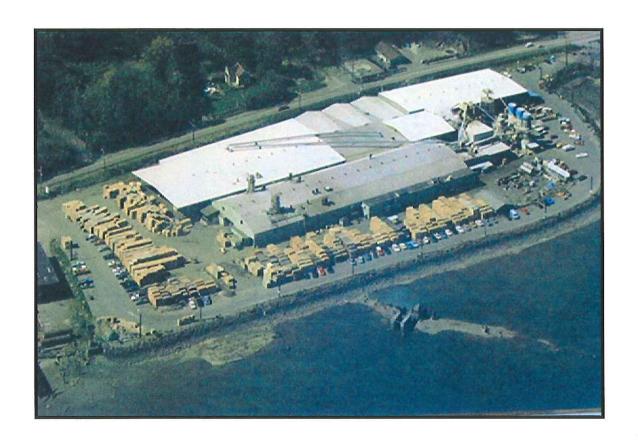


## Former Hardel Mutual Plywood Site 1210 West Bay Drive NW Olympia, Washington

# **Post - Construction Quarterly Groundwater Monitoring Report**



March 23, 2011

**Prepared For: Hardel Mutual Plywood Corporation** 

Prepared By:



GREYLOCK CONSULTING LLC

GC Project No. 0401.3

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## 1.0 INTRODUCTION

This report documents the results of the second round of quarterly compliance monitoring for groundwater at the former Hardel Mutual Plywood Site, located at 1210 West Bay Drive NW in Olympia, Washington (Figure 1).

The goal of the quarterly groundwater monitoring is to evaluate the long-term effectiveness of the Interim Action cleanup that was completed in October, 2010. Nine monitoring wells from within and downgradient of excavated areas were sampled, and groundwater flow direction and gradient were assessed.

## 1.1 Site Description

The Former Hardel Mutual Plywood Site (Site) is located at 1210 West Bay Drive NW in Olympia, Washington (Thurston County tax parcel numbers 72600200100 & 91013100000). The property is 17.8 acres in size, consisting of approximately 6.7 acres of uplands and 11.1 acres of tide lands. The upland portion of the property consists primarily of crushed concrete surfacing and asphalt pavement. The property is generally level. It is bordered to the north by Budd Inlet and the former Delson Lumber Site, to the south by the former Reliable Steel Site, to the west by West Bay Drive NW and residential/commercial properties, and to the east by Budd Inlet. The Site is presently vacant.

## 1.2 Project Background

An Interim Action cleanup which included the excavation of diesel/heavy oil-impacted soils at the Site, was conducted between June and October of 2010 (Greylock, 2010). Greylock staff observed the direct excavation by Wyser Construction of diesel/heavy oil-impacted soils from a total of three areas on the Site in July-September 2010.

Approximately 23,331 tons of diesel/heavy oil-impacted soil and debris was excavated and transported off-site by Envirocon Trucking and Rock-On Trucking to Weyerhauser's permitted landfill in Cowlitz County, Washington.

Treated water from the work area was discharged to the sanitary sewer system between July 9th and September 21st, 2010 in accordance with the LOTT "Discharge Authorization Letter".

The Interim Action report concluded that the removal of free product, the removal of contaminated groundwater, and the removal of diesel/heavy oil-impacted soil in the three

excavated areas was successful in achieving compliance with the Model Toxics Control Act (MTCA) target soil cleanup levels.

Six of the groundwater monitoring wells previously installed at the site by Greylock were decommissioned by ESN Northwest during the Interim Action to accommodate soil excavation activities. The decommissioned wells included MW-1, MW-4, MW-5, MW-7, MW-8, and MW-9. The previously installed monitoring wells MW-2, MW-3, and MW-6 remained intact at the Site. Five new compliance monitoring wells were installed at the site in November, 2010 for post-construction groundwater monitoring (MW-10, through MW-15). Approximate monitoring well locations are shown on Figure 2.

## 1.3 Purpose

The purpose of this assessment was to acquire groundwater samples from the nine wells for laboratory analyses using low flow purging techniques, to determine groundwater flow direction and gradient, and to determine if groundwater analytical results were in compliance with site cleanup standards. Groundwater samples were submitted to the ESN Northwest's laboratory for the following analyses:

- Total Petroleum Hydrocarbons as Diesel and Motor Oil using Method NWTPH-Dx and
- Polyaromatic Hydrocarbons (PAHs) using EPA Method 8270.

## 2.0 FIELD ACTIVITIES

## 2.1 Water Level Measurements

Water levels were measured using a well probe at all nine well locations on February 22, 2011. Water level measurements are provided in Table 1. Shallow groundwater at the site occurred at depths ranging from 1.13 to 3.31 ft below the top of casing (TOC) of monitoring wells.

With the exception of MW-11 and MW-13 all the monuments were filled with surface water upon removing the monument's lids. Surface water was removed from the monument until the water level was below the top of the well casing prior to removing the well cap.

Figure 3 shows the groundwater flow direction across the site on February 22, 2011. In general, groundwater flow is from west to east/northeast across the site.

At the northern part of the site, groundwater flow is to the east-northeast with a gradient of approximately 0.02 ft per ft near MW-13. At the southern part of the site, groundwater flow is

to the east with a gradient of approximately 0.005 ft per ft near MW-3. The groundwater gradient is steepest along the western boundary of the site, and flattens out across the center of the site.

## 2.2 Groundwater Sampling

Groundwater samples were collected from eight of the on-site monitoring wells on February 22, 2011 using a peristaltic pump and disposable tubing under low flow conditions. We were unable to sample MW-6 (the upgradient well) on February 22<sup>nd</sup> due to extreme weather conditions. It was sampled early the following day on February 23<sup>rd</sup>.

All samples were collected in accordance with standard operating and decontamination procedures. Prior to collecting groundwater samples, groundwater was purged from each monitoring well until temperature, turbidity, conductivity, dissolved oxygen, and pH generally stabilized. Groundwater samples were collected using a peristaltic pump and tubing. New tubing was used for each groundwater sample. Samples were collected with gloved hands. New nitrile gloves were worn at each sample location. Samples were placed in preconditioned sterilized-containers provided by ESN Northwest, an Ecology accredited analytical laboratory. Samples were stored on ice in a sealed cooler and transported directly to ESN Northwest in Olympia, Washington in this condition.

No sediment was observed in any of the groundwater samples collected.

## 3.0 ANALYTICAL LABORATORY RESULTS

Groundwater samples were submitted to ESN Northwest for laboratory testing as outlined below.

- 1. Total Petroleum Hydrocarbons by Ecology Method NWTPHD-Dx, and
- 2. Polyaromatic Hydrocarbons by EPA Method 8270.

Analytical test reports are included in Appendix A. Table 2 compares the results against published Model Toxics Control Act (MTCA) Method A or Method B Cleanup Levels (CLARC, 2011). MTCA Method A cleanup levels were used for screening when available. MTCA Method B cleanup levels were used for screening when no Method A levels were available.

## 3.1 NWTPH-Dx Results

The NWTPH-Dx Method provides analytical results for dieseland heavy oil range total petroleum hydrocarbons. All nine of the collected groundwater samples analyzed by this method revealed <u>no detectable</u> concentrations above the laboratory's lower reporting limits.

## 3.2 PAH Results

The EPA 8270 Method provides analytical results for polyaromatic hydrocarbons (PAHs). Ground water samples from the wells indicated that eight wells had no detectable concentrations above the laboratory's reporting limit of 0.1 ug/L. At MW-10, acenaphthene was detected at 11ug/L. This reported PAH concentration was well below the published WDOE target Method B cleanup standard of 960 ug/L.

No <u>carcinogenic</u> PAHs by test method 8270 were detected above the laboratory's lower reporting limit of 0.1 ppb for all nine of the analyzed groundwater samples.

## 4.0 CONCLUSIONS

Based on the results of laboratory testing, groundwater at the nine monitoring well locations sampled during this second quarterly "compliance monitoring" event is <u>compliant</u> with Ecology's target Method A or Method B groundwater cleanup levels for diesel/heavy oil-range total-petroleum hydrocarbons and polynuclear aromatic hydrocarbons (PAHs). No carcinogenic PAHs were detected in the nine lab tested groundwater samples collected in the course of this sampling event.

The low concentration of <u>non-carcinogenic</u> PAHs detected in groundwater sampled from well MW-10 may be attributable to the presence of remaining buried treated timber piling supports which were historically installed to provide building foundation and floor support for the former on-site plywood/lumber mill structures.

## **5.0 LIMITATIONS**

We have prepared this report for the exclusive use of Hardel Mutual Plywood Corp. and their authorized agents and regulatory agencies as part of their evaluation of the environmental conditions of the site. This report is not intended for use by others, and the information contained herein is not applicable to other sites. No one except Hardel Mutual Plywood Corp. and their authorized agents should rely on this report without first conferring with Greylock.

Greylock personnel performed this study in accordance with generally accepted standards of care that existed in the state of Washington at the time of this study. We make no other warranty, either expressed or implied.

This report is based on conditions that existed at the time the study was completed. The findings of this report may be affected by the passage of time or events such as a change in property use or occupancy, or by natural events, such as floods, earthquakes, or groundwater fluctuations.

If you have any questions regarding this report, please call us at (253) 661-3520.

Washi

Hydrogeologist

Suzanne Dudziak

Censed Geo

Sincerely,

GREYLOCK CONSULTING LLC

Suzanne Dudziak, L.H.G.

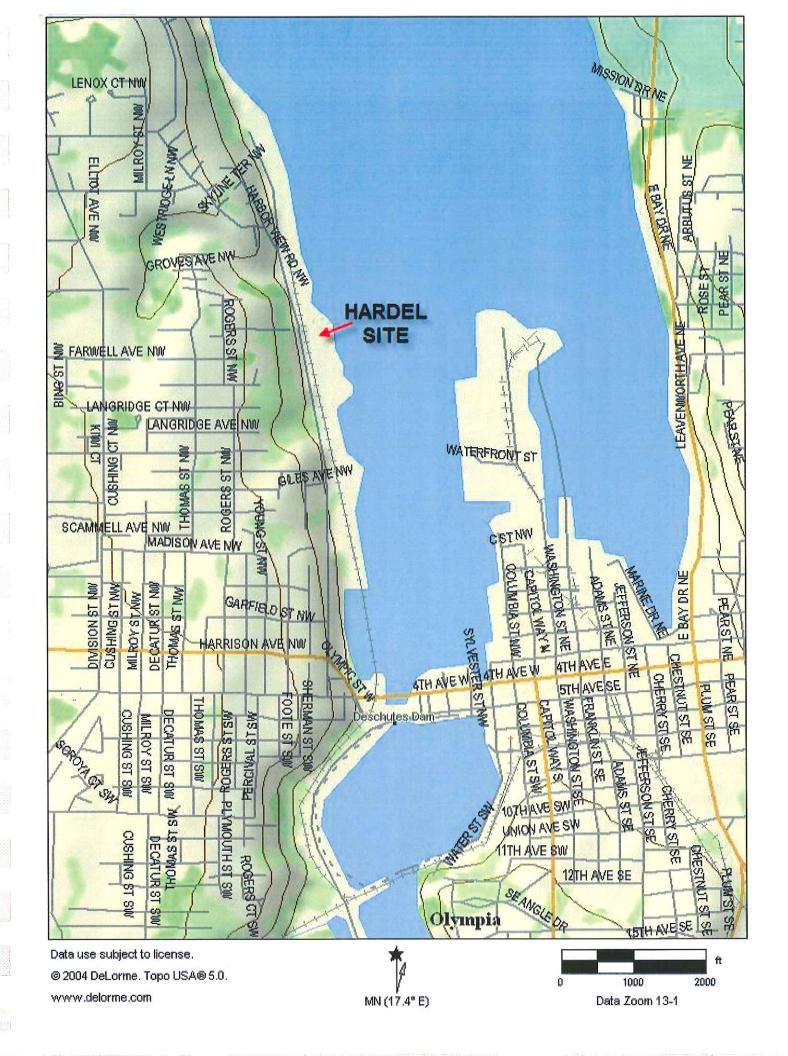
Principal Hydrogeologist

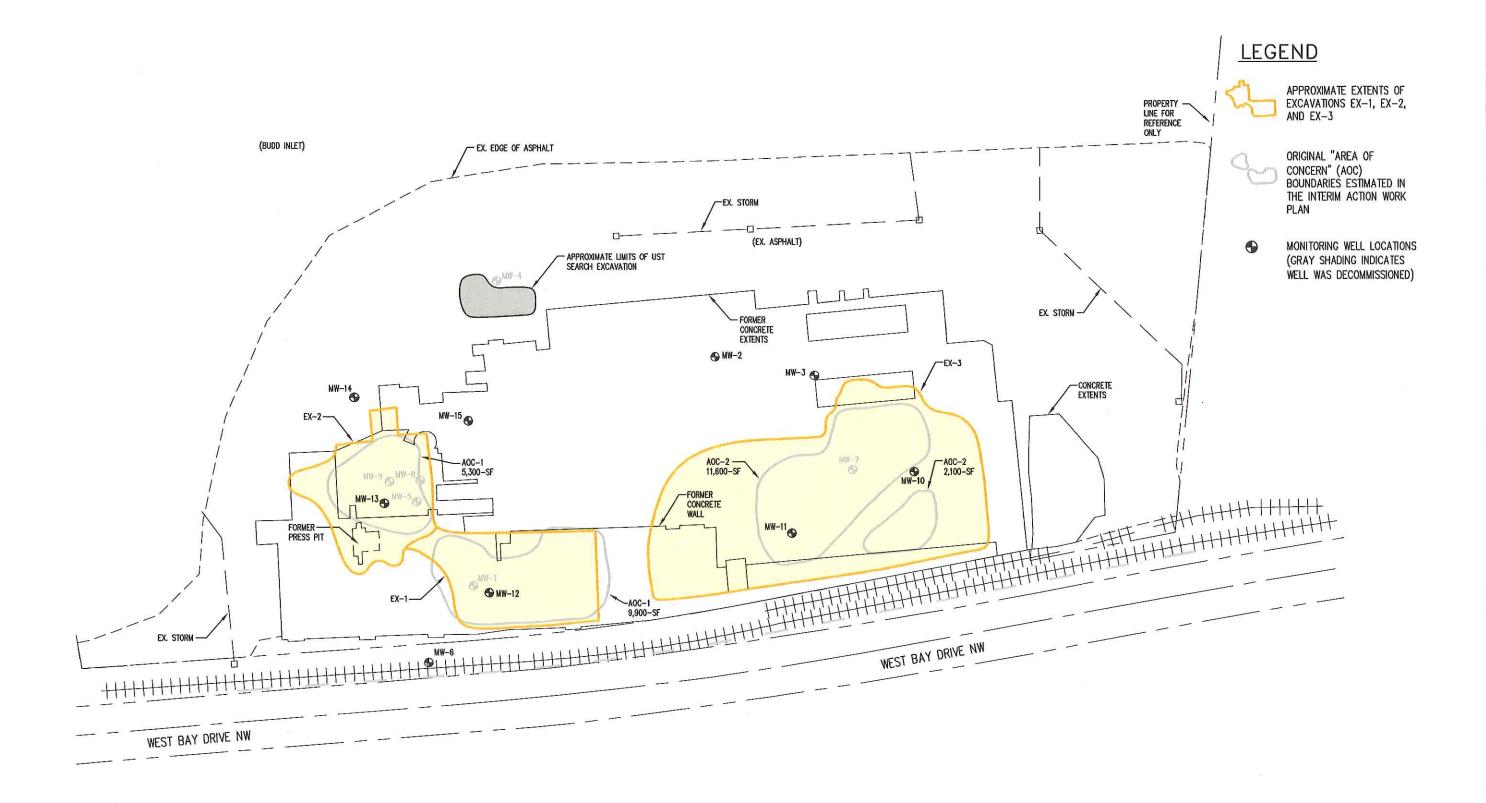
## **6.0 REFERENCES**

CLARC, 2011. Cleanup Levels and Risk Calculations (CLARC) Washington State Department of Ecology.

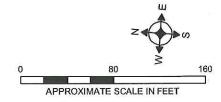
Greylock, 2010. Interim Action Closure Report, Former Hardel Mutual Plywood Site, 1210 NW West Bay Drive, Olympia, Washington. December 2010.

# **FIGURES**





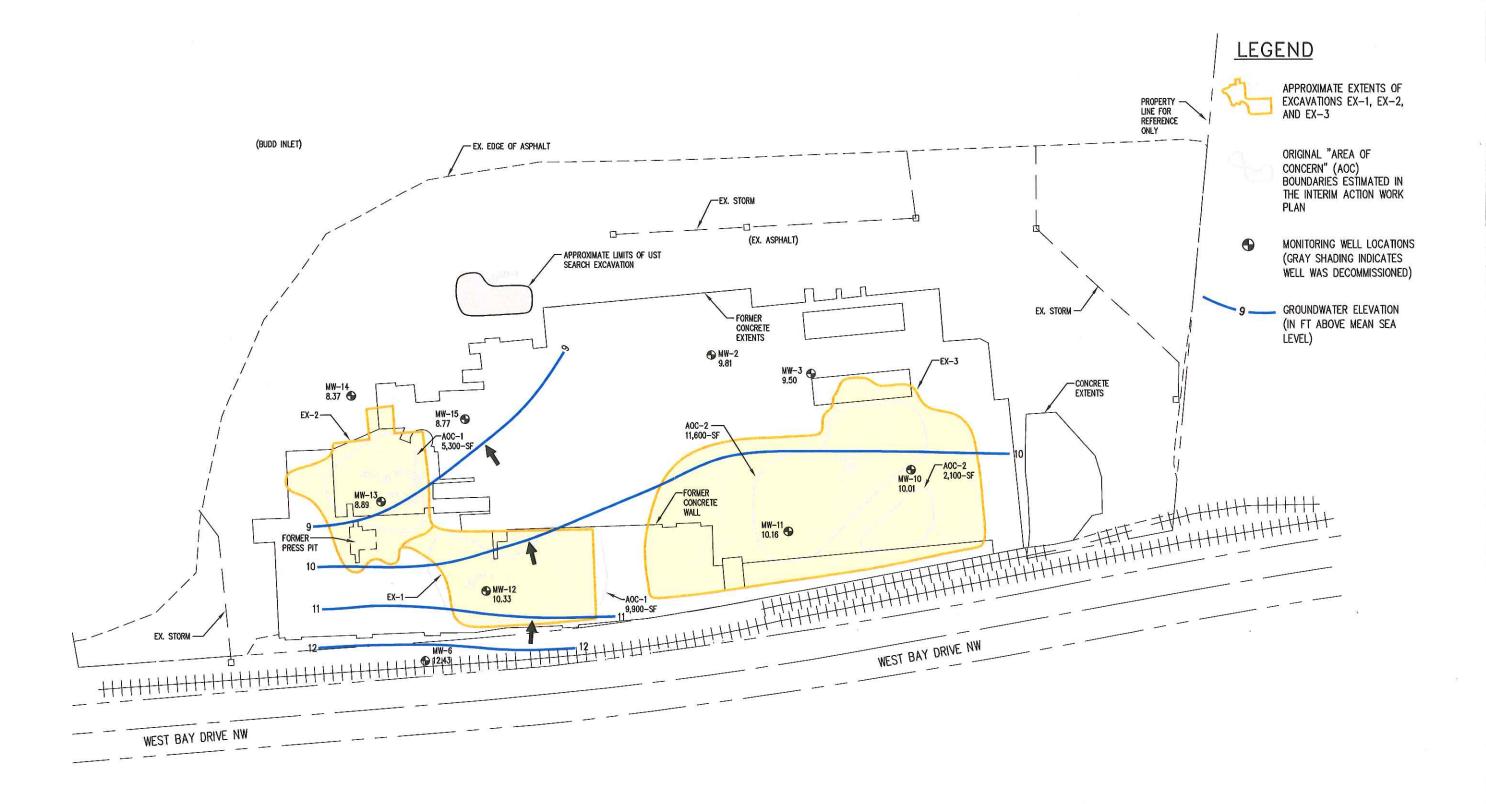




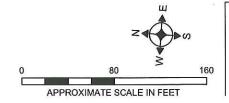
Modified from KPFF Demolition and Site Plan, March 2010

FIGURE 2 : APPROXIMATE MONITORING WELL LOCATIONS

Project : Hardel Mutual Plywood Site Location : Olympia, Washington Client : Hardel Mutual Plywood Corp.
Project No : 0401.2







Modified from KPFF Demolition and Site Plan, March 2010

FIGURE 3: INFERRED & GENERALIZED GROUNDWATER CONTOURS

Project : Hardel Mutual Plywood Site Location : Olympia, Washington Client : Hardel Mutual Plywood Corp.

Project No: 0401.2

# **TABLES**

Table 1. Groundwater Elevations

Hardel Mutual Plywood Site: 1210 West Bay Drive NW, Olympia, WA

22-Feb-2011		High Tide +13.	19 ft MLLW @ 0	7:22 AM
Station	Time	MW	Depth to	Groundwater
		Elevation (ft)	Water (ft)	Elevation (ft)
MW-2	9:20	11.68	1.87	9.81
MW-3	9:18	11.40	1.90	9.50
MW-6	9:32	15.74	3.31	12.43
MW-10	9:38	11.14	1.13	10.01
MW-11	9:35	11.32	1.16	10.16
MW-12	9:29	12.25	1.92	10.33
MW-13	9:26	10.95	2.06	8.89
MVV-14	9:24	10.53	2.16	8.37
MW-15	9:22	11.51	2.74	8.77

			Table 2:		Groundwater Sampling Analytics	Groundwater Sampling Analytical Results	ults				
			Former Harde	del Mutual Plywoo Test Methods: NW All results and limi	od Site, 1210 Wes VTPH-DX/DX Exte	Former Hardel Mutual Plywood Site, 1210 West Bay Drive NW, Olympia, WA Test Westhods: NWTPH-DX/DX Extended & EPA 8270 All results and limits in parts-per-billion (ppb) or ug/L	lympia, WA				
Test Method NWTPH-DX	MTCA Method A or Method B										1
Extended / EPA 8270	Criteria (ua/L)	Sample ID: Date Sampled:	MW-2 02/22/11	MW-3 02/22/11	MW-6 02/23/11	MW-10 02/22/11	02/22/11	MW-12 02/22/11	02/22/11	02/22/11	02/22/11
Diesel	200	Results (ug/L):	< 250	< 250	< 250	< 250	< 250	< 250	< 250	< 250	< 250
Heavy Oil	200	Results (ug/L):	< 500	< 500	< 500	< 500	< 500	< 500	< 500	< 500	< 500
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Acenapthene	960	Results (ug/L):	× 0.1	× 0.1	v 0.1	0.11	 V	-:0		- - - -	- /
Acenaphthylene	NP <sup>2</sup>	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	۸ 0.1
Anthracene	4.800	Results (ua/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Renzo(a)anthracene	ď	Results (ua/L):	< 0.1	× 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)ovrene	0.1	Results (ug/L):	< 0.1	× 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	N.	Results (ua/L):	< 0.1	× 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ahi)perviene	A.	Results (ua/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	ď	Results (ua/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	P.	Results (ua/L):	< 0.1	× 0.1	< 0.1	< 0.1	× 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a h)anthracene	N N	Results (ua/L):	< 0.1	× 0.1	< 0.1	< 0.1	× 0.1	< 0.1	۸ 0.1	< 0.1	< 0.1
Fluorene	640	Results (ua/L):	× 0.1	× 0.1	× 0.1	< 0.1	۸ 0.1	× 0.1	۸ 0.1	× 0.1	< 0.1
Fluoranthene	640	Results (ug/L):	< 0.1	< 0.1	× 0.1	< 0.1	۸ 0.1	× 0.1	۸ 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	Ą	Results (ug/L):	۸ 0.1	× 0.1	< 0.1	< 0.1	× 0.1	× 0.1	۸ 0.1	٥٥.1	< 0.1
Napthalene	160	Results (ug/L):	× 0.1	< 0.1	× 0.1	< 0.1	× 0.1	< 0.1	۸ 0.1	× 0.1	< 0.1
1-Methylnaphthalene	AN	Results (ug/L):	< 0.1	< 0.1	۸ 0.1	< 0.1	× 0.1	< 0.1	k 0.1	< 0.1	< 0.1
2-Methylnaphthalene	32	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	Ŗ	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	× 0.1	× 0.1	× 0.1	× 0.1	< 0.1
Pyrene	480	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	1- Metho	1- Method A soil cleanup level for unrestricted land use as published in the Model Toxics Control Act (MTCA), Chapter 173-340 WAC.	of for unrestricted	land use as public	shed in the Model	Toxics Control Act (	(MTCA), Chapter 17	73-340 WAC.			
		MTCA Method B of	cleanup levels we	are used for scree.	ning when no Metl	MTCA Method B cleanup levels were used for screening when no Method A were available.	ο̈́				
week.	2-	NP- Not Published	t: No Method A o	r Method B stand	ard formula value	NP- Not Published: No Method A or Method B standard formula value published in CLARC database for the listed analyte.	3 database for the li.	sted analyte.			

# **APPENDIX A**

**Analytical Report** 

ESN Environmental

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## ESN NORTHWEST CHEMISTRY LABORATORY

Greylock Consulting Hardel Mutual Plywood PROJECT Client Project #0401-3 Olympia, WA ESN Northwest 1210 Eastside Street SE Suite 200 Olympia, WA 98501 (360) 459-4670 (360) 459-3432 Fax lab@esnnw.com

## Analysis of Diesel Range Organics & Lube Oil Range Organics in Water by Method NWTPH-Dx

Sample Number	Date Prepared	Date Analyzed	Surrogate Recovery (%)	Diesel Range Organics (ug/L)	Lube Oil Range Organics (ug/L)
Method Blank	2/28/2011	2/28/2011	97%	nd	nd
MW-3	2/28/2011	2/28/2011	92%	nd	nd
MW-10	2/28/2011	2/28/2011	112%	nd	nd
MW-11	2/28/2011	2/28/2011	82%	nd	nd
MW-12	2/28/2011	2/28/2011	116%	nd	nd
MW-2	2/28/2011	2/28/2011	87%	nd	nd
MW-15	2/28/2011	2/28/2011	134%	nd	nd
MW-14	2/28/2011	2/28/2011	87%	nd	nd
MW-13	2/28/2011	2/28/2011	110%	nd	nd
MW-6	2/28/2011	2/28/2011	111%	nd	nd
Reporting Limits				250	500

<sup>&</sup>quot;nd" Indicates not detected at the listed detection limits.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE: 50% TO 150%

<sup>&</sup>quot;int" Indicates that interference prevents determination.

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## Analysis of Polynuclear Aromatic Hydrocarbons in Water by Method 8270

**Analytical Results** 

S	Reporting	MTH BLK	LCS	MW-3	MW-10	MW-11	MW-12	MW-2
Date extracted	Limits	02/28/11	02/28/11	02/28/11	02/28/11	02/28/11	02/28/11	02/28/11
Date analyzed	(ug/L)	02/28/11	02/28/11	02/28/11	02/28/11	02/28/11	02/28/11	02/28/11
Acenaphthene	0.1	nd	123%	nd	11	nd	nd	nd
Acenaphthylene	0.1	nd	90%	nd	nd	nd	nd	nd
Anthracene	0.1	nd	110%	nd	nd	nd	nd	nd
Benzo(a)anthracene*	0.1	nd	130%	nd	nd	nd	nd	nd
Benzo(a)pyrene*	0.1	nd	115%	nd	nd	nd	nd	nd
Benzo(b)fluoranthene*	0.1	nd	118%	nd	nd	nd	nd	nd
Benzo(ghi)perylene	0.1	nd	93%	nd	nd	nd	nd	nd
Benzo(k)fluoranthene*	0.1	nd	115%	nd	nd	nd	nd	nd
Chrysene*	0.1	nd	113%	nd	nd	nd	nd	nd
Dibenzo(a,h)anthracene*	0.1	nd	97%	nd	nd	nd	nd	nd
Fluorene	0.1	nd	148%	nd	nd	nd	nd	nd
Fluoranthene	0.1	nd	124%	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)pyrene*	0.1	nd	100%	nd	nd	nd	nd	nd
Naphthalene	0.1	nd	119%	nd	nd	nd	nd	nd
1-Methylnaphthalene	0.1	nd	ns	nd	nd	nd	nd	nd
2-Methylnaphthalene	0.1	nd	ns	nd	nd	nd	nd	nd
Phenanthrene	0.1	nd	113%	nd	nd	nd	nd	nd
Pyrene	0.1	nd	123%	nd	nd	nd	nd	nd
Total Carcinogens				nd	nd	nd	nd	nd
Surrogate recoveries:								
2-Fluorobiphenyl		126%	70%	53%	60%	57%	135%	100%
p-Terphenyl-d14		106%	72%	105%	97%	93%	94%	77%

## Data Qualifiers and Analytical Comments

\* - Carcinogenic Analyte

nd - not detected at listed reporting limits

na - not analyzed

C - coelution with sample peaks

M - matrix interference

J - estimated value

Results reported on dry-weight basis

Acceptable Recovery limits: 50% TO 150%

Acceptable RPD limit: 35% ns-not in the spiking solution

### ESN NORTHWEST CHEMISTRY LABORATORY

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## Analysis of Polynuclear Aromatic Hydrocarbons in Water by Method 8270

**Analytical Results** 

<u> </u>	Reporting	MW-15	MW-14	MW-13	MW-6
Date extracted	Limits	02/28/11	02/28/11	02/28/11	02/28/11
Date analyzed	(ug/L)	02/28/11	02/28/11	02/28/11	02/28/11
Acenaphthene	0.1	nd	nd	nd	nd
Acenaphthylene	0.1	nd	nd	nd	nd
Anthracene	0.1	nd	nd	nd	nd
Benzo(a)anthracene*	0.1	nd	nd	nd	nd
Benzo(a)pyrene*	0.1	nd	nd	nd	nd
Benzo(b)fluoranthene*	0.1	nd	nd	nd	nd
Benzo(ghi)perylene	0.1	nd	nd	nd	nd
Benzo(k)fluoranthene*	0.1	nd	nd	nd	nd
Chrysene*	0.1	nd	nd	nd	nd
Dibenzo(a,h)anthracene*	0.1	nd	nd	nd	nd
Fluorene	0.1	nd	nd	nd	nd
Fluoranthene	0.1	nd	nd	nd	nd
Indeno(1,2,3-cd)pyrene*	0.1	nd	nd	nd	nd
Naphthalene	0.1	nd	nd	nd	nd
1-Methylnaphthalene	0.1	nd	nd	nd	nd
2-Methylnaphthalene	0.1	nd	nd	nd	nd
Phenanthrene	0.1	nd	nd	nd	nd
Pyrene	0.1	nd	nd	nd	nd
Total Carcinogens		nd	nd	nd	nd
Surrogate recoveries:	¥				
2-Fluorobiphenyl		71%	84%	66%	60%
p-Terphenyl-d14		100%	103%	82%	127%

## Data Qualifiers and Analytical Comments

\* - Carcinogenic Analyte

nd - not detected at listed reporting limits

na - not analyzed

C - coelution with sample peaks

M - matrix interference

J - estimated value

Results reported on dry-weight basis

Acceptable Recovery limits: 50% TO 150%

Acceptable RPD limit: 35% ns-not in the spiking solution

# **APPENDIX B**

**Well Monitoring Data Sheets** 

Greylock Consulting LLC 720 S. 333rd St. Ste 210, Federal Way, WA 98003 (253) 661-3520

Project: Hardel Mutual Plywood Site	Well ID: MW-6
Client: Hardel Mutual Plywood Corp	Well Diameter: 75 //
Date: 7-23-/1	Well Depth: 4 //
Sampler: Mark Willoughby	
Depth to Product:	Thickness of Product: NA
Flow Rate: 2 Umn	Tubing Depth: 7
Depth to Water 3.3/ Pre. 09/5	Post: NA

Time	Temp © or F	рН	Cond. uS	Turbidity NTUs	DO Mg/L	Observations
0920 0924 0928 0932 0936	10.54 10.67 10.72 10.72	637 6:57 6:67 6:70	125 126 129 130 131	1348-6 1008-7 596-2 419-5 307-4	8.68	Wolfes very must
Did well dewate Sampling Time Sample ID Analyzed For: Equip. Blank IE	1: 094 MW- TPH-DX 8	40		Amt. actually evacual Sampling Date: 2	-23-10	r Egllons

\* TOOK Sample before Turtisity Stobulized becoure Snow down four began to intensify.

Project: Hardel Mutual Plywood Site	Well ID: MW-13
Client: Hardel Mutual Plywood Corp	Well Diameter: 1"
Date: 7-22-11	Well Depth: 13'
Sampler: Mark Willoughby	
Depth to Product: NA	Thickness of Product:
Flow Rate: 2 L/min	Tubing Depth: 7'
Depth to Water 7 01 Pre 1425	Post:

Time	Temp © or F	рН	Cond. uS	Turbidity NTUs		Observations
1435	9.19 9.16 9.15 9.14	7-12-6-93-6-92	401 423 434 437	40.9	1.80 0.32 0.26 0.23	haye ilea
				P.		
Did well dewate Sampling Time Sample ID A Analyzed For: Equip. Blank ID	1 14 1 W - 1 2 TPH-DX 8	-49		Amt. actually evacua Sampling Date: "7 Laboratory: #3 /	-72-11	Gollus

Project: Hardel Mutual Plywood Site	Well ID: MW-14
Client: Hardel Mutual Plywood Corp	Well Diameter: 1"
Date: 2-77-11	Well Depth: 13'
Sampler: Mark Willoughby	
	Thickness of Product: U/7
Flow Rate: 2 C/min.	Tubing Depth: 7'
Depth to Water 7.3/ Pre 1355	Post:

Time	Temp © or F	рН	Cond. uS	Turbidity NTUs	DO Mg/L	Observations
1404 1404 1408 1417 1416	10:00 10:00 10:07 10:14	7.03 8.95 6.93 6.92	870 880 920 938 941	16.5 5.5 7.9 2.3 1.6	3-2 0-33 0-79 0-30 0-34	Purge Cler
Did well dewate Sampling Time Sample ID Analyzed For: Equip. Blank ID	: 14/ ///////////////////////////////////	8		Amt. actually evacua Sampling Date:	ted: 7	2 Gallons

Project: Hardel Mutual Plywood Site	Well ID: MW-15
Client: Hardel Mutual Plywood Corp	Well Diameter: 1"
Date: 7-17-11	Well Depth: 13'
Sampler: Mark Willoughby	
Depth to Product:	Thickness of Product: M.A
Flow Rate: 7 L/min	Tubing Depth: 7'
Depth to Water 2-76 Pre: 1315	Post:

	_						
Time	Temp	рН	Cond.	Turbidity	DO Mg/L	Observations	
	© or		uS	NTUs			
	F						
1320	9.11	6.41	564	113.0	1.94	Purge Cl	outes
1220	0.816		563	166.3	0.35	7	1
1226	19.54	6.52	555	64.7	0.25		
12 22	10-22	6.54		14.4	0.28		
1336	10.22		552	10.7	0.26		
13 40	10.23	6.56	547	11-0	031		
18 40	100	6/6		110	0.51		
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Did well dewater? (Yes No			Amt. actually evacuated: 2.5 Gollens				
Sampling Time: 1342			Sampling Date: 7-22-1/				
Sample ID Mu-15			Laboratory:	311			
Analyzed For: TPH-DX & PAHS							
Equip. Blank ID	);						

Project: Hardel Mutual Plywood Site	Well ID: MW-2
Client: Hardel Mutual Plywood Corp	Well Diameter/ 2"
Date: 7 77-11	Well Depth:
Sampler: Mark Willoughby	
Depth to Product: NA	Thickness of Product: MA
Flow Rate: 24/min	Tubing Depth: 6'
Depth to Water 1 87 Pre 1231	Post:

Time	Temp C or F	рН	Cond. uS	Turbidity NTUs		Observations
1735 1 <b>3</b> 39 1743 1247 1251	796 7.90 9.96 8.28 2.19	7.45	346 350 359 382 394	60.9 43.4 10.4 7.1 6.3	5-73 0-57 0-35 0-34 0-24	Profe Cleaning is
					727	
Sampling Time Sample ID Analyzed For:	Did well dewater? Yes No Sampling Time: 17.5.3 Sample ID MW. 2 Analyzed For: TPH-DX & PAHS Equip. Blank ID:				ated: 7 2-72-1/ €3/4	Gollons

Project: Hardel Mutual Plywood Site	Well ID: MW-12
Client: Hardel Mutual Plywood Corp	Well Diameter: 1"
Date: 7-72 - 11	Well Depth: 13'
Sampler: Mark Willoughby	5
Depth to Product: / / / /	Thickness of Product: NA
Flow Rate: 24/Min.	Tubing Depth: 7'
Depth to Water / 9 Pre. 113 %	Post:

Time	Temp O or F	рН	Cond. uS	Turbidity NTUs	DO Mg/L	Observations	
1145 1149 1157 1201 1705 1706 1714 1718	9.52 9.17 9.00 9.87 8-84 9.73 9.68	6.50 6.50 6.51 6.51 6.51 6.51 6.51	209 235 258 270 773 275 276 276 775	60.8 155.0 98.3 413.4 504.2 505.4 281.5 291.5	2-90 0.29 0.38 0.30 0.30 0.37 0.37	water Cloudy water Barring Charles 11 Cleving al man	
	1 20				) ×		*
							- 11
Did well dewater? Yes No Sampling Time: 17.22 Sample ID MW - 12 Analyzed For: TPH-DX & PAHS Equip. Blank ID:				ited: 4 -72-1 ESM	Gallons		

Project: Hardel Mutual Plywood Site	Well ID: MW-11
Client: Hardel Mutual Plywood Corp	Well Diameter: 1"
Date: 7-12-11	Well Depth: 13'
Sampler: Mark Willoughby	
Depth to Product: IN 19	Thickness of Product: NA
Flow Rate: 2L/min,	Tubing Depth: 7'
Depth to Water 116 Per 1105	Post:

Company and the second						
Time	Temp	рН	Cond.	Turbidity	DO Mg/L	Observations
	O or		uS	NTUs		E
	F					
1113	9.26	6.28	302	26.4	2-11	justos cler
11 17	59	6.2-3	277	5-7		WW.
1121	8.36	020	753	4.2	0.23	
11 25	8-35	6.00	239	7-6	0.22	
11 20	8-23	6.21	7 28	1.9	0.21	
11-6-1	0 25	551	200		0 4	
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Did well dewater? Yes No			Amt. actually evacuated: 2.7 Gol/S			
Sampling Time: //32						
Sample ID MW-I			Laboratory:	ESH 11		
Analyzed For: TPH-DX & PAHS				Laboratory.		
Equip. Blank II	).	<u> </u>				
Equip. Blank ID:						

Project: Hardel Mutual Plywood Site	Well ID: MW-10
Client: Hardel Mutual Plywood Corp	Well Diameter: 1"
Date: 2-22-11	Well Depth: 13'
Sampler: Mark Willoughby	
Depth to Product: NP	Thickness of Product: $NA$
Flow Rate: 2 C/Min	Tubing Depth: 7
Depth to Water / 12 Preset /030	Post:

Time	Temp © or F	рН	Cond. uS	Turbidity NTUs	DO Mg/L	Observations
1035 1039 1043 1047 1055	8.76 9.05 8.96 8.89 8.97	6.90 6.62 6.61 6.61	247 2,80 287 307 309 316	154.8 89.1 44.5 15.5 13.7 9.8	1.95 11.91 106 0.99 0.91	Purge Murky Purge Clearing to Water Clearer Turbidity imbraving
Did well dewater? (Yes) No Sampling Time: 1057 Sample ID MW-LO Analyzed For: TPH-DX & PAHS Equip. Blank ID:			Amt. actually evacual Sampling Date:	7-22-11	Gallens	

Project: Haules Mutual Plywords.te	Well ID: MW-3
Client: Hardel Mutual Mywood Cort	
	Well Depth:
Sampler: µ w	
Depth to Product: № A	Thickness of Product: NA
Flow Rate: 2 L/min	Pump Depth: 6'
Depth to Water 1.90' at 9950	Post:

Time	Temp O or F	рН	Cond. uS	Turbidity NTUs	Water Removed> (gals or mL) Do MG/L	Observations
1002 1006 1019 1014 1015	9.27 9.30 9.31 9.41 9.75	7.68 8.61 8.94 8.83 8.60	539	18:2 19:0 16:0 14:5 12:7	DO MG/L  0.35  0.47	ivsts Clear
Did well dewate Sampling Time Sample ID M Analyzed For: Equip. Blank ID	105 W-3 TPH-		PAHS	Sampling	ually evacuated: ₹ Date: 2-22- ry: £51√	2 Gallons

Handel Wates Levels

Well Time DTW (4)

MW-3 918 1.90

MW-2 920 1.87

MW-15 922 2.74

MW-14 924 2.16

MW-13 926 2.06

MW-17 929 1.92

MW-17 935 1.16

MW-10 938 1.13