ENVIRONMENTAL SAMPLING LETTER NORTHSHORE UTILITY DISTRICT HEADQUARTERS KENMORE, WASHINGTON PREPARED FOR NORTHSHORE UTILITY DISTRICT



NELSON GEOTECHNICAL ASSOCIATES, INC. GEOTECHNICAL ENGINEERS & GEOLOGISTS

17311 – 135th Avenue NE, A-500 Woodinville, WA 98072 (425) 486-1669 • (425) Fax 481-2510

Snohomish County (425) 337-1669 Wenatchee/Chelan (509) 784-2756

February 26, 2001

Mr. Dan Olson, Manager Northshore Utility District 6830 NE 185th Street Kenmore, Washington 98028

> Environmental Sampling Letter Northshore Utility District Headquarters Kenmore, Washington NGA File No. 303100N

Dear Mr. Olson:

This letter presents the results of our environmental sampling services at your headquarters and service center site.

INTRODUCTON

The site is located at $18520 - 68^{th}$ Avenue NE, in Kenmore, Washington. You have requested that we evaluate the ground water in existing wells on the site on a semi-annual basis, to fulfill an agreement made with the Washington Department of Ecology (Ecology). We have been provided with reports and letters by Dames and Moore, dated July 19, September 22, November 20, and December 27, 1995, and a letter from Ecology, dated July 9, 1997, for our use in preparing this letter.

Dames and Moore previously installed four wells on the property as part of their surface and subsurface characterization at the site. The site is currently occupied by two remodeled buildings and one new structure, which make up your headquarters and service center. Ecology has reviewed the reports for this site and has required that the existing four wells be sampled on a semi-annual basis for three years. Each ground water sample is to be analyzed for total petroleum hydrocarbons as gasoline, diesel, and heavy oil (TPH-G, TPH-D, TPH-O) and benzene, ethylbenzene, and xylene (BETX). This letter presents the results of the fifth semi-annual ground water sampling. The first four samplings were conducted by

Nelson-Couvrette and Associates, Inc. The sampling is now being conducted by Nelson Geotechnical Associates, Inc.

SCOPE

The purpose of our services is to provide environmental sampling analysis of ground water samples, and report our findings.

Specifically, the services to be provided by NGA are as follows:

- 1. Review the previous environmental reports for the project.
- 2. Purge and sample the four monitoring wells on the property.
- 3. Analyze each of the four samples for:
 - Gasoline by WTPH-G
 - Diesel and Heavy Oil by WTPH-D extended
 - BETX by EPA Method 8020
- 4. Document our results in a short letter.
- 5. Provide consultation and additional environmental services, as requested.

GROUND WATER SAMPLING

Ground water samples were collected on February 9, 2001, in general accordance with the <u>Guidance for Site Checks and Site Assessments for Underground Storage Tanks</u> (Ecology, 1992). The well locations are shown on the Site Plan in Figure 1. Typically, one to two well volumes of ground water are purged from each well prior to sampling. In this case, the amount of ground water purged prior to sampling was limited due to recharge conditions. Monitoring Well 1 (MW-1), and MW-3 were bailed dry after purging two plus well volumes prior to sampling. Four plus well volumes were purged from MW-2 and MW-4 prior to sampling. Ground water samples were obtained using disposable polyethylene bailers dedicated to each well to avoid cross-contamination of wells. Samples were chilled and maintained under chain of custody until delivered to a subcontracted analytical laboratory.

GROUND WATER CONDITIONS

The existing wells installed by Dames and Moore were converted from above ground completions to flush-mount completions during the remodeling of the Northshore Utility District facility. This involved

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cutting the wells off below existing grade and installing flush-mounted monuments. The elevations of the wells were measured relative to an assigned datum of 100 feet in order to correlate water level data. Elevations were measured utilizing standard differential elevation techniques with the aid of self-leveling level. Ground water level measurements obtained during our most recent sampling are presented in **Table 1**.

		TABLE 1 – GRO	OUND WATER E	LEVATIONS	
Well	Date	Ground Surface	Top of Casing	Depth to Ground	Ground Water
I.D.		Elevation 1	Elevation	Water ²	Elevation
		(feet)	(feet)	(feet)	(feet)
MW-1	1-19-99	NR⁵	NR ⁵	NR ⁵	NR ⁵
MW-1	7-28-99	98.93^{3}	98.65^{3}	2.04	96.61 ⁴
MW-1	1-27-00			1.41	97.24
MW-1	7-27-00			2.49	96.16
MW-1	2-9-01			1.81	96.84
MW-2	1-19-99	NR ⁵	NR⁵	NR ⁵	NR ⁵
MW-2	7-28-99	99.29^{3}	98.63^{3}	2.10	96.53 ⁴
MW-2	1-27-00			1.17	97.46
MW-2	7-27-00			3.28	95.35
MW-2	2-9-01			1.06	97.57
MW-3	1-19-99	NR ⁵	NR ⁵	NR ⁵	NR ⁵
MW-3	7-/28-99	100.30^3	100.03^3	3.07	96.96 ⁴
MW-3	1-27-00			1.96	98.07
MW-3	7-27-00			4.15	95.88
MW-3	2-9-01			1.40	98.63
MW-4	1-19-99	NR ⁵	NR⁵	NR⁵	NR ⁵
MW-4	7-28-99	97.82^{3}	96.99^{3}	3.10	93.89 ⁴
MW-4	1-27-00			2.89	94.10
MW-4	7-27-00			3.17	93.82
MW-4	2-9-01			2.88	94.11

¹ From an arbitrary bench mark elevation of 100 feet.

Water level measurements obtained from the existing monitoring wells indicate that ground water is present at depths of approximately 1.06 to 2.88 feet below the ground surface and the inferred ground water migration direction is generally to the west northwest.

² Measured from top of casing.

³ Surveyed on July 28, 1999.

⁴ Corrected ground water elevation due to mathematical error. These numbers supercede letter dated October 27, 1999.

⁵ Elevations Not Recorded.

The ground water gradient and inferred flow directions are based on simplifying assumptions and should be viewed as a generalized estimation based on limited data. Ground water conditions may vary, depending on seasonal variations in precipitation, changes in site utilization, and other factors.

QUANTITATIVE ANALYSIS

The concentration of petroleum hydrocarbons existing in the subsurface materials were quantified by testing for:

- 1. Gasoline by WTPH-G
- 2. Diesel and Heavy Oil by WTPH-D extended
- 3. BETX by EPA method 8020

The results of ground water sampling indicate concentrations of total petroleum hydrocarbons (TPH) as gasoline, BETX, and heavy oil were below Model Toxics Control Act (MTCA) Method A action levels. Concentrations of TPH as diesel were above MTCA Method A action levels in MW-1 and MW-2 and below MTCA Method A action levels in MW-3 and MW-4. A summary of analytical laboratory results on ground water is presented in Table 2. Analytical laboratory certificates are attached. MTCA Method A action levels for ground water are presented in the last row of Table 2. Previous results by NCA and by Dames and Moore are summarized in Table 2.

	TABLE 2 – WATER SAMPLE ANALYSIS												
Well	Date	WTPH-G	Benzene	Ethylbenzene	Tolulene	Xylenes	WTPH-	WTPH-					
I.D.	Sampled	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	Diesel	Heavy Oil					
							(ppb)	(ppb)					
*MW-1	10-23-95	120	<0.50	< 0.50	0.58	<1.0	1,500	NA					
MW-1	1-19-99	ND	ND	ND	ND	ND	952	ND					
MW-1	7-28-99	ND	ND	ND	ND	ND	1,110	ND					
MW-1	1-27-00	ND	ND	ND	ND	ND	399	ND					
MW-1	7-27-00	ND	ND	ND	ND	ND	1,050	ND					
MW-1	2-9-01	ND	ND	ND	ND	1.07	1,030	ND ·					
*MW-2	10-23-95	<20	<0.50	< 0.50	<0.50	<0.50	1,200	NA					
MW-2	1-19-99	ND	ND	ND	ND	ND	854	874					
MW-2	7-28-99	ND	ND	ND	ND	ND	1,310	ND					
MW-2	1-27-00	79.8	ND	ND	ND	ND	2,080	ND					
MW-2	7-27-00	ND	ND	ND	ND	ND	1,410	ND					
MW-2	2-9-01	ND	ND	ND	ND	ND	1,780	ND					
*MW-3	10-23-95	73	0.81	< 0.50	0.78	2.6	1,000	NA					
MW-3	1-19-99	ND	ND	ND	ND	ND	331	ND					
MW-3	7-28-99	ND	ND	ND	ND	ND	343	ND					
MW-3	1-27-00	ND	ND	ND	ND	ND	ND	ND					
MW-3	7-27-00	ND	ND	ND	ND	ND	ND	ND					
MW-3	2-9-01	ND	ND	ND	ND	ND	ND	ND					
*MW-4	10-23-95	120	< 0.50	< 0.50	9.2	<1.0	7,100	NA					
MW-4	1-20-99	ND	ND	ND	ND	ND	331	ND					
MW-4	7-28-99	ND	ND	ND	ND	1.05	348	ND					
MW-4	1-27-00	ND	ND	ND	ND	ND	326	ND					
MW-4	7-27-00	ND	ND	ND	ND	ND	426	ND					
MW-4	2-9-01	ND	ND	ND	ND	ND	401	ND					
MTCA A	ction	1,000.0	5.0	30.0	40.0	20.0	1,000.0	1,000.0					
Level	S												

^{*} Sampling and analysis performed by Dames and Moore

NA – Not Analyzed
ND – Analyte not detected at or above detection limit concentrations listed in the analytical laboratory reports.
Shaded results are above MTCA Method A action levels.

USE OF THIS LETTER

This letter has been provided for Northshore Utility District and their agents, for their use on this project. The results and conclusions presented in this letter are professional opinions based on testing accomplished for this study and should not be considered a warranty of subsurface conditions.

Within the limitations of scope, schedule, and budget for our services, we have strived to take care that our work has been done in accordance with generally accepted practices in this area at the time this letter was prepared. No other conditions, expressed or implied, should be understood.

It has been a pleasure to provide service to you on this project. If you have any questions or require further information, please call.

Sincerely,

NELSON GEOTECHNICAL ASSOCIATES, INC.

Bala Dodoye-Alali Staff Geologist

Ronald D. Free, PG Project Geologist David L. Nelson, PG

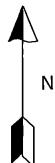
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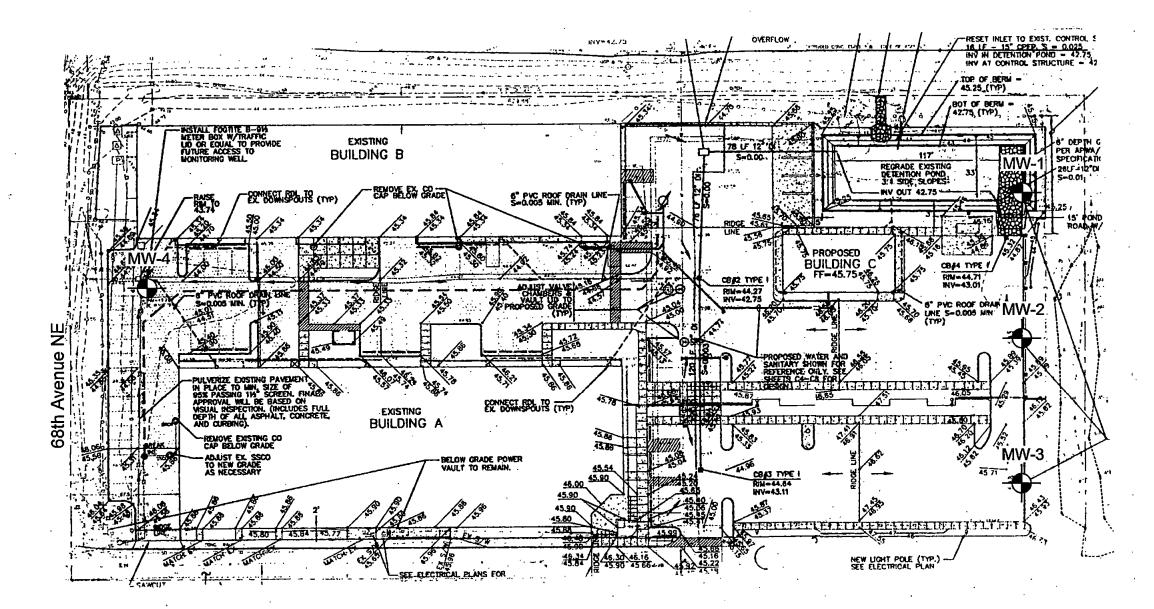
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Two Copies Submitted
One Figure
Attachment – Laboratory Certificates
cc: Mr. John Lillie - Ecology, NW Region

Bala Dodoff. alal

Site Plan

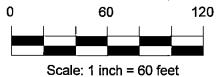




LEGEND

MW-1

NUMBER AND APPROXIMATE LOCATION OF MONITORING WELL





Northshore Utility District Headquarters

FILE NO. 303100N FIGURE



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Nelson Geotechnical Associates, Inc.

17311-135th Ave NE, #A-500 Woodinville WA, 98072

Project: Northshore Utility District

Project Number: 303100N Project Manager: Ron Free Reported:

02/16/01 13:54

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1/2/01	B1B0179-01	Water	02/09/01 09:55	02/09/01 12:21
MW-2/2/01	B1B0179-02	Water	02/09/01 10:35	02/09/01 12:21
MW-3/2/01	B1B0179-03	Water	02/09/01 11:05	02/09/01 12:21
MW-4/2/01	B1B0179-04	Water	02/09/01 11:40	02/09/01 12:21

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Gill, Project Manager

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Page 1 of 7



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Nelson Geotechnical Associates, Inc.

Project: Northshore Utility District

17311-135th Ave NE, #A-500 Woodinville WA, 98072

Project Number: 303100N Project Manager: Ron Free

Reported: 02/16/01 13:54

Gasoline Range Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8021B North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-1/2/01 (B1B0179-01) Water	Sampled: 02/09/	01 09:55 Re	ceived: 02/	/09/01 12: 21	l				
Gasoline Range Hydrocarbons	ND	50.0	ug/l	1	1B11001	02/11/01	02/12/01	WTPH-G/8021B	
Benzene	ND	0.500	19	11	п	n ·	n	11	
Toluene	ND	0.500		**	11	n	11	n	
Ethylbenzene	ND	0.500	н	H	Ħ	11	н	"	
Xylenes (total)	1.07	1.00	•	n		n	n	19	
Surrogate: 4-BFB (FID)	99.2 %	50-150			,,	"	"	"	
Surrogate: 4-BFB (PID)	96.7%	50-150			"	"	"	"	
MW-2/2/01 (B1B0179-02) Water	Sampled: 02/09/	01 10:35 Re	ceived: 02/	09/01 12:21	l				
Gasoline Range Hydrocarbons	ND	50.0	ug/l	1	1B11001	02/11/01	02/12/01	WTPH-G/8021B	-
Benzene	ND	0.500	н	n	н	и	m	н	
Toluene	ND	0.500	11	n		*	n	**	
Ethylbenzene	ND	0.500	11	11	71	n	n	и	
Xylenes (total)	ND	1.00	u	n	Ħ		n	n	
Surrogate: 4-BFB (FID)	97.5 %	50-150			"	"	"	"	
Surrogate: 4-BFB (PID)	94.6 %	50-150			"	"	•	"	
MW-3/2/01 (B1B0179-03) Water	Sampled: 02/09/0	01 11:05 Re	ceived: 02/	09/01 12:21					
Gasoline Range Hydrocarbons	ND	50.0	ug/l	1	1B11001	02/11/01	02/12/01	WTPH-G/8021B	
Benzene	ND	0.500	H*	**	10	17	n	19	
Toluene	ND	0.500	11	н	H	n	n	n	
Ethylbenzene	ND	0.500	n	и	n	n	17	n	
Xylenes (total)	ND	1.00	n	н	m	Ħ	10	n	
Surrogate: 4-BFB (FID)	95.6 %	50-150			"	,,	n	"	
Surrogate: 4-BFB (PID)	96.5 %	50-150			"	,,	"	79	

North Creek Analytical - Bothell

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mar Gill, Project Manager



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Nelson Geotechnical Associates, Inc.

17311-135th Ave NE, #A-500

Woodinville WA, 98072

Project: Northshore Utility District

Project Number: 303100N Project Manager: Ron Free

Reported:

02/16/01 13:54

Gasoline Range Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8021B North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	,	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-4/2/01 (B1B0179-04) Water	Sampled: 02/09/	01 11:40 I	Received: 02	/09/01 12:21					
Gasoline Range Hydrocarbons	ND	50.0	ug/l	1	1B11001	02/11/01	02/12/01	WTPH-G/8021B	-
Benzene	ND	0.500	, "	n	۳.	M	. n	n	
Toluene	ND	0.500) "	n	**	w	"	•	
Ethylbenzene	ND	0.500) "	n		•	n	n	
Xylenes (total)	ND	1.00	"	77	•	,	n	и	
Surrogate: 4-BFB (FID)	97.3 %	50-150			"	"	"	"	
Surrogate: 4-BFB (PID)	96.5 %	50-150			•	"	"	"	

North Creek Analytical - Bothell

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Project Manager



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Nelson Geotechnical Associates, Inc.

17311-135th Ave NE, #A-500 Woodinville WA, 98072

Project: Northshore Utility District

Project Number: 303100N Project Manager: Ron Free

Reported:

02/16/01 13:54

Diesel Hydrocarbons (C12-C24) and Heavy Oil (C24-C36 by WTPH-D (extended) North Creek Analytical - Bothell

		Reporting							
Analyte	Result	Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-1/2/01 (B1B0179-01RE1) Water	Sampled: 02	2/09/01 09:55	Received	l: 02/09/01 1	12:21				
Diesel Range Hydrocarbons	1.03	0.250	mg/l	1	1B15002	02/15/01	02/15/01	WTPH-D	
Heavy Oil Range Hydrocarbons	ND	0.750	n	n	**	n	Ħ	n	
Surrogate: 2-FBP	85.4 %	50-150			"	"	"	<i>n</i>	
Surrogate: Octacosane	94.5 %	50-150			n	,,	"	"	
MW-2/2/01 (B1B0179-02RE1) Water	Sampled: 02	2/09/01 10:35	Received	l: 02/09/01 1	2:21				
Diesel Range Hydrocarbons	1.78	0.250	mg/l	1	1B15002	02/15/01	02/15/01	WTPH-D	
Heavy Oil Range Hydrocarbons	ND	0.750	"	19	17	n	n	m	
Surrogate: 2-FBP	89.5 %	50-150			n	n	"	"	
Surrogate: Octacosane	97.3 %	50-150			"	*	"	"	
MW-3/2/01 (B1B0179-03RE1) Water	Sampled: 02	2/09/01 11:05	Received	: 02/09/01 1	2:21				
Diesel Range Hydrocarbons	ND	0.250	mg/l	1	1B15002	02/15/01	02/15/01	WTPH-D	
Heavy Oil Range Hydrocarbons	ND	0.750	"	n	•	•	•	Ħ	
Surrogate: 2-FBP	81.1 %	50-150		,	"	"	"	"	
Surrogate: Octacosane	95.1 %	50-150			#	"	"	n	
MW-4/2/01 (B1B0179-04RE1) Water	Sampled: 02	2/09/01 11:40	Received	: 02/09/01 1	2:21				
Diesel Range Hydrocarbons	0.401	0.250	mg/l	1	1B15002	02/15/01	02/15/01	WTPH-D	
Heavy Oil Range Hydrocarbons	ND	0.750	n	n	"	п	n	n	
Surrogate: 2-FBP	94.7 %	50-150			"	"	"	"	
Surrogate: Octacosane	105 %	50-150			. "	"	"	tt	

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Project Manager



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Nelson Geotechnical Associates, Inc.

17311-135th Ave NE, #A-500 Woodinville WA, 98072

Project: Northshore Utility District

Project Number: 303100N Project Manager: Ron Free

Reported: 02/16/01 13:54

Gasoline Range Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8021B - Quality **Control**

North Creek Analytical - Bothell

		Reporting		Spike	Source	-	%REC		RPD	
Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1B11001: Prepared 02/11/0	1 Using El	PA 5030B	(P/T)			•				
Blank (1B11001-BLK1)			•		•					
Gasoline Range Hydrocarbons	ND	50.0	ug/l							·
Benzene	ND	0.500	n							
Toluene	ND	0.500	W.							
Ethylbenzene	ND	0.500	**							
Xylenes (total)	ND	1.00	n							
Surrogate: 4-BFB (FID)	46.4		" .	48.0		96.7	50-150			
Surrogate: 4-BFB (PID)	45.6		"	48.0		95.0	50-150			
LCS (1B11001-BS1)										
Gasoline Range Hydrocarbons	518	50.0	ug/l	500	-	104	70-130			
Surrogate: 4-BFB (FID)	47.8		"	48.0	_	99.6	50-150			
Duplicate (1B11001-DUP1)					Source: I	31B0179-0)2			
Gasoline Range Hydrocarbons	ND	50.0	ug/l		ND			14.2	25	
Surrogate: 4-BFB (FID)	45.8		"	48.0		95.4	50-150			-
Matrix Spike (1B11001-MS1)		Source: B1B0179-02								
Benzene	8.90	0.500	ug/l	10.0	ND	89.0	70-130			
Toluene	8.69	0.500	"	10.0	ND	86.9	70-130			
Ethylbenzene	9.28	0.500	**	10.0	ND	90.8	70-130			
Xylenes (total)	27.5	1.00	н	30.0	ND	90.6	70-130			
Surrogate: 4-BFB (PID)	46.6		"	48.0		97.I	50-150			
Matrix Spike Dup (1B11001-MSD1)					Source: E	31 B0179 -0	12			
Benzene	9.36	0.500	ug/l	10.0	ND	93.6	70-130	5.04	15	
Toluene	9.30	0.500	"	10.0	ND	93.0	70-130	6.78	15	
Ethylbenzene	9.99	0.500	"	10.0	ND	97.8	70-130	7.37	15	
Xylenes (total)	29.5	1.00	H	30.0	ND	97.2	70-130	7.02	15	
Surrogate: 4-BFB (PID)	47.3	<u> </u>	"	48.0		98.5	50-150			

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Project Manager

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Nelson Geotechnical Associates, Inc.

Project: Northshore Utility District

17311-135th Ave NE, #A-500 Woodinville WA, 98072

Project Number: 303100N Project Manager: Ron Free

Reported: 02/16/01 13:54

Diesel Hydrocarbons (C12-C24) and Heavy Oil (C24-C36 by WTPH-D (extended) - Quality Control North Creek Analytical - Bothell

			Reporting		Spike	Source		%REC		RPD	
Analyte		Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Batch 1B15002:	Prepared 02/15/01	Using El	PA 3510C/	600 Series							
Blank (1B15002-BI	LK1)				~						-
Diesel Range Hydroca	rbons	ND	0.250	mg/l							
Heavy Oil Range Hydr	rocarbons	ND	0.750	11							
Surrogate: 2-FBP		0.264		"	0.320		82.5	50-150			
Surrogate: Octacosane	?	0.315		"	0.320		98.4	<i>50-150</i>			
LCS (1B15002-BS1)										
Diesel Range Hydrocar	rbons	1.72	0.250	mg/l	2.00		86.0	60-140			
Surrogate: 2-FBP		0.290		"	0.320	-	90.6	50-150			
Duplicate (1B15002	P-DUP1)					Source: B	31B0179-0)2RE1			
Diesel Range Hydrocar	rbons	1.71	0.250	mg/l		1.78			4.01	30	
Heavy Oil Range Hydr	ocarbons	ND	0.750	*		ND			2.38	30	
Surrogate: 2-FBP		0.496		"	0.586		84.6	50-150			-
Surrogate: Octacosane	•	0.542		**	0.586		92.5	50-150			

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Project Manager



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 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244

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20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711

541.383.9310 fax 541.382,7588

Nelson Geotechnical Associates, Inc.

17311-135th Ave NE, #A-500 Woodinville WA, 98072

Project: Northshore Utility District

Project Number: 303100N Project Manager: Ron Free

Reported:

02/16/01 13:54

Notes and Definitions

DET

Analyte DETECTED

ND

Analyte NOT DETECTED at or above the reporting limit

NR

Not Reported

dгу

Sample results reported on a dry weight basis

RPD

Relative Percent Difference

North Creek Analytical - Bothell

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mar Gill, Project Manager

North Creek Analytical, Inc. **Environmental Laboratory Network** Page 7 of 7



117 h Cre уN, 00, B -- NA 9 East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711

i) 42(

(509) 924-9200 FAX 924-9290

(503) 906-9200 FAX 906-9210 (541) 383-9310 FAX 382-7588

CHAIN OF CUSTODY REPORT

Work Order # BIRA179

CLIENT: Nelson G	- 1-1	1.0		7	-	т							***	IK	Jiu	er#: \					
REPORT TO: Ron Free	eo leur	nical H	<u> 560c1</u>	atci		INVOICE TO: SAME										TURNAROUND REQUEST in Business Days*					
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ADDRESS: 17311 - 1357 Woodinville PHONE: 425-486-16	510										STD.		eum Hydrocar								
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