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

Compliance Well Installation &
First Round of Groundwater Monitoring

February 17, 2011

Prepared For: Hardel Mutual Plywood Corporation

Prepared By:

GREYLOCK CONSULTING LLC
GC Project No. 0401

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Attachments:

720 S. 333rd Street, Suite 210, Federal Way, WA 98003 • Office: (253) 661-3520 • Fax: (253)835-8916

1.0 INTRODUCTION

This report documents the installation of five new groundwater monitoring wells along with the results of the first round of quarterly compliance monitoring for groundwater at the former Hardel Mutual Plywood site located at 1210 West Bay Drive NW in Olympia, Washington. The project work was completed in accordance with the December 3, 2009-dated Draft Interim Action Work Plan.

The goal of the post-construction groundwater monitoring is to evaluate the long-term effectiveness of the Interim Action cleanup. The monitoring plan is utilizing the remaining pre-existing groundwater monitoring wells at the Site, but also includes five new groundwater monitoring wells installed at locations approved by the Washington Department of Ecology (Ecology). The five new permanent groundwater monitoring wells were installed, developed, and sampled to reduce the possibility of excessive sediment impacting the analytical results. Groundwater flow direction and gradient were also 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

The Site has been utilized by logging/lumber related businesses from as early as 1924 through 1996. Between 1924 and 1951, the Site was occupied by Henry McCleary Timber Company, Olympia Harbor Lumber Company, Olympia Towing, and West Side Log Dump (Tetra Tech, 1999). From 1951 through 1996 the Site was used by Hardel as a plywood manufacturing facility.

In 1996 a fire consumed the manufacturing facility. The only structures remaining after the fire were concrete building foundations, asphalt pavement, and an inactive rail line. Functioning storm drainage and water lines also remained on the property.

The subject site has been the focus of several previous environmental studies along with a recent Interim Action cleanup. The purpose of the Interim Action (IA) at the Site was to remove free product and soil greater than target cleanup levels. A summary of findings from the previous studies and Interim Action are presented below.

Tetra Tech EM Inc., 1999

Tetra Tech EM Inc. performed a Phase 1 Environmental Site Assessment at the site in July 1999. This study involved historical research and interviews. No soil, groundwater, or sediment sampling was performed during that study by Tetra Tech. Potential areas of concern were identified based on historical features.

Stemen Environmental Inc., 2004

Stemen Environmental Inc. performed a Phase 2 Environmental Site Assessment on the property in June and July of 2004. A total of 34 investigative soil samples and 33 investigative water samples were collected from 33 exploratory borings. Select soil and water samples from borings and test pits were laboratory tested for total petroleum hydrocarbons (TPH), semi-volatiles, metals, and polychlorinated biphenyls (PCBs). Testing identified the presence of heavy oil and diesel-range petroleum products in soil and groundwater on the site. Free phase petroleum product was detected in borings on the northwestern end of the property. Laboratory testing confirmed the presence of polyaromatic hydrocarbons (PAHs) in soils on the northwestern portion of the property and in groundwater on the southwestern portion of the property.

Greylock Consulting LLC, 2007, 2009a, 2009b, 2010

Greylock completed a Remedial Investigation (RI) at the Site in December of 2007. Twenty-six (26) soil borings were advanced to depths ranging from approximately 12 to 20 ft below ground surface (bgs) using a direct push drill rig. Seven (7) of those borings were developed as shallow groundwater monitoring wells. Groundwater flow direction and tidal influence was assessed. Samples of soil and groundwater were tested in the laboratory for TPH and PAHs.

The RI concluded that shallow groundwater was present at approximately 3 to 4.5 ft bgs. The direction of groundwater flow was toward the east. Tidal fluctuation did not appear to affect the direction of groundwater flow at the Site.

The RI concluded that soil containing heavy oil, diesel, and PAHs above target cleanup levels were present along the western end of the Site. Groundwater in this area contained heavy oil and diesel above target cleanup levels. One well at the northwestern part of the Site (MW-1) contained oil, 0.95 ft thick, floating on the water table in 2007. Additional borings were

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recommended to further characterize the extent of soil and groundwater contamination at the Site.

Greylock completed a Supplemental Characterization and Feasibility Study at the Site in May, 2009. Eleven (11) supplemental soil borings were advanced to depths ranging from approximately 5 to 16 ft bgs using a direct push drill rig. Also, three (3) hand auger borings were advanced, west of the concrete slab.

Two discrete areas of concern (AOCs) were identified for soil and groundwater. AOC No. 1 was characterized by soil and groundwater containing heavy oil above target cleanup standards. Free product was observed on the water table in this area. AOC No. 2 was characterized by soil and groundwater containing diesel above target cleanup standards. Both areas were located along the western part of the Site. Four different remedial options were evaluated for cleanup of soil and groundwater. The preferred remedial option for the Site was identified as free product removal along with excavation and off-site disposal of a preliminary estimate of 11,300 cubic yards of contaminated soils.

Greylock completed a Supplemental Subsurface Investigation in October, 2009. Eight (8) soil borings were advanced to depths ranging from approximately 4.5 to 20 ft bgs using a hollow stem auger rig. Two (2) wells were installed for the purpose of intercepting and recovering free product. This supplemental investigation encountered additional soil and groundwater impacted with heavy oil. The results of that investigation identified an additional estimated 3,650 cubic yards of soil that would require excavation and off-site disposal.

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. A Greylock geologist 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.

The Interim Action report concluded that results of cleanup confirmation soil sampling and laboratory testing from the floors and sidewalls of the three (3) on-site remedial excavations indicated that the removal of free product, the removal of contaminated groundwater and the removal of diesel/heavy oil-impacted soil in those areas was successful in achieving compliance with the Model Toxics Control Act (MTCA) target soil cleanup levels at the sampled localities.

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.

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Approximately 1,250,600 gallons of 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".

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.

1.3 Purpose

The purpose of this assessment was to install and develop five new monitoring wells on the Site, along with acquiring groundwater samples from the new wells and three previously installed wells for laboratory analyses using low flow purging techniques, and to determine groundwater flow direction and gradient. If soil exhibited any odor and/or sheen, soil samples would be collected from the impacted zone and archived. Collected 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.

A relative survey of the new monitoring wells elevations was performed and groundwater flow direction and gradient was assessed.

2.0 FIELD ACTIVITIES

2.1 Monitoring Well Installation and Development

On November 15, 2010 Greylock's subcontracted driller, ESN Northwest, advanced five soil borings and converted them into 1-inch diameter monitoring wells at the site. Drilling was performed with a truck-mounted, hydraulic, direct push probe. Continuous cores were collected during drilling to enable geologic logging and evaluation of potential odor and sheen in soils.

Approximate monitoring well locations are shown on Figure 2. The five newly installed monitoring wells (MW-10 through MW-15) were situated at locations pre-approved by Ecology (within or hydrologically down-gradient of the remedial excavations conducted at the site in July-September 2010).

Borings were advanced to a depth of approximately 13 ft below ground surface (bgs). Borings were continuously logged (Appendix A). No hydrocarbon odor or sheen was observed in any of the borings, except for a slight petroleum-like odor and sheen noted in grey silty sand and sawdust recovered from approximately 12-to-13 feet bgs in the boring for MW-10. Groundwater was encountered at approximately 2 to 3 ft bgs during drilling.

Following well installation, all wells were developed by pumping until turbidity stabilized. No odor or sheen was observed in purge water from any of the monitoring wells, except for a slight possible organic sheen on water purged from well MW-14. The sheen broke-up easily when stirred with a stick and did not reform. Purge water was contained in a 55-gallon drum onsite.

All test probe and purging equipment were decontaminated between well locations.

2.2 Groundwater Sampling

Groundwater samples were collected from all nine on-site monitoring wells on December 1, 2010 using a peristaltic pump and disposable tubing under low flow conditions.

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, 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.

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 B. Table 1 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.

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3.1 NWTPH-Dx Results

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

3.2 PAH Results

The EPA 8270 Method provides analytical results for polyaromatic hydrocarbons (PAHs). Groundwater samples from MW-6, MW-12, and MW-14 revealed results below the reporting limits for PAHs of 0.1 parts-per-billion (ppb).

No carcinogenic 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.

Very low levels of non-carcinogenic PAHs were reported in the analyzed groundwater samples collected from wells MW-10, MW-11, MW-13, MW-15, MW-2, and MW-3. Detected PAHs included acenapthene (ranging from 1.7 ppb to 23 ppb), anthracene (1.1 ppb for MW-15), fluorene (3.1 ppb for MW-10), fluroanthene (2.3 ppb for MW-15), naphthalene (ranging from 11 ppb to 58 ppb), 1-methylnaphthalene (ranging from 1.8 ppb to 7.1 ppb), 2-methylnaphthalene (ranging from 0.70 ppb to 0.8 ppb), phenanthrene (3.4 ppb for MW-15), and pyrene (8.9 ppb for MW-15). All of the reported PAH concentrations were well below their published WDOE target Method A or Method B (standard formula value) cleanup standards.

4.0 MONITORING WELL SURVEY & WATER LEVEL MEASUREMENTS

Elevations of the pre-existing monitoring wells MW-2, MW-3, and MW-6 were previously surveyed by Andresen Surveying PLLC on August 13, 2007. Relative elevations of the newly installed monitoring wells MW-10 through MW-15 were surveyed by Greylock on November 30, 2010 using a Spectra Precision laser grade level. Water levels were measured using a well probe at all nine well locations. Water level measurements are provided in Table 2. Shallow groundwater at the site occured at depths ranging from 0.54 ft to 2.83 ft below the top of casing (TOC) of monitoring wells on November 30, 2010.

The seal on the well cap for MW-2 was noted to be loose and the well monument was full of surface water upon removing the monument's lid. 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. Based on these observations, it appears possible that the water level measured in MW-2 on November 30, 2010 may be slightly elevated due to infiltration of surface water into the well from the loose well cap.

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Figure 2 shows the groundwater flow direction across the site on November 30, 2010. 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 0.0125 ft per ft on November 30, 2010. At the southern part of the site, groundwater flow is to the northeast with a gradient of approximately 0.0042 ft per ft.

5.0 CONCLUSIONS

Based on the results of laboratory testing, groundwater at the nine monitoring well localities sampled during this first quarterly "compliance monitoring" event is compliant 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 concentrations of non-carcinogenic PAHs detected in groundwater sampled from wells MW-10, MW-11, MW-13, MW-15, MW-2, and MW-3 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.

6.0 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.

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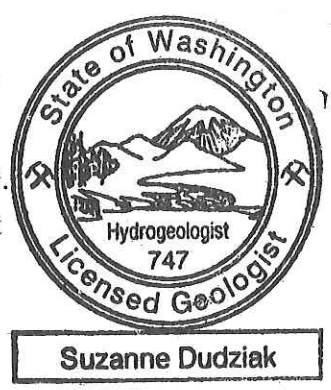
If you have any questions regarding this report, please call us at (253) 661-3520.

Sincerely,
GREYLOCK CONSULTING LLC

Suzanne Dudziak, L.H.G.
Principal Hydrogeologist



7.0 REFERENCES

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Tetra Tech EM Inc., 1999. *Phase 1 Environmental Site Assessment Hardel Mutual Plywood Waterfront Property.* July 1999.

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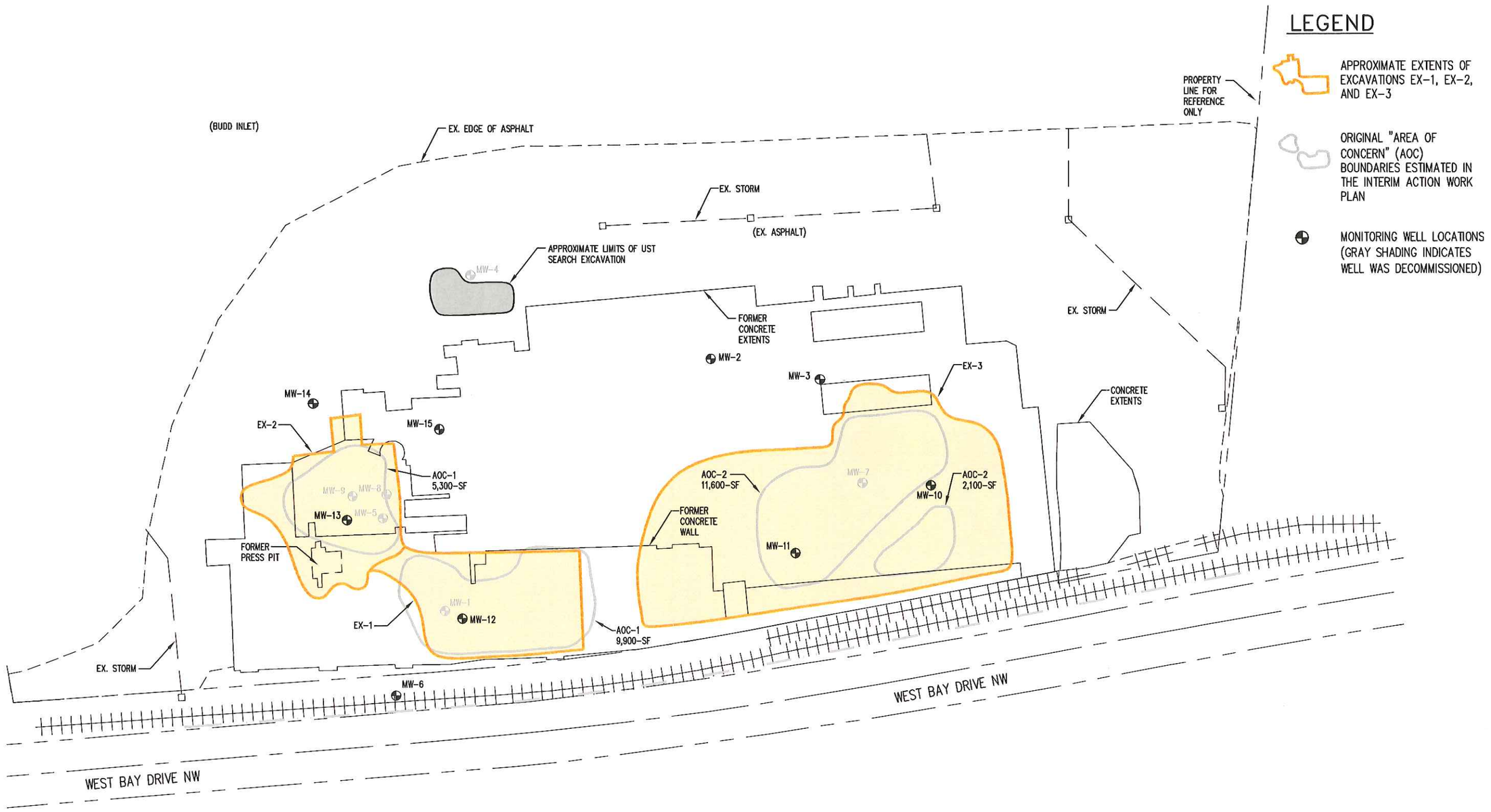
FIGURES

MN (17.4° E)

ft
0 1000 2000
Data Zoom 13-1



Modified from KPFF Demolition and Site Plan, March 2010

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APPROXIMATE SCALE IN FEET

FIGURE 2 : APPROXIMATE MONITORING WELL LOCATIONS

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

TABLES

Table 1: Groundwater Sampling Analytical Results

December 1, 2010 Sampling Event

Former Hardel Mutual Plywood Site, 1210 West Bay Drive NW, Olympia, WA
Test Methods: NWTPH-DX/DX Extended & EPA 8270
All results and limits in parts-per-billion (ppb) or ug/L

Test Method NWTPH-DX Extended / EPA 8270	MTCA Method A or Method B Criteria[1]	Sample ID:	MW-2 / 12-1-10	MW-3 / 12-1-10	MW-6 / 12-1-10	MW-10 / 12-1-10	MW-11 / 12-1-10	MW-12 / 12-1-10	MW-13 / 12-1-10	MW-14 / 12-1-10	MW-15 / 12-1-10
	(ppb)	Date Sampled:	12/01/10	12/01/10	12/01/10	12/01/10	12/01/10	12/01/10	12/01/10	12/01/10	12/01/10
Diesel	500	Results (ppb):	<50	<50	<50	<50	<50	<50	<50	<50	<50
Heavy Oil	500	Results (ppb):	<250	<250	<250	<250	<250	<250	<250	<250	<250
Acenapthene	960	Results (ppb):	1.7	5.5	<.1	23	5.0	<.1	2.5	<.1	4.0
Acenaphthylene	NP[2]	Results (ppb):	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Anthracene	4,800	Results (ppb):	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	1.1
Benzo(a)anthracene	NP	Results (ppb):	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Benzo(a)pyrene	0.1	Results (ppb):	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Benzo(b)fluoranthene	NP	Results (ppb):	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Benzo(ghi)perylene	NP	Results (ppb):	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Benzo(k)fluoranthene	NP	Results (ppb):	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Chrysene	NP	Results (ppb):	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Dibenzo(a,h)anthracene	NP	Results (ppb):	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Fluorene	640	Results (ppb):	<.1	<.1	<.1	3.1	<.1	<.1	<.1	<.1	<.1
Fluoranthene	640	Results (ppb):	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	2.3
Indeno(1,2,3-cd)pyrene	NP	Results (ppb):	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Napthalene	160	Results (ppb):	11	<.1	<.1	8.8	58	<.1	32	<.1	<.1
1-Methylnaphthalene	NP	Results (ppb):	<.1	<.1	<.1	7.1	2.1	<.1	1.8	<.1	<.1
2-Methylnaphthalene	32	Results (ppb):	<.1	<.1	<.1	<.1	0.8	<.1	0.70	<.1	<.1
Phenanthrene	NP	Results (ppb):	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	3.4
Pyrene	480	Results (ppb):	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	8.9

Notes:

1- Method A soil cleanup level for unrestricted land use as published in the Model Toxics Control Act (MTCA), Chapter 173-340 WAC. MTCA Method B cleanup levels were used for screening when no Method A were available.

2- NP- Not Published: No Method A or Method B standard formula value published in CLARC database for the listed analyte.

Table 2. Groundwater Elevations
Hardel Mutual Plywood Site: 1210 West Bay Drive NW, Olympia, WA

30-Nov-2010		High Tide +15.75 ft MLLW @ 12:29 PM		
Station	Time	MW Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
MW-2	13:42	11.68	1.21	10.47
MW-3	13:45	11.40	1.30	10.10
MW-6	13:10	15.74	2.83	12.91
MW-10	13:39	11.14	0.54	10.60
MW-11	13:35	11.32	0.73	10.59
MW-12	13:14	12.25	1.32	10.93
MW-13	13:18	10.95	1.44	9.51
MW-14	13:22	10.53	1.62	8.91
MW-15	13:27	11.51	2.20	9.31

APPENDIX A

(Boring/Well Logs)

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LOG OF BOREHOLE

Project: Hardel Mutual Plywood Environmental Cleanup	**Job #:** 0401.3	**Boring #:** MW-10
Location: 1210 West Bay Drive NW, Olympia, WA	**Approximate Elevation:**	
Subcontractor/Equipment: ESN Northwest	**Drilling Method:** Direct Push	
Date: November 15, 2010	**Logged By:** C. Cass	

Depth (ft.)	Soil Description	Lithology	Color	Comments	Well Construction
0	Concrete		Grey	Crushed concrete surfacing	Cement
	Gravel and Sand (SW)				Bentonite
5			Medium Brown	Excavation backfill material	
					1 in. prepack screen, 0.01 slot
10	Silty Sand (SM)		Grey	With shell fragements; some sawdust at 13 ft bgs	

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Water Resources & Environmental Services

LOG OF BOREHOLE

Project: Hardel Mutual Plywood Environmental Cleanup	**Job #:** 0401.3	**Boring #:** MW-11
Location: 1210 West Bay Drive NW, Olympia, WA	**Approximate Elevation:**	
Subcontractor/Equipment: ESN Northwest	**Drilling Method:** Direct Push	
Date: November 15, 2010	**Logged By:** C. Cass	

Depth (ft.)	Soil Description	Lithology	Color	Comments	Well Construction
0	Concrete		Grey	Crushed concrete surfacing	Cement
	Gravel and Sand (SW)		Medium Brown		Bentonite
5				Excavation backfill material	
	Sand (SM)		Grey	With shell fragements	1 in. prepack screen, 0.01 slot
	Wood (F)		Brown	Sawdust from 9 to 12 ft. No sheen.	
10			Grey		
	Silty Sand (SM)				

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Water Resources & Environmental Services

LOG OF BOREHOLE

Project: Hardel Mutual Plywood Environmental Cleanup	**Job #:** 0401.3	**Boring #:** MW-12
Location: 1210 West Bay Drive NW, Olympia, WA	**Approximate Elevation:**	
Subcontractor/Equipment: ESN Northwest	**Drilling Method:** Direct Push	
Date: November 15, 2010	**Logged By:** C. Cass	

Depth (ft.)	Soil Description	Lithology	Color	Comments	Well Construction
0	Concrete		Grey	Crushed concrete surfacing	Cement
	Gravel and Sand (SW)				Bentonite
5			Medium Brown	Excavation backfill material	
10					1 in. prepack screen, 0.01 slot
	Clayey Sand (SC)		Grey	Old fill material, with wood debris	
	Silty Sand (SM)		Grey		

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Water Resources & Environmental Services

LOG OF BOREHOLE

Project: Hardel Mutual Plywood Environmental Cleanup	**Job #:** 0401.3	**Boring #:** MW-13
Location: 1210 West Bay Drive NW, Olympia, WA	**Approximate Elevation:**	
Subcontractor/Equipment: ESN Northwest	**Drilling Method:** Direct Push	
Date: November 15, 2010	**Logged By:** C. Cass	

Depth (ft.)	Soil Description	Lithology	Color	Comments	Well Construction
0	Concrete		Grey	Crushed concrete surfacing	Cement
	Gravel and Sand (SW)		Medium Brown	Excavation backfill material	Bentonite
5	Gravel (GP)		Variable	Excavation backfill material ("drain rock")	1 in. prepack screen, 0.01 slot
10	Wood		Brown	Old sawdust fill	

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LOG OF BOREHOLE

Project: Hardel Mutual Plywood Environmental Cleanup	**Job #:** 0401.3	**Boring #:** MW-14
Location: 1210 West Bay Drive NW, Olympia, WA	**Approximate Elevation:**	
Subcontractor/Equipment: ESN Northwest	**Drilling Method:** Direct Push	
Date: November 15, 2010	**Logged By:** C. Cass	

Depth (ft.)	Soil Description	Lithology	Color	Comments	Well Construction
0	Gravel and Sand (SW)		Grey & Brown		Cement; Bentonite
	Silty Sand (SM)				
5			Grey & Brown	Mixed with wood debris from ~3-to-8.5 feet bgs	1 in. prepack screen, 0.01 slot
10	Wood (F)		Dark Brown	Wood debris (old fill material)	

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Water Resources & Environmental Services

LOG OF BOREHOLE

Project: Hardel Mutual Plywood Environmental Cleanup	**Job #:** 0401.3	**Boring #:** MW-15
Location: 1210 West Bay Drive NW, Olympia, WA	**Approximate Elevation:**	
Subcontractor/Equipment: ESN Northwest	**Drilling Method:** Direct Push	
Date: November 15, 2010	**Logged By:** C. Cass	

Depth (ft.)	Soil Description	Lithology	Color	Comments	Well Construction
0	Concrete		Grey	Crushed concrete surfacing	Cement
	Silty Sand (SM)		Brown		Bentonite
	Sand (SP)		Grey		
5	Wood (F)		Brown		
	Silty Sand (SM)		Grey	with some shell fragments	1 in. prepack screen, 0.01 slot
10	Wood (F)		Dark Brown	with some grey silty sand	

APPENDIX B

(Analytical Report)

ESN NORTHWEST, INC. Environmental Services Network

CHAIN-OF-CUSTODY RECORD

CLIENT: Greylock Consulting LLC

ADDRESS: 720 S. 333rd St, Suite 210, Federal Way, WA 98003

PHONE: 253-661-3520 FAX:

CLIENT PROJECT #: 0401.3 PROJECT MANAGER: Suzanne Dudziak

DATE: 12-1-'10 PAGE 1 OF 1

PROJECT NAME: Hardel Mutual Plywood

LOCATION: 1210 W. Bay Dr. NW, Olympia, WA

COLLECTOR: Chris Cass DATE OF COLLECTION 12-1-2010

Sample Number	Depth	Time	Sample Type	Container Type	TPH-HCID	TPH - DIESEL & OIL	TPH - GASOLINE	BTEX	VOC 8260CL	VOC 8260	SemiVol 8270	PAH's 8270	PCB's 8082	CL Pesticides 8081	RCRA 8 Metals	MTCA 5 Metals	Pb	Asbestos-PLM	GRO Suite	DRO Suite	WO Suite	NOTES	Total Number of Containers	Laboratory Note Number
1. MW-6/12-1-10		10:10	Water	500 ml amber	X						X											1 container HCl preserved	2	
2. MW-10/12-1-10		10:55	"	"	X						X											"	2	
3. MW-11/12-1-10		11:30	"	"	X						X											"	2	
4. MW-12/12-1-10		12:05	"	"	X						X											"	2	
5. MW-13/12-1-10		12:40	"	"	X						X											"	2	
6. MW-14/12-1-10		13:20	"	"	X						X											"	2	
7. MW-15/12-1-10		13:59	"	"	X						X											"	2	
8. MW-2/12-1-10		14:35	"	"	X						X											"	2	
9. MW-3/12-1-10		15:15	"	"	X						X											"	2	
10.																								
11.																								
12.																								
13.																								
14.																								
15.																								
16.																								
17.																								
18.																								

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
Chris Cass	12-1-10 / 15:52	A. Harnden	12-1-10 3:45
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☐ ESN DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	18
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

Turn Around Time: 24 HR 48 HR (5 DAY)

ESN NORTHWEST CHEMISTRY LABORATORY

Greylock Consulting
Hardel Mutual Plywood PROJECT
Client Project #401.3
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	12/3/2010	12/6/2010	73%	nd	nd
MW-6	12/3/2010	12/6/2010	92%	nd	nd
MW-10	12/3/2010	12/6/2010	92%	nd	nd
MW-11	12/3/2010	12/6/2010	83%	nd	nd
MW-12	12/3/2010	12/6/2010	82%	nd	nd
MW-13	12/3/2010	12/6/2010	65%	nd	nd
MW-14	12/3/2010	12/6/2010	93%	nd	nd
MW-15	12/3/2010	12/6/2010	86%	nd	nd
MW-2	12/3/2010	12/6/2010	68%	nd	nd
MW-3	12/3/2010	12/6/2010	75%	nd	nd
Reporting Limits				250	500

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 50% TO 150%

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Analysis of Polynuclear Aromatic Hydrocarbons in Water by Method 8270

Analytical Results

	Reporting	MTH BLK	LCS	MW-6	MW-10	MW-11	MW-12	MW-13
Date extracted	Limits	12/03/10	12/03/10	12/03/10	12/03/10	12/03/10	12/03/10	12/03/10
Date analyzed	(ug/L)	12/06/10	12/06/10	12/06/10	12/06/10	12/06/10	12/06/10	12/06/10
Acenaphthene	0.1	nd	125%	nd	**23**	**5.0**	nd	**2.5**
Acenaphthylene	0.1	nd	121%	nd	nd	nd	nd	nd
Anthracene	0.1	nd	112%	nd	nd	nd	nd	nd
Benzo(a)anthracene*	0.1	nd	93%	nd	nd	nd	nd	nd
Benzo(a)pyrene*	0.1	nd	89%	nd	nd	nd	nd	nd
Benzo(b)fluoranthene*	0.1	nd	113%	nd	nd	nd	nd	nd
Benzo(ghi)perylene	0.1	nd	104%	nd	nd	nd	nd	nd
Benzo(k)fluoranthene*	0.1	nd	105%	nd	nd	nd	nd	nd
Chrysene*	0.1	nd	129%	nd	nd	nd	nd	nd
Dibenzo(a,h)anthracene*	0.1	nd	106%	nd	nd	nd	nd	nd
Fluorene	0.1	nd	134%	nd	**3.1**	nd	nd	nd
Fluoranthene	0.1	nd	119%	nd	nd	nd	nd	nd
Indeno(1,2,3-cd)pyrene*	0.1	nd	98%	nd	nd	nd	nd	nd
Naphthalene	0.1	nd	125%	nd	**8.8**	**58**	nd	**32**
1-Methylnaphthalene	0.1	nd	ns	nd	**7.1**	**2.1**	nd	**1.8**
2-Methylnaphthalene	0.1	nd	ns	nd	nd	**0.8**	nd	**0.70**
Phenanthrene	0.1	nd	119%	nd	nd	nd	nd	nd
Pyrene	0.1	nd	98%	nd	nd	nd	nd	nd
Total Carcinogens				nd	nd	nd	nd	nd
Surrogate recoveries:								
2-Fluorobiphenyl		109%	116%	90%	99%	100%	77%	69%
p-Terphenyl-d14		102%	116%	134%	129%	134%	116%	89%

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%
ns-not in the spiking solution

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Analysis of Polynuclear Aromatic Hydrocarbons in Water by Method 8270

Analytical Results

	Reporting	MW-14	MW-15	MW-2	MW-3
Date extracted	Limits	12/03/10	12/03/10	12/03/10	12/03/10
Date analyzed	(ug/L)	12/06/10	12/06/10	12/06/10	12/06/10
Acenaphthene	0.1	nd	**4.0**	**1.7**	**5.5**
Acenaphthylene	0.1	nd	nd	nd	nd
Anthracene	0.1	nd	**1.1**	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	**2.3**	nd	nd
Indeno(1,2,3-cd)pyrene*	0.1	nd	nd	nd	nd
Naphthalene	0.1	nd	nd	**11**	nd
1-Methylnaphthalene	0.1	nd	nd	nd	nd
2-Methylnaphthalene	0.1	nd	nd	nd	nd
Phenanthrene	0.1	nd	**3.4**	nd	nd
Pyrene	0.1	nd	**8.9**	nd	nd
Total Carcinogens		nd	nd	nd	nd
Surrogate recoveries:					
2-Fluorobiphenyl		93%	88%	74%	93%
p-Terphenyl-d14		131%	115%	97%	109%

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%
ns-not in the spiking solution

APPENDIX C

(Well Monitoring Data Sheets)

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

WELL MONITORING DATA SHEET

Project: Hardel Mutual Plywood Site	Well ID: MW-6
Client: Hardel Mutual Plywood Corp.	Well Diameter: 0.75 inches
Date: 12-1-10	Well Depth: ~8 ft
Sampler: CGC	Tubing Depth: ~7 ft
Flow Rate: ~1.2 Liters/min	Depth to Water: 3.25 ft @ 9:38 am

Time	Temp (C) or F	pH	DO	Turbidity NTUs	Water Removed (gals or mL)	Observations
948	10.6	6.93	63.4	997		Very turbid
9:52	10.89	6.77	76.1	1175		
956	11.07	6.70	94.4	738.6		
10:00	11.12	6.72	90.6	572		
10:04	11.13	6.71	91.9	385		Water clearing

Did well dewater? (Yes) No	Amt. actually evacuated: ~1.5 gallons
Sampling Time: 10:10	Sampling Date: 12-1-10
Sample ID MW-6/12-1-10	Laboratory: ESN
Analyzed For: TPH-Dx & PAHs	

Greylock Consulting LLC
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WELL MONITORING DATA SHEET

Project: Hardel Mutual Plywood	Well ID: MW-10
Client: Hardel Mutual Plywood Corp.	Well Diameter: 1-inch
Date: 12-1-10	Well Depth: 13 - ft
Sampler: CGC	Tubing Depth: 7 - ft
Flow Rate: ~2.4 Liters/min.	Depth to Water: 0.71 ft @ 10:24 AM

Time	Temp (C) or F	pH	DO	Turbidity NTUs	Water Removed (gals or mL)	Observations
10:35	10.56	6.78	9.85	22.2		Mostly clear water
10:39	11.04	6.72	4.00	4.4		
10:43	11.28	6.72	2.72	3.2		
10:47	11.23	6.73	2.88	5.3		

Did well dewater? Yes (No)	Amt. actually evacuated: ~2 gallons
Sampling Time: 10:55	Sampling Date: 12-1-10
Sample ID MW-10 / 12-1-10	Laboratory: ESN
Analyzed For: TPH-Dx & PAHs	

Greylock Consulting LLC
720 S. 333rd St. Ste 210, Federal Way, WA 98003
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WELL MONITORING DATA SHEET

Project: Hardel Mutual Plywood	Well ID: MW-11
Client: Hardel Mutual Plywood Corp.	Well Diameter: 1-inch
Date: 12-1-10	Well Depth: 13 ft
Sampler: CGC	Tubing Depth: ~7 ft
Flow Rate: ~2.4 liters/min	Depth to Water: 0.71 ft @ 10:59 AM

Time	Temp (C) or F	pH	DO	Turbidity NTUs	Water Removed (gals or mL)	Observations
11:12	10.54	6.30	0.66	4.5		Clear purgewater
11:16	10.34	6.40	0.64	2.1		
11:20	10.22	6.45	0.71	1.5		
11:24	10.16	6.47	0.76	1.4		

Did well dewater? Yes (No)	Amt. actually evacuated: ~2 gallons
Sampling Time: 11:30	Sampling Date: 12-1-10
Sample ID MW-11 / 12-1-10	Laboratory: ESN
Analyzed For: TPH-Dx & PAHs	

Greylock Consulting LLC
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WELL MONITORING DATA SHEET

Project: Hardel Mutual Plywood Site	Well ID: MW-12
Client: Hardel Mutual Plywood Corp.	Well Diameter: 1-inch
Date: 12-1-10	Well Depth: 13 ft
Sampler: CGC	Tubing Depth: ~7 ft
Flow Rate: ~2.4 liters/Min.	Depth to Water: 1.16 ft @ 11:36 AM

Time	Temp (C) or F	pH	DO	Turbidity NTUs	Water Removed (gals or mL)	Observations
11:48	10.95	6.96	1.23	21.9		Clear purge water
11:52	10.95	7.02	0.71	31.4		
11:56	10.95	7.03	0.63	30.1		
12:00	10.94	7.01	0.58	50.0		

Did well dewater? Yes (No)	Amt. actually evacuated: ~2 gallons
Sampling Time: 12:05	Sampling Date: 12-1-10
Sample ID MW-12 / 12-1-10	Laboratory: ESN
Analyzed For: TPH-Dx / PAHs	

Greylock Consulting LLC
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WELL MONITORING DATA SHEET

Project: Hardel Mutual Plywood Site	Well ID: MW-13
Client: Hardel Mutual Plywood Corp	Well Diameter: 1-inch
Date: 12-1-10	Well Depth: 13 ft
Sampler: C & C	Tubing Depth: ~7 ft
Flow Rate: ~2.4 liters/min.	Depth to Water: 1.45ft @ 12:14 AM

Time	Temp (C) or F	pH	DO	Turbidity NTUs	Water Removed (gals or mL)	Observations
12:23	10.11	7.17	4.16	15.3		Clear purge water
12:27	10.29	7.02	0.83	5.5		
12:31	10.37	6.98	0.63	2.0		
12:35	10.37	6.97	0.65	1.2		

Did well dewater? Yes (No)	Amt. actually evacuated: ~2 gallons
Sampling Time: 12:40	Sampling Date: 12-1-10
Sample ID MW-13/12-1-10	Laboratory: ESN
Analyzed For: TPH-Dx & PAHs	

Greylock Consulting LLC
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WELL MONITORING DATA SHEET

Project: Hardel Mutual Plywood Site	Well ID: MW-14
Client: Hardel Mutual Plywood Corp.	Well Diameter: 1-inch
Date: 12-1-10	Well Depth: 13 - ft
Sampler: CGC	Tubing Depth: ~ 5.5 ft
Flow Rate: ~ 2.4 liters/m.n.	Depth to Water: 1.54 ft @ 12:47 PM

Time	Temp (C) or F	pH	DO	Turbidity NTUs	Water Removed (gals or mL)	Observations
12:57	11.88	7.05	2.19	17.9		Slight sheen on
13:01	12.84	7.05	6.3	5.2		purge water
13:05	12.90	7.05	0.61	5.2		(breaks up &
13:09	12.95	7.05	0.74	4.1		does not reform
13:14	13.00	7.05	0.73	2.6		⇒ possible organic
						sheen).

Did well dewater? Yes (No)	Amt. actually evacuated: ~2.5 gallons
Sampling Time: 13:20	Sampling Date: 12-1-'10
Sample ID MW-14/12-1-10	Laboratory: ESN
Analyzed For: TPH-Dx & PAHs	

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

WELL MONITORING DATA SHEET

Project: Hardel Mutual Plywood Site	Well ID: MW-15
Client: Hardel Mutual Plywood Corp.	Well Diameter: 1-inch
Date: 12-1-10	Well Depth: 13 ft
Sampler: CGC	Tubing Depth: ~5.5 ft
Flow Rate: ~2.4 liters/min.	Depth to Water: 2.03 ft @ 13:30

Time	Temp C or F	pH	DO	Turbidity NTUs	Water Removed (gals or mL)	Observations
13:39	13.01	6.62	2.19	95		Clear purge water
13:43	13.31	6.67	0.75	4.5		
13:47	13.52	6.69	0.72	2.3		
13:51	13.79	6.71	0.67	2.2		
13:55	13.86	6.71	0.66	1.7		

Did well dewater? Yes (No)	Amt. actually evacuated: ~2.5 gallons
Sampling Time: 13:59	Sampling Date: 12-1-10
Sample ID MW-15/12-1-10	Laboratory: ESN
Analyzed For: TPH-Dx & PAHs	

Greylock Consulting LLC
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WELL MONITORING DATA SHEET

Project: Hardel Mutual Plywood Site	Well ID: MW-2
Client: Hardel Mutual Plywood Corp	Well Diameter: 2-Inches
Date: 12-1-10	Well Depth: ?
Sampler: CGC	Tubing Depth: ~ 6 ft
Flow Rate: ~2.4 liters/min.	Depth to Water: 1.22 ft @ 14:07

Time	Temp C or F	pH	DO	Turbidity NTUs	Water Removed (gals or mL)	Observations
14:13	9.82	7.51	6.01	17.8		Water removed from monument prior to opening well cap. Clear purge water.
14:17	9.79	7.34	1.23	4.9		
14:21	9.82	7.29	0.94	3.0		
14:25	9.93	7.26	0.77	2.6		
14:29	10.07	7.25	0.74	2.3		

Did well dewater? Yes (No)	Amt. actually evacuated: ~2-5 gallons
Sampling Time: 14:35	Sampling Date: 12-1-'10
Sample ID MW-2/12-1-10	Laboratory: ESN
Analyzed For: TPH-Dx & PAHs	

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WELL MONITORING DATA SHEET

Project: Hardel Mutual Plywood Site	Well ID: MW-3
Client: Hardel Mutual Plywood Corp.	Well Diameter: 2-inches
Date: 12-1-10	Well Depth: ?
Sampler: CGC	Tubing Depth: ~6 ft
Flow Rate: ~2.4 liters/min.	Depth to Water: 1.31 ft @ 14:41

Time	Temp (C) or F	pH	DO	Turbidity NTUs	Water Removed (gals or mL)	Observations
14:45	11.46	11.05	9.46	44.1		Initial purge water light brown
14:50	11.58	10.71	5.41	52.6		
14:54	11.93	10.14	3.24	55.7		clearing up
14:58	12.11	9.50	1.67	50.2		while pumping.
15:02	12.06	9.72	1.33	46.7		
15:06	12.13	9.40	0.99	45.1		Loose seal on
15:10	12.19	9.21	17.89	44.4		well cap.

Did well dewater? Yes (No)	Amt. actually evacuated: ~2.5 gallons
Sampling Time: 15:15	Sampling Date: 12-1-10
Sample ID MW-3/12-1-10	Laboratory: ESN
Analyzed For: TPH-Dx & PAHs	