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

Post - Construction Groundwater Monitoring
Summary of Four Quarters

November 28, 2011

Prepared For: Hardel Mutual Plywood Corporation

Prepared By:

GREYLOCK CONSULTING LLC

GC Project No. 0401.4

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1.0 INTRODUCTION

This report summarizes the results of four quarters of compliance monitoring for groundwater at the former Hardel Mutual Plywood site located at 1210 West Bay Drive NW in Olympia, Washington (Figure 1). 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 was to evaluate the long-term effectiveness of the Interim Action cleanup that was completed in October, 2010. Nine wells 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 (IA) cleanup which included the excavation of diesel/heavy oil-impacted soils at the Site, was conducted between June and October of 2010 (Greylock, 2010). The purpose of IA was to remove free product and soil greater than state cleanup levels. 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.

Prior to excavating, concrete building foundations were removed to allow access to the contaminated soil beneath. 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. Soil samples were collected to confirm that all soil above cleanup levels had been removed. Documentation of soil sampling is provided in the Interim Action Closure Report (Greylock, 2010).

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Site storm water was controlled and contained onsite during soil excavation. Treated groundwater and storm 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".

Following removal of contaminated soil and backfilling of clean imported soil, the concrete was crushed onsite and used for surfacing material.

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, Inc. 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 quarterly monitoring was to acquire groundwater samples from 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, Inc.'s analytical 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.

Quarterly groundwater monitoring reports were submitted to Department of Ecology on February 17, March 23, June 3, and September 22, 2011. This report summarizes monitoring from all four quarters.

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2.0 FIELD ACTIVITIES

2.1 Water Levels and Groundwater Flow Direction

Water levels were measured using a well probe at all nine well locations over four quarters. Shallow groundwater at the site was observed at depths ranging from 0.4 to 4.31 ft below the monitoring well's top of casing (TOC). The direction of groundwater flow over four quarters was primarily toward the east. At the northern part of the site, the direction of groundwater flow was toward the east-northeast.

2.1 Groundwater Sampling

Groundwater samples were collected from nine on-site monitoring wells over the last four quarters 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, conductivity, dissolved oxygen and pH 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, Inc. of Olympia, Washington.

3.0 ANALYTICAL LABORATORY RESULTS

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

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

3.1 NWTPH-Dx Results

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

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3.2 PAH Results

The EPA 8270 Method provides analytical results for polyaromatic hydrocarbons (PAHs).

No carcinogenic PAHs by test method 8270 were detected above the laboratory's lower reporting limit of 0.1 ug/L during four quarters of groundwater sampling.

Ground water samples from the wells revealed that the following non-carcinogenic PAHs were detected during four quarters of sampling: Acenapthene, Napthalene, 1-Methylnaphthalene, 2-Methylnaphthalene, Phenanthrene, Pyrene, Fluorene and Flouranthene. Table 1 shows the range in concentration of these chemicals over four quarters. The detected PAH concentrations were below the published WDOE target Method A or Method B (standard formula value) cleanup standards (CLARC, 2011).

4.0 CONCLUSIONS

Based on the results of laboratory testing, groundwater at the nine monitoring well localities sampled during the last four quarters of "compliance monitoring" 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).

The low concentration of non-carcinogenic PAHs detected in groundwater sampled 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

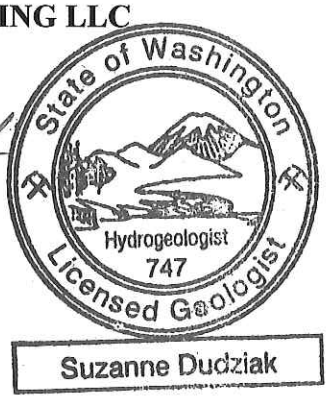
We have prepared this report for the exclusive use of Hardel Mutual Plywood Corp. and their authorized agents and regulatory agencies as part of their evaluation of the environmental conditions of the site. This report is not intended for use by others, and the information contained herein is not applicable 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.

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

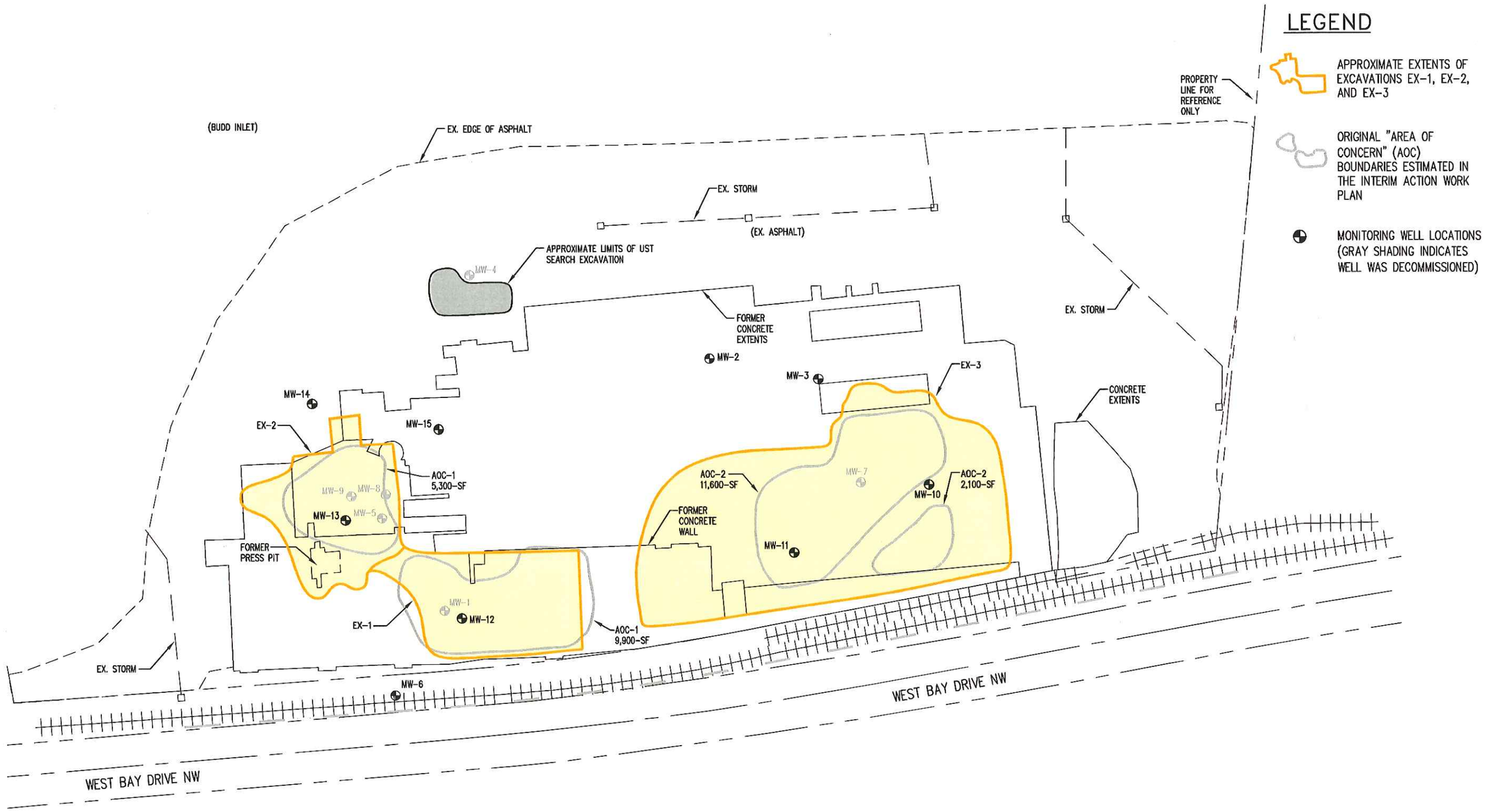
Figure 1. Vicinity Map

1210 West Bay Drive NW
Olympia, WA 98502

MN (0.0 W)

0 1000 2000 ft

Data Zoom 13-1



Modified from KPFF Demolition and Site Plan, March 2010

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0 80 160
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

TABLE

Table 1: Groundwater Sampling Analytical Results

12/1/2010 - 8/25/2011

Former Hardel Mutual Plywood Site, 1210 West Bay Drive NW, Olympia, WA
Test Method: EPA 8270
All results and limits in ug/L

Test Method EPA 8270	MTCA Method A or Method B Criteria[1]	Sample ID:	MW-2	MW-3	MW-6	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15
			12/01/2010 2/22/2011 5/16/11 8/25/2011	12/01/2010 2/22/2011 5/16/11 8/25/2011	12/01/2010 2/23/2011 5/16/2011 8/25/2011	12/01/2010 2/22/2011 5/16/11 8/25/2011	12/01/2010 2/22/2011 5/16/11 8/25/2011	12/01/2010 2/22/2011 5/16/11 8/25/2011	12/01/2010 2/22/2011 5/16/11 8/25/2011	12/01/2010 2/22/2011 5/16/11 8/25/2011	12/01/2010 2/22/2011 5/16/11 8/25/2011
	(ug/L)	Date Sampled:									
Acenapthene	960	Results (ug/L):	< 0.1 - 1.7	< 0.1 - 5.5	< 0.1	<0.1 - 23	< 0.1 - 5	< 0.1	< 0.1 - 2.5	< 0.1	< 0.1 - 4
Fluorene	640	Results (ug/L):	< 0.1 - 0.6	< 0.1 - 0.4	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	640	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1 - 0.4	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1 - 0.2
Napthalene	160	Results (ug/L):	< 0.1 - 21	< 0.1	< 0.1	< 0.1 - 6.1	< 0.1 - 120	< 0.1	< 0.1	< 0.1	< 0.1 - 1.1
1-Methylnaphthalene	1.5	Results (ug/L):	< 0.1 - 0.6	< 0.1 - 0.9	< 0.1	< 0.1 - 1.3	< 0.1 - 0.4	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	32	Results (ug/L):	< 0.1 - 0.2	< 0.1 - 0.7	< 0.1	< 0.1 - 1.4	< 0.1 - 0.3	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	NP	Results (ug/L):	< 0.1 - 0.2	< 0.1	< 0.1	< 0.1 - 5.7	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	480	Results (ug/L):	< 0.1	< 0.1	< 0.1	< 0.1 - 0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1 - 0.1

Notes:

1- Method A groundwater 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.