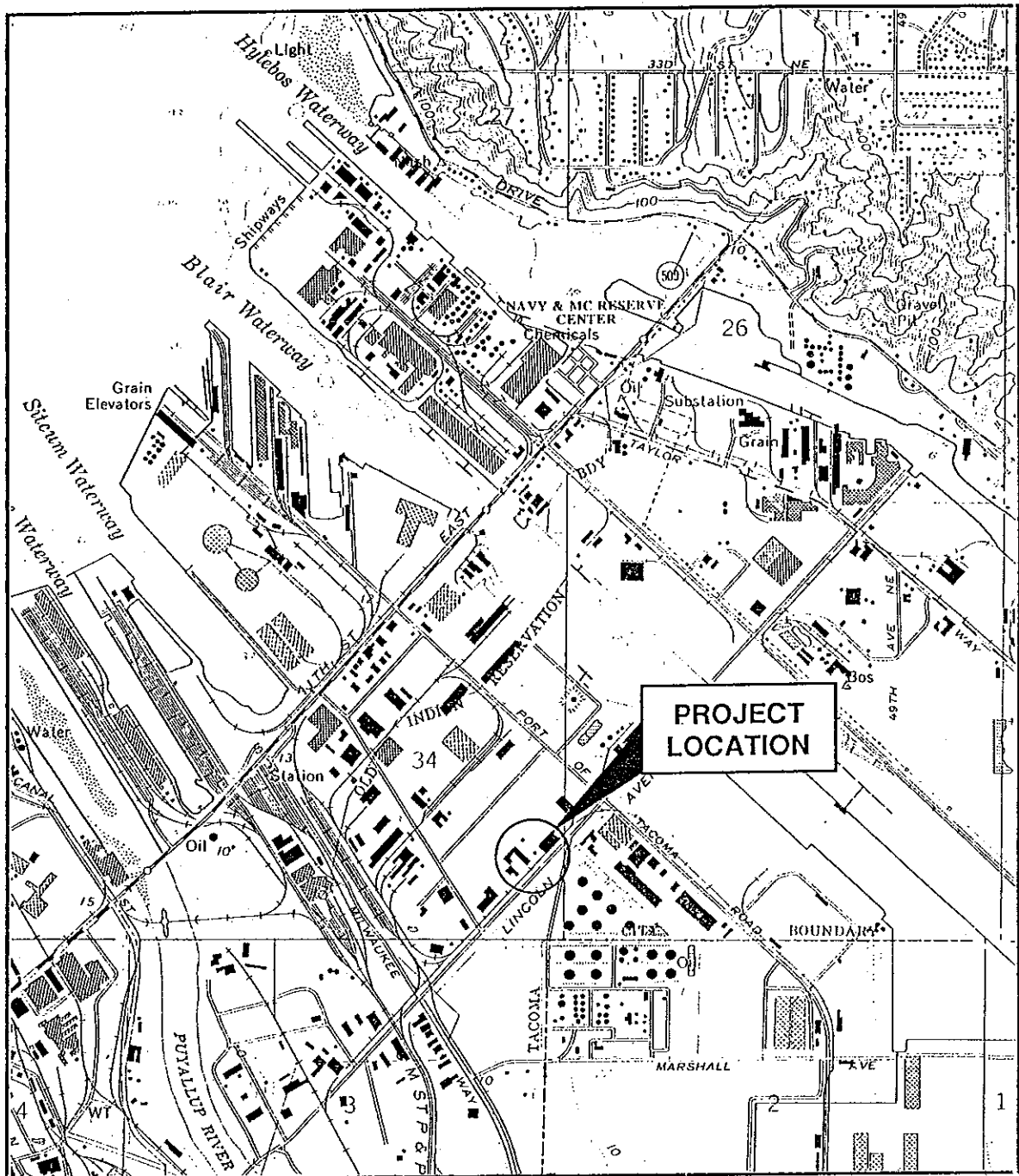


James F. Zitnik, P.E.
Vice President

TLF:BLC:JFZ/tlf

Enclosures: Figure 1 - Vicinity Map
Figure 2 - Boring Plan
Figure 3 - Monitoring Well Plan
Table 1 - Summary of Groundwater Sampling Events
Table 2 - Soil Sampling Analysis Summary
Table 3 - Summary of Static Groundwater Elevation Measurements (in feet)
Appendix A - Environmental Field Drilling Logs
Appendix B - Analytical Laboratory Report
Appendix C - Important Information About Your Environmental Report

cc: Cynthia Wanless, R.S. - Tacoma-Pierce County Health Department
Washington Department of Ecology, Southwest Regional Office



NOTE

Map adapted from USGS topographic map of Tacoma North, WA. quadrangle, dated 1981.

Northwest Wire Rope & Equipment, Inc.
Tacoma, Washington

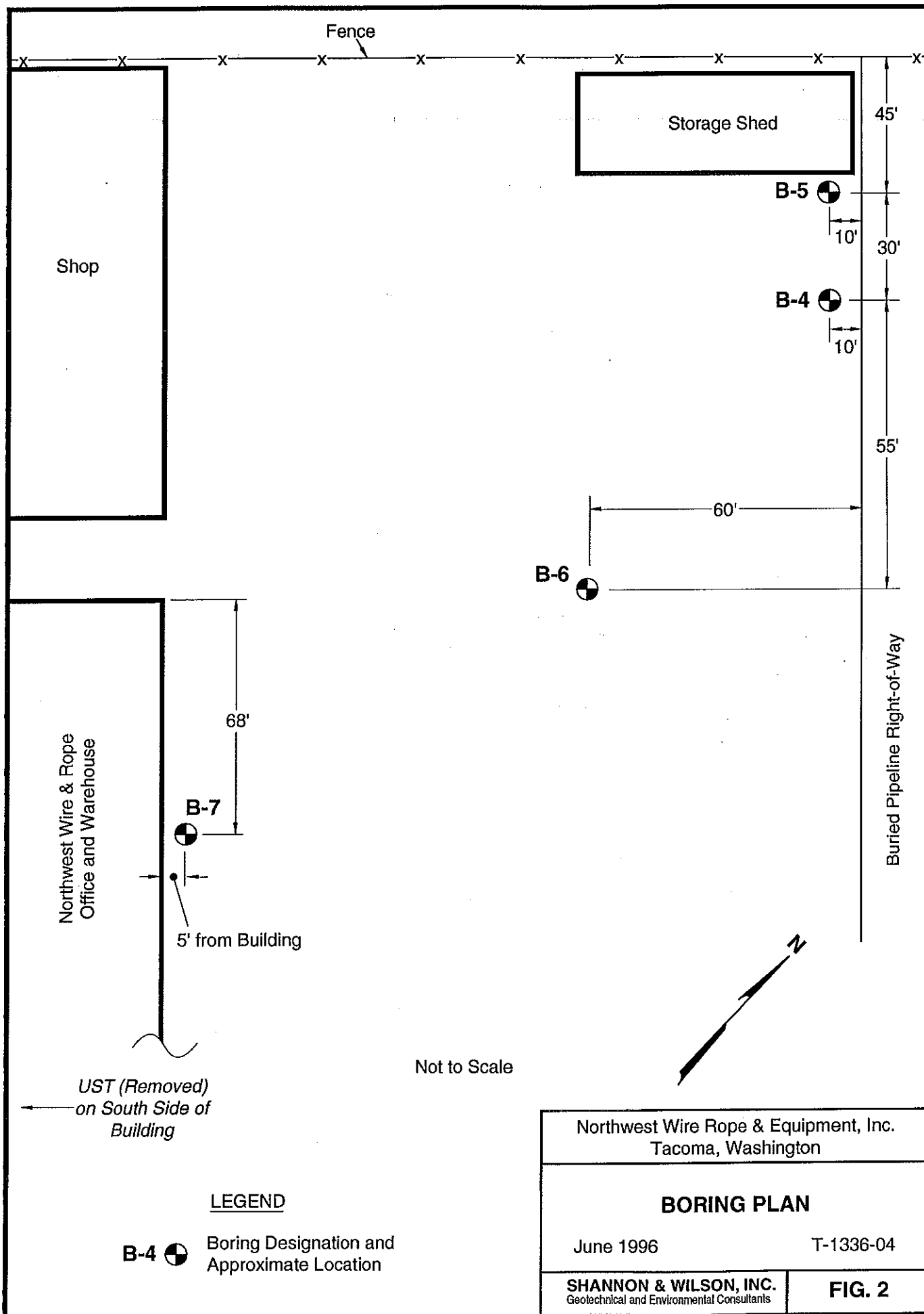
VICINITY MAP

June 1996

T-1336-04

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 1



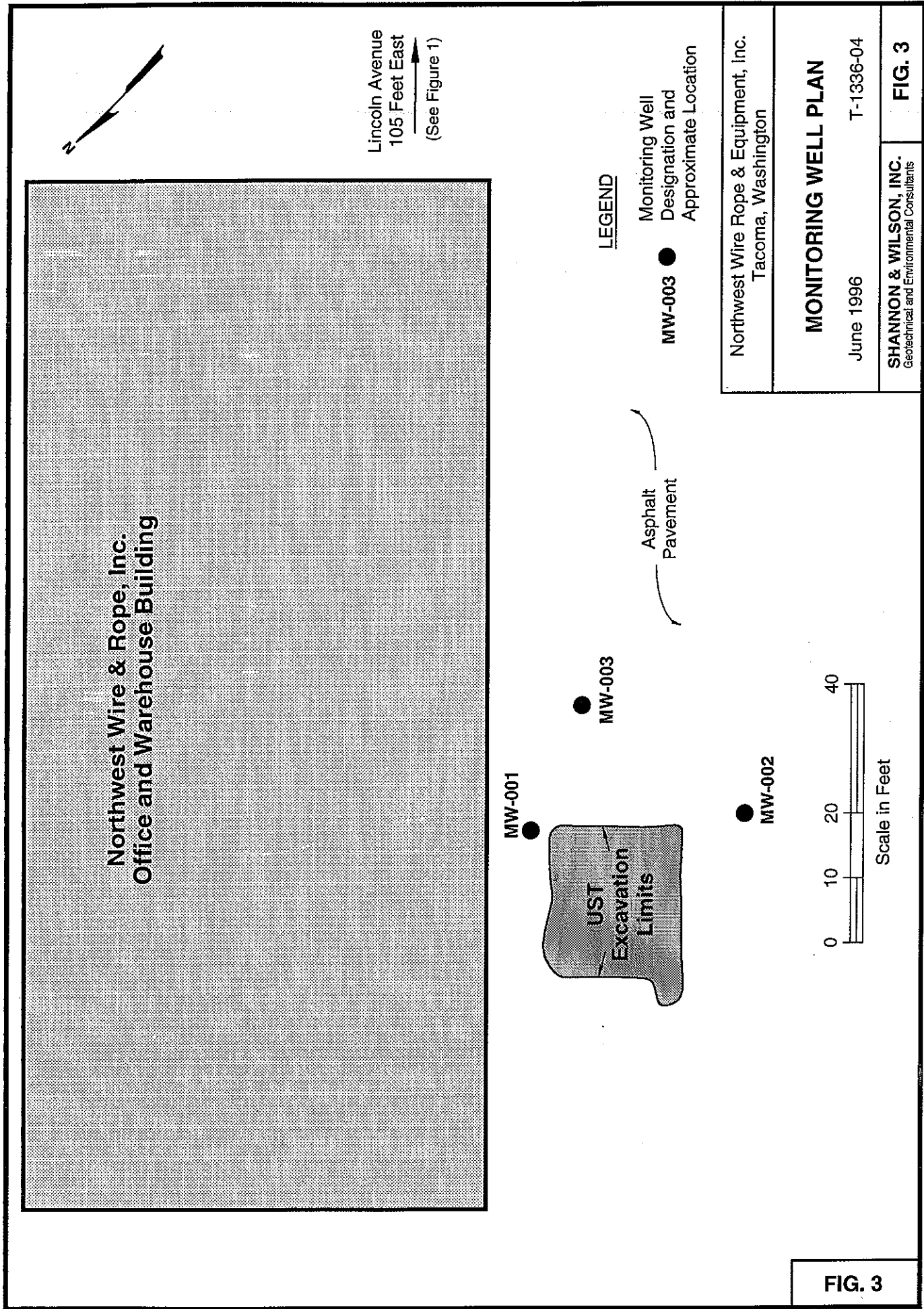


FIG. 3

**TABLE 1 - SUMMARY OF GROUNDWATER SAMPLING EVENTS
SEVEN GROUNDWATER SAMPLING EVENTS
NORTHWEST WIRE ROPE & EQUIPMENT, INC. - TACOMA, WASHINGTON**

Sample Number	Date Sampled	WTPH-G (ppb)	BTEX Distinction			Total Lead (ppb)
			Benzene (ppb)	Ethylbenzene (ppb)	Toluene (ppb)	
Monitoring Well Number 1 (MW001)						
NWR-MW001-021-GW-0	9/18/92	<100	<1	<1	<1	22
NWR-MW001-026-GW-0	12/18/92	1,800	1.1	2.0	<1.0	23
NWR-MW001-032-GW-0	3/18/93	4,200	1.3	1.0	<1	3
NWR-MW001-037-GW-0	6/18/93	1,400	<1	<1	<1	<2
NWR-MW001-042-GW-1	9/28/93	<250	<2.0	<10	<20	NR
1336046	1/7/94	<250	<2.0	<10	<20	NR
1336054	6/5/96	410	<1.0	<1.0	1.8	NR
Monitoring Well Number 2 (MW002)						
NWR-MW002-019-GW-0	9/18/92	<100	<1	<1	<1	<5
NWR-MW002-024-GW-0	12/18/92	<250	<1.0	<1.0	<1.0	12
NWR-MW002-030-GW-0	3/18/93	<250	<1	<1	<1	6
NWR-MW002-035-GW-0	6/18/93	<250	<1	<1	<1	4
NWR-MW002-040-GW-0	9/28/93	NR	NR	NR	NR	15
1336044	1/7/94	NR	NR	NR	NR	3
1336052	6/5/96	NR	NR	NR	NR	<2.0
Monitoring Well Number 3 (MW003)						
NWR-MW003-020-GW-0	9/18/92	400	1	<1	<1	<5
NWR-MW003-025-GW-0	12/18/92	740	1.3	1.4	<1.0	8
NWR-MW003-031-GW-0	3/18/93	1,100	1.7	<1	<1	3
NWR-MW003-036-GW-0	6/18/93	330	<1	<1	<1	<2
NWR-MW003-041-GW-0	9/28/93	410	NR	NR	NR	NR
1336045	1/7/94	380	NR	NR	NR	NR
1336053	6/5/96	310	NR	NR	NR	NR
Cleanup Levels for Groundwater (1)		1,000	5.0	30.0	40.0	20.0
						5.0

NR = Not Required

ppb = parts per billion, ug/l

< = Below reporting limit.

(1) Washington Model Toxics Control Act (MTCA), Method A

TABLE 2 - SOIL SAMPLING ANALYSIS SUMMARY
 DATE SAMPLED: JUNE 5, 1996
 NORTHWEST WIRE ROPE & EQUIPMENT, INC. - TACOMA, WASHINGTON

Sample Number	Location	Depth (feet)	PID (ppm)	WTPH-HCID		
				Gasoline (ppm)	Diesel (ppm)	Oil (ppm)
1336048	B-4	2.5-3.7	3.5	< 20	< 50	< 100
1336049	B-5	5.0-6.2	5.8	< 20	< 50	< 100
1336050	B-6	5.0-5.4	1.1	< 20	< 50	< 100
1336051	B-7	5.0-6.2	4.9	< 20	< 50	< 100

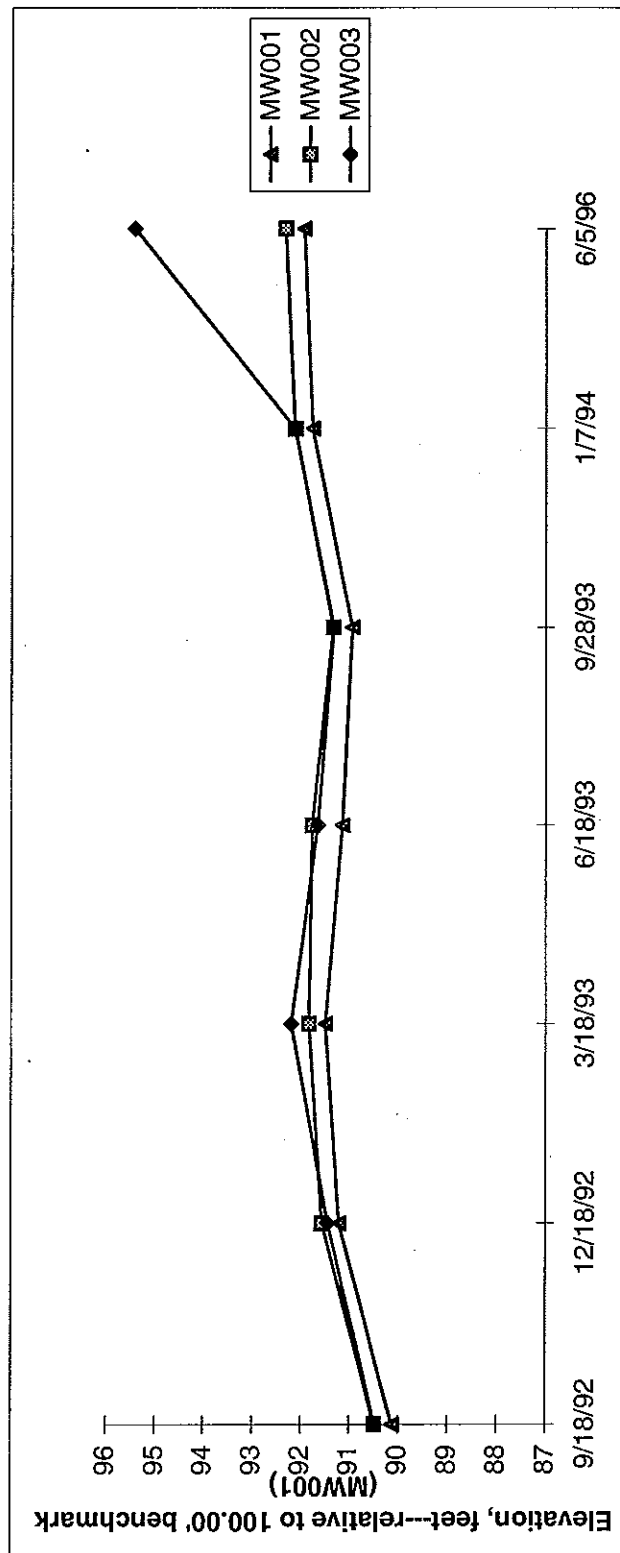
ppm = parts per million, mg/kg

< = Below method reporting limit

**TABLE 3 - SUMMARY OF STATIC GROUNDWATER ELEVATION
MEASUREMENTS IN FEET (1)
NORTHWEST WIRE ROPE & EQUIPMENT, INC. - TACOMA, WASHINGTON**

Location	9/18/92	12/18/92	3/18/93	6/18/93	9/28/93	1/7/94	6/5/96
MW001	90.12	91.21	91.49	91.14	90.95	91.77	91.95
MW002	90.48	91.56	91.83	91.76	91.34	92.13	92.32
MW003	90.47	91.44	92.20	91.65	91.33	92.13	95.43

(1) Relative to a locally established benchmark of 100.00'



SHANNON & WILSON, INC.

APPENDIX A
ENVIRONMENTAL FIELD DRILLING LOGS

T-1336-04

ENVIRONMENTAL BOREHOLE LOG



Date Started 6/5/96	Location Northwest Wire Rope & Equipment	Depth Water First Encountered (Ft) 1.5
Date Completed 6/5/96	Drilling Company Holt	Drilling Method Hollow-stem Auger
Total Depth (Ft) 14.0	Sampling Method 2-inch O.D. split-spoon	Hammer: Weight (lbs) 140 Drop (In) 30
Borehole Diam. (In) 8	Ground Elev. (ft)	Monument Elev. (ft)
		PVC Elev. (ft)

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
								Ground Surface				
							1.5	Loose, brown, sandy GRAVEL; moist; no hydrocarbon odor.	GW			
							3.0	Loose, brown, fine SAND; wet; no hydrocarbon odor.	SP			
	1	3/4/4	80	3.5	0833		3.0	Environmental sample no. 1336048 from 2.5 to 3.7 feet.	SP			
							5.0	Loose, black and red, fine SAND, trace silt; wet; no hydrocarbon odor.				
	2	3/3/4	100	2.7	0835		5.0	Very loose, gray, fine SAND; wet; no hydrocarbon odor.	SP			
							7.5					
	3	1	100	4.0	0845		8.0	Very soft, black PEAT; moist; no hydrocarbon odor.	PT			
							10.0	Very soft, green PEAT; moist; no hydrocarbon odor.	PT			
	4	1	100	5.5	0850		10.0	Very soft, slightly silty CLAY; moist; numerous organics (peat); no hydrocarbon odor.	CL			
							12.5					
	5	0/1/2	100	6.3	0910		14.0	Soft, gray, silty CLAY, trace fine sand; moist; numerous organics (peat); interbedded (2 inches) with very loose, gray, silty SAND; wet; no hydrocarbon odor.	SC			
								BOTTOM OF BORING COMPLETED 6/5/96				

Remarks: Refer to key for explanation of terminology and symbols.

* USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

-  2" O.D. Split-Spoon Sample
  Water Level and Date Measured
 3" O.D. Split-Spoon Sample
  Water Level at Time of Drilling

Northwest Wire Rope & Equipment
Tacoma, Washington

LOG OF BORING B-4

June 1996

T-1336-04

Logged By

TLF

Reviewed By

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-1

ENVIRONMENTAL BOREHOLE LOG

Date Started 6/5/96	Location Northwest Wire Rope & Equipment	Depth Water First Encountered (Ft) 2.0
Date Completed 6/5/96	Drilling Company Holt	Drilling Method Hollow-stem Auger
Total Depth (Ft) 11.5	Sampling Method 2-inch O.D. split-spoon	Hammer: Weight (lbs) 140 Drop (In) 30
Borehole Diam. (In) 8	Ground Elev. (ft)	Monument Elev. (ft)
		PVC Elev. (ft)

Depth (Ft)	Sample Number	Interval	Blow Count/6 In	Recovery (%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
								Ground Surface				
							2.0	Loose, brown, sandy GRAVEL; moist; no hydrocarbon odor.	GW			
	1	2/5/5	67	4.3	1008			Loose, black, fine SAND; wet; no hydrocarbon odor.	SP			
5	2	2/5/2	80	5.8	1012			Environmental sample no. 1336049 from 5 to 6.2 feet.				
	3	0-6"/1-12"	67	5.5	1016		7.5	Very soft, gray-green, clayey PEAT; moist; no hydrocarbon odor.	PT			
10	4	1	100	3.1	1020		10.0	Very soft, gray, slightly silty, peaty CLAY; moist; no hydrocarbon odor.	CL			
							11.5	BOTTOM OF BORING COMPLETED 6/5/96				

Remarks: Refer to key for explanation of terminology and symbols.

* USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | | | |
|--|----------------------------|--|---------------------------------|
| | 2" O.D. Split-Spoon Sample | | Water Level and Date Measured |
| | 3" O.D. Split-Spoon Sample | | Water Level at Time of Drilling |

Northwest Wire Rope & Equipment
Tacoma, Washington

LOG OF BORING B-5

June 1996

T-1336-04

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Geotechnical and Environmental Consultants

FIG. A-2

ENVIRONMENTAL BOREHOLE LOG

Date Started 6/5/96		Location Northwest Wire Rope & Equipment				Depth Water First Encountered (Ft) 1.5			
Date Completed 6/5/96		Drilling Company Holt				Drilling Method Hollow-stem Auger			
Total Depth (Ft) 11.5		Sampling Method 2-inch O.D. split-spoon				Hammer: Weight (lbs) 140 Drop (In) 30			
Borehole Diam. (In) 8		Ground Elev. (ft)		Monument Elev. (ft)		PVC Elev. (ft)			

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
								Ground Surface				
							1.5	Loose, brown, slightly silty, sandy GRAVEL; moist; no hydrocarbon odor.	GW			
	1	4/6/8	80	1.6	1105			Loose, black, fine SAND; wet; no hydrocarbon odor.	SP			
5	2	1/3/2	27	1.1	1110			Environmental sample no. 1336050 from 5 to 5.4 feet.				
	3	1	0	0	1112		7.5	Very soft, gray, slightly silty, peaty CLAY; moist; no hydrocarbon odor.	CL			
10	4	1	100	2.5	1116							
							11.5	BOTTOM OF BORING COMPLETED 6/5/96				
15												

Remarks: Refer to key for explanation of terminology and symbols.

* USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | | | |
|--|----------------------------|--|---------------------------------|
| | 2" O.D. Split-Spoon Sample | | Water Level and Date Measured |
| | 3" O.D. Split-Spoon Sample | | Water Level at Time of Drilling |

Northwest Wire Rope & Equipment
Tacoma, Washington

LOG OF BORING B-6

June 1996

T-1336-04

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SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-3

ENVIRONMENTAL BOREHOLE LOG

Date Started 6/5/96	Location Northwest Wire Rope & Equipment	Depth Water First Encountered (Ft) 2.5
Date Completed 6/5/96	Drilling Company Holt	Drilling Method Hollow-stem Auger
Total Depth (Ft) 11.5	Sampling Method 2-inch O.D. split-spoon	Hammer: Weight (lbs) 140 Drop (In) 30
Borehole Diam. (In) 8	Ground Elev. (ft)	Monument Elev. (ft)
		PVC Elev. (ft)

Depth (Ft)	Sample Number	Interval	Blow Counts/6 In	Recovery(%)	PID (ppm)	Time	Depth (Ft)	Lithologic Description	USCS* Symbol	Soil Log	Well Log	Depth (Ft)
								Ground Surface				
							2.5	Loose, gray, fine SAND; moist; no hydrocarbon odor.	GW			
	1	5/8/8	80	3.3	1143			Medium dense to loose, black, fine SAND; moist to wet; no hydrocarbon odor.	SP			
6	2	3/2/3	80	4.9	1146							
	3	1-12"/1-6"	100	3.1	1152		8.0	Very soft, gray, peaty CLAY; moist; no hydrocarbon odor.	CL			
10	4	1	73	2.3	1156		9.5	Very soft, gray CLAY; wet; numerous organics (small wood and peat); no hydrocarbon odor.	CL			
							11.5	BOTTOM OF BORING COMPLETED 6/5/96				
15												

Remarks: Refer to key for explanation of terminology and symbols.

* USC soil descriptions are based on visual classification, unless otherwise noted. Contacts between soil layers are approximate and may be gradual.

LEGEND

- | | |
|--------------------------------|-----------------------------------|
| I 2" O.D. Split-Spoon Sample | ▼ Water Level and Date Measured |
| III 3" O.D. Split-Spoon Sample | ▽ Water Level at Time of Drilling |

Northwest Wire Rope & Equipment
Tacoma, Washington

LOG OF BORING B-7

June 1996

T-1336-04

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SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-4

SHANNON & WILSON, INC.

APPENDIX B
ANALYTICAL LABORATORY REPORT

T-1336-04



**OnSite
Environmental Inc.**

Analytical Testing and Mobile Laboratory Services

June 11, 1996

Tolli Forker
Shannon & Wilson, Inc.
400 N 34th Street, Suite 100
Seattle, WA 98103

Re: Analytical Data for Project T-1336-04
Laboratory Reference No. 9606-020

Dear Tolli:

Enclosed are the results of the analyses, and associated quality control data, of samples submitted on June 6, 1996.

The standard policy of OnSite Environmental Inc., is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Chemist

Enclosures

Date of Report: June 11, 1996
Samples Submitted: June 6, 1996
Lab Traveler: 06-020
Project: T-1336-04

WTPH-HCID

Date Extracted: 6-7-96
Date Analyzed: 6-7-96

Matrix: Soil

Client ID	Lab ID	GC Characterization	o-terphenyl Surrogate Recovery	Flags
1336048	06-020-1	<20 ppm Gasoline range hydrocarbons <50 ppm Diesel range hydrocarbons <100 ppm Oil range hydrocarbons	103%	
1336049	06-020-2	<20 ppm Gasoline range hydrocarbons <50 ppm Diesel range hydrocarbons <100 ppm Oil range hydrocarbons	100%	
1336050	06-020-3	<20 ppm Gasoline range hydrocarbons <50 ppm Diesel range hydrocarbons <100 ppm Oil range hydrocarbons	106%	
1336051	06-020-4	<20 ppm Gasoline range hydrocarbons <50 ppm Diesel range hydrocarbons <100 ppm Oil range hydrocarbons	100%	

Date of Report: June 11, 1996
Samples Submitted: June 6, 1996
Lab Traveler: 06-020
Project: T-1336-04

WTPH-HCID
METHOD BLANK QUALITY CONTROL

Date Extracted: 6-7-96
Date Analyzed: 6-7-96

Matrix: Soil

Lab ID: **MB0607S1**

	GC Characterization	o-terphenyl Surrogate Recovery	Flags
Method Blank	<20 ppm Gasoline range hydrocarbons <50 ppm Diesel range hydrocarbons <100 ppm Oil range hydrocarbons	103%	

Date of Report: June 11, 1996
Samples Submitted: June 6, 1996
Lab Traveler: 06-020
Project: T-1336-04

WTPH-G

Date Extracted: 6-6-96
Date Analyzed: 6-6-96

Matrix: Water
Units: ug/L (ppb)

Client ID	Lab ID	Dilution Factor	TPH-Gas	Surrogate Recovery*	Flags	PQL
1336053	06-020-6	1.0	310	83%		100

* 4-Bromofluorobenzene

Date of Report: June 11, 1996
Samples Submitted: June 6, 1996
Lab Traveler: 06-020
Project: T-1336-04

WTPH-G
METHOD BLANK QUALITY CONTROL

Date Extracted: 6-6-96
Date Analyzed: 6-6-96

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0606W1

	Dilution Factor	TPH-Gas	Surrogate Recovery*	Flags	PQL
Method Blank	1.0	ND	83%		100

* 4-Bromofluorobenzene

Date of Report:
Samples Submitted:
Lab Traveler:
Project:

WTPH-G
DUPLICATE QUALITY CONTROL

Date Extracted: 5-31-96
Date Analyzed: 5-31-96

Matrix: Water
Units: ug/L (ppb)

Lab ID: 05-102-1

	Dilution Factor	TPH-Gas	Surrogate Recovery*	Flags	PQL
Sample	1.0	ND	87%		100
Duplicate	1.0	ND	79%		100
RPD		NA			

* 4-Bromofluorobenzene

Date of Report: June 11, 1996
Samples Submitted: June 6, 1996
Lab Traveler: 06-020
Project: T-1336-04

EPA 602 & WTPH-G

Date Extracted: 6-06-96
Date Analyzed: 6-06-96

Matrix: Water
Units: ug/L (ppb)

Lab ID: 06-020-7
Client ID: 1336054

Dilution Factor 1

	Result	Flags	PQL
Benzene	ND		1
Toluene	1.8		1
Ethyl Benzene	ND		1
m,p-Xylene	ND		1
o-Xylene	ND		1
TPH-Gas	410		100
4-BFB			
Surrogate Recovery	78%		

Date of Report: June 11, 1996
Samples Submitted: June 6, 1996
Lab Traveler: 06-020
Project: T-1336-04

**EPA 602 & WTPH-G
METHOD BLANK QUALITY CONTROL**

Date Extracted: 6-06-96
Date Analyzed: 6-06-96

Matrix: Water
Units: ug/L (ppb)

Lab ID: MB0606W-1

Dilution Factor 1

	Result	Flags	PQL
Benzene	ND		1
Toluene	ND		1
Ethyl Benzene	ND		1
m,p-Xylene	ND		1
o-Xylene	ND		1
TPH-Gas	ND		100
4-BFB			
Surrogate Recovery	83%		

Date of Report: June 11, 1996
Samples Submitted: June 6, 1996
Lab Traveler: 06-020
Project: T-1336-04

**EPA 602 & WTPH-G
DUPLICATE QUALITY CONTROL**

Date Extracted: 5-31-96
Date Analyzed: 5-31-96

Matrix: Water
Units: ug/L (ppb)

Lab ID:	05-102-1 Original	05-102-1 Duplicate	RPD
Dilution Factor	1	1	
Benzene	1.15	1.12	NA
Toluene	ND	ND	NA
Ethyl Benzene	ND	ND	NA
m,p-Xylene	ND	ND	NA
o-Xylene	ND	ND	NA
TPH-Gas	ND	ND	NA
4-BFB			
Surrogate Recovery	87%	79%	

Date of Report: June 11, 1996
 Samples Submitted: June 6, 1996
 Lab Traveler: 06-020
 Project: T-1336-04

**EPA 602 & WTPH-G
 MS/MSD QUALITY CONTROL**

Date Extracted: 5-31-96
 Date Analyzed: 5-31-96

Matrix: Water
 Units: ug/L (ppb)

Lab ID	05-102-1		05-102-1		
spiked @ 50 ppb	MS	Percent	MSD	Percent	
Dilution Factor	1	Recovery	1	Recovery	RPD
Benzene	47.0	92%	48.3	94%	2.8
Toluene	46.4	93%	47.6	95%	2.6
Ethyl Benzene	46.6	93%	47.6	95%	2.1
m,p-Xylene	46.6	93%	47.8	96%	2.5
o-Xylene	46.5	93%	47.7	95%	2.5
4-BFB					
Surrogate Recovery	97%		96%		

Date of Report: June 11, 1996
Samples Submitted: June 6, 1996
Lab Traveler: 06-020
Project: T-1336-04

EPA 7421

Date Extracted: 6-10-96
Date Analyzed: 6-10-96

Matrix: Water
Units: mg/L (ppb)

Client ID	Lab ID	Dilution Factor	Total Lead	PQL
1336052	06-020-5	1.1	ND	2.0

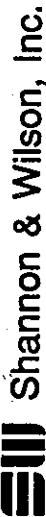
Date of Report: June 11, 1996
Samples Submitted: June 6, 1996
Lab Traveler: 06-020
Project: T-1336-04

**EPA 7421
QUALITY CONTROL**

Date Extracted: 6-10-96
Date Analyzed: 6-10-96

Matrix: Water
Units: ug/L (ppb)

Client ID	Dilution Factor	Total Lead	PQL
Method Blank	1.1	ND	2.0
Sample: 06-020-5	1.1	ND	2.0
Duplicate	1.1	ND	2.0
RPD		NA	
Matrix Spike @ 27.5 ppm	1.1	28.9	2.0
Percent Recovery		105%	
Matrix Spike Duplicate	1.1	28.3	2.0
Percent Recovery		103%	
RPD		2.1%	



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Chain of Custody Record

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Laboratory OnSite
Attn: DE

[illegible]

06-020

Sample Identity	Lab No.	Time	Date Sampled	Remarks Matrix					
				Comp	Grab	WTPH-HClD	WTPH-G	WTPH-6/BTEX	Total Lead (mg/L)
13310048	1	833	6/5/96	X	X				1 SOIL
49	2	1012		X	X				1 SOIL
50	3	1110		X	X				1 SOIL
51	4	1146		X	X				1 SOIL
52	5	1435		X		X			1 WATER
53	6	1522		X		X			2 WATER
54	7	1552		X		X			2 WATER

Project Information		Sample Receipt	
Project Number:	T-13310-04	Total Number of Containers	9
Project Name:	NWWR	COC Seals/Intact?	Y/N/A
Contact:	Tollie L-F	Received Good Cond./Cold	Y
Ongoing Project?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Delivery Method:	HAND
Sampler:	TLF	(attach shipping bill/rany)	

Instructions			
Requested Turn Around Time:	standard		
Special Instructions:	Total lead field filtered before prepnd		

Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Signature:	[Signature]	Signature:		Signature:	
Printed Name:	Louise Swell-Johnson	Printed Name:		Printed Name:	
Date:	6/14/96	Date:		Date:	
Company:	Tollie Lowell-Forker	Company:		Company:	
STW					

Received By: 1.		Received By: 2.		Received By: 3.	
Signature:	[Signature]	Signature:		Signature:	
Printed Name:	Jessica Newman	Printed Name:		Printed Name:	
Date:	6/14/96	Date:		Date:	
Company:	Teresa Harris	Company:		Company:	

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File



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Chain of Custody Record

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Laboratory Onsite
Attn: DE

Analysis Parameters/Sample Container Description

(include preservative if used)

[illegible]

Project Information		Sample Receipt	
Project Number:	T-1330-DA	Total Number of Containers	9
Project Name:	NWWR	COC Seals/Intact?	Y/N/NA
Contact:	TOLLIVER	Received Good Cond./Cold	Y
Ongoing Project?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Delivery Method:	HAND
Sampler:	TLF	(attach shipping bill if any)	
Instructions			
Requested Turn Around Time:		Standard	
Special Instructions:		Total lead field filtered before prep	
Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report Yellow - w/shipment - for consignee files			

Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Signature:	Time: 12:50	Signature:	Time:	Signature:	Time:
Printed Name:	John Brown	Printed Name:	Date:	Printed Name:	Date:
Company:	Tolliver for Ker	Company:		Company:	
STW					
Received By: 1.		Received By: 2.		Received By: 3.	
Signature:	Time: 1:00	Signature:	Time:	Signature:	Time:
Printed Name:	John Brown	Printed Name:	Date:	Printed Name:	Date:
Company:	Tolliver for Ker	Company:		Company:	

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

APPENDIX C

IMPORTANT INFORMATION ABOUT YOUR ENVIRONMENTAL REPORT



Dated: June 27, 1996

To: Northwest Wire Rope & Equipment

Attn: Mr. Ron Kline

Important Information About Your Geotechnical/Environmental Report

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors which were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland