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REGION 5 RAC2

REMEDIAL ACTION CONTRACT FOR

Remedial, Enforcement Oversight, and
Non-Time Critical Removal Activities at Sites of Release
or Threatened Release of Hazardous Substances in Region 5

2011 ANNUAL REPORT
LONG-TERM RESPONSE ACTION
Penta Wood Products Site
Town of Daniels, Wisconsin

WA No. 132-LRLR-05WE / Contract No. EP-S5-06-01

June 2012

PREPARED FOR

U.S. Environmental Protection Agency

PREPARED BY

CH2M HILL
Ecology and Environment, Inc.
Environmental Design International, Inc.
Teska Associates, Inc.

FOR OFFICIAL USE ONLY

2011 Annual Report

Penta Wood Products Site

WA No. 132-LRLR-05WE/Contract No. EP-S5-06-01

Prepared for

May 2012

CH2MHILL®

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Abbreviations and Acronyms

BTEX	benzene, toluene, ethylbenzene, and xylene
CAMU	Corrective Action Management Unit
ES	Enforcement Standard
EW	extraction well
gpm	gallons per minute
LNAPL	light nonaqueous phase liquid
MG	million gallons
µg/L	micrograms per liter
mg/L	milligrams per liter
MW	monitoring well
NAPL	nonaqueous phase liquid
ORP	oxidation-reduction potential
PCP	pentachlorophenol
RA	remedial action
scfm	standard cubic feet per minute
USEPA	U.S. Environmental Protection Agency
WDNR	Wisconsin Department of Natural Resources
WPDES	Wisconsin Pollutant Discharge Elimination System

SECTION 1

Introduction

The annual report documents the following groundwater monitoring, groundwater treatment system, and bioventing system operation; hazardous waste generation and disposal; site inspections and maintenance; and other remedial activities that occurred at the Penta Wood Products Site, as performed by CH2M HILL for the U.S. Environmental Protection Agency (USEPA) under Work Assignment No. 132-LRLR-05WE.

The groundwater remedial action (RA) includes operation and maintenance and performance monitoring of the groundwater extraction and treatment system, light nonaqueous phase liquid (LNAPL) removal, bioventing system monitoring, and long-term monitored natural attenuation.

The continued operation of the groundwater extraction wells has depressed the water table in the LNAPL zone and promoted LNAPL removal. The continued operation of the groundwater extraction wells also effectively captures groundwater containing 1,000 micrograms per liter (µg/L) or more of pentachlorophenol (PCP). Continuous operation of the LNAPL recovery has reduced the source of PCP to the groundwater. Bioventing has been implemented to promote natural degradation of the residual diesel fuel petroleum hydrocarbons and PCP in unsaturated zones, including the LNAPL smear zone. The most concentrated portions of the PCP groundwater plume are being contained, collected, and treated, and the concentration of PCP in the groundwater is being reduced to a level that allows natural attenuation to achieve the *Wisconsin Administration Code* NR 140 standards. Groundwater is discharged in accordance the Wisconsin Pollutant Discharge Elimination System (WPDES) permit.

Effects of the continued operation of the groundwater extraction wells, LNAPL recovery, and bioventing system on the extent of contamination are monitored through semiannual groundwater sampling. Soil gas parameters are measured to monitor oxygen uptakes.

In 2010, an evaluation was performed to identify options that would either accelerate the site cleanup activities and/or reduce the long-term operation and maintenance costs associated with continued operation. It was determined that with the installation of three additional extraction wells, the amount of PCP removal from the subsurface could be accelerated and potentially be closer to achieving cleanup objectives by the time the site operations are transferred to the State of Wisconsin in August 2014. Three additional extraction wells were installed in the 2010/2011 winter, and operation began in April 2011.

SECTION 2

Groundwater Monitoring

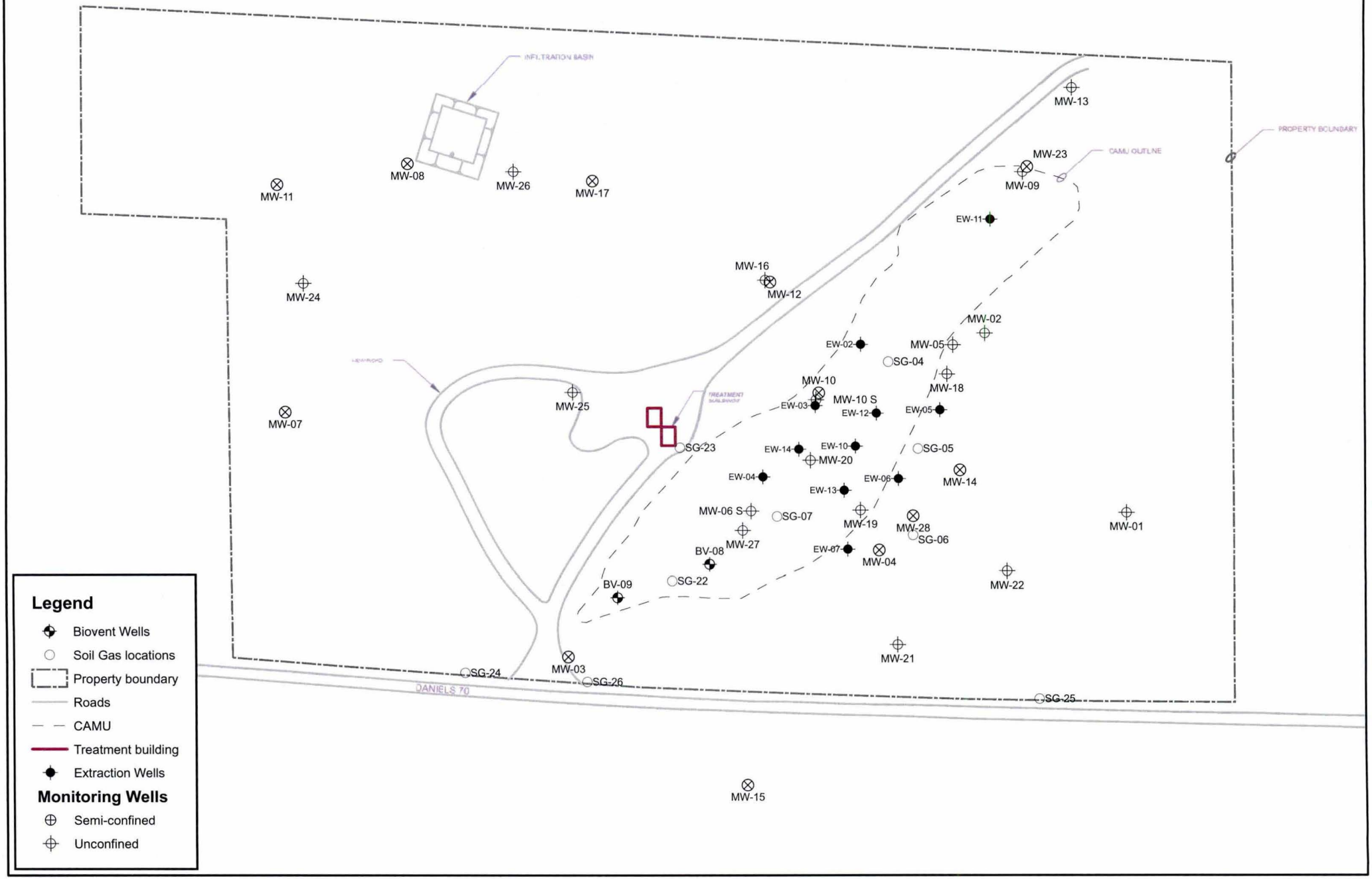
The 10th year of post-RA groundwater monitoring at the Penta Wood Products Site included two groundwater sampling events. The semiannual groundwater sampling event was conducted in June 2011 and consisted of sampling five monitoring wells, five residential wells, and one onsite potable well, along with static water level measurements collected at all monitoring wells, and measurement of product thickness in monitoring wells where LNAPL was present. The annual groundwater sampling event was conducted in October 2011 and consisted of sampling 16 monitoring wells (Figure 1), 5 residential wells (Figure 2), and 1 onsite potable well; measuring static water levels in all monitoring wells; and measuring product thickness in monitoring wells where LNAPL was present historically. This report presents the results of the two groundwater sampling events. It is an update of the previous year's report, and retains and updates evaluations based on the new data.

The treatment system operated for approximately 1 year prior to September 2001, when it was shut down to allow for pilot testing and plant modifications intended to help achieve effluent criteria. Since the restart on February 27, 2004, the treatment system has been running continuously with the exception of occasional downtime for routine maintenance and repairs. The October 2011 monitoring well results reflect approximately 7.5 years of system operation since the groundwater treatment system was restarted. The groundwater results also reflect approximately 4 years of bioventing system operations.

During the groundwater sampling events, samples were collected to monitor groundwater contaminant levels. Parameters that were analyzed include PCP; naphthalene; benzene, toluene, ethylbenzene, and xylene (BTEX); dissolved metals; and natural attenuation parameters. A summary of the analytical results for the June and October sampling events is provided in Appendix A, and the natural attenuation parameters that were sampled for in June and October are provided in Appendix B.

Water level and LNAPL measurements are made to determine the remaining LNAPL thickness and the groundwater flow direction(s) in the unconfined and semiconfined aquifers as described in the following subsections. Groundwater elevations, oil/water interface measurement data, historical LNAPL thickness data, and other observations are included in Appendix C.

Trends in the distribution and concentrations of PCP and other parameters are used with water level measurements to evaluate the effectiveness of the treatment system in capturing the affected groundwater, also known as capture zone analysis, as described in the following subsections. The capture zone analysis and parameters help to assess the effectiveness of the groundwater and LNAPL extraction, treatment, and natural attenuation.



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0 80 160 320 480 640 Feet

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Figure 1
Well Location Map
2011 Annual Report
Pentawood Products Superfund Site
Siren, Wisconsin

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0 ft 1,500 ft

Figure 2
Residential Sampling Map
Pentawood Products Superfund Site
Siren WI

2.1 Water Levels and LNAPL Measurements

Water levels in monitoring wells were measured in June and October 2011. A water level indicator was used to measure the distance from the top of the inner well casing to the water surface. In wells where LNAPL has been previously detected, the depth to the product surface (if present) and water surface were measured from the top of the inner well casing using an oil/water interface probe.

Groundwater elevations, oil/water interface measurement data, historical LNAPL thickness data, and other observations are included in Appendix C.

The following subsection discusses LNAPL thickness and distribution, and the effects the groundwater extraction well network has had on the unconfined and semiconfined aquifers.

2.1.1 LNAPL Thickness

LNAPL was observed in two monitoring wells during the annual and semiannual sampling events. The observed LNAPL thicknesses are summarized in Table 1. MW-10S and MW-20 have historically seen measurable amounts of LNAPL, so they are included in Table 1 for completeness.

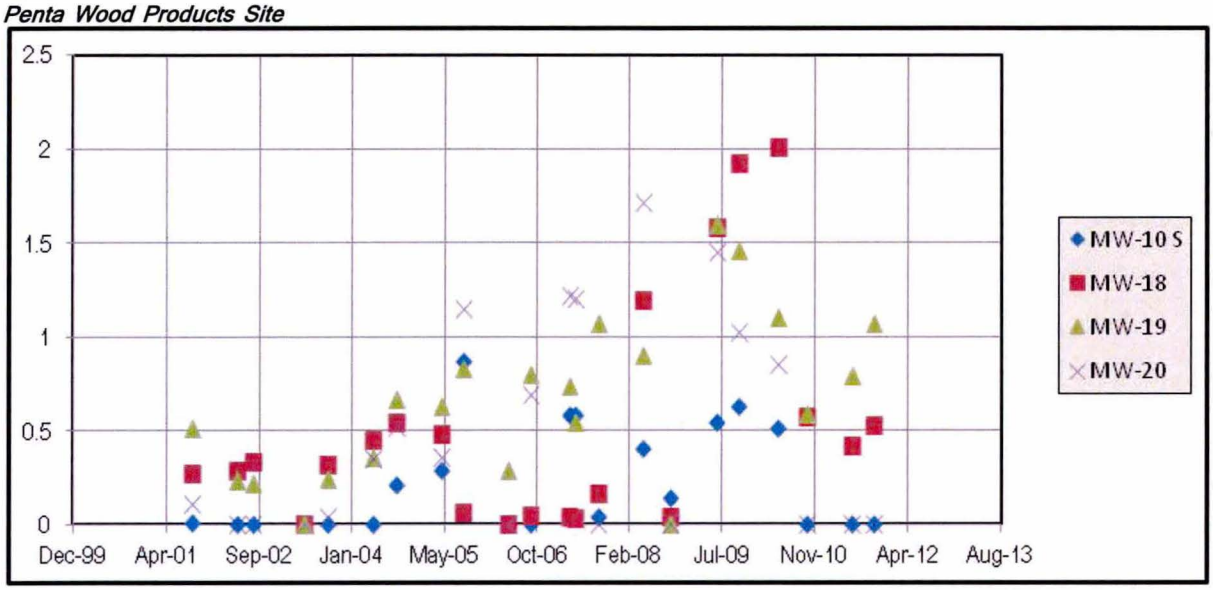
TABLE 1
2011 Monitoring Well LNAPL Measurement
Penta Wood Products Site

	LNAPL Measurement (feet)	
Monitoring Well	Semiannual Event June 2011	Annual Event October 2011
MW-10S	0.0	0.0
MW-18	0.42	0.53
MW-19	0.79	1.07
MW-20	0.0	0.0

In June and October 2011, the LNAPL thickness measured in monitoring wells MW-10S, MW-18, MW-19, and MW-20 was considerably lower than in 2010. In MW-10S and MW-20, a measurable amount of LNAPL was not detected. The decrease in LNAPL thickness is likely the result of successful LNAPL removal and bioventing, which results in the volatilization of the residual diesel fuel petroleum hydrocarbons and PCP in the LNAPL smear zone. The decrease in LNAPL thickness could also be affected by the steadily increasing groundwater elevation at the site since 2009. As water levels rise, LNAPL becomes retained in the formation, leaving behind a residual LNAPL trapped below the water table.

LNAPL-absorbent socks used to remove additional LNAPL from monitoring wells were not installed in 2011, so accurate thickness measurements could be collected. It also should be noted that since removal of the LNAPL socks in 2010, there has been no measurable amount of LNAPL in wells MW-18 and MW-20.

FIGURE 3
Historical LNAPL Thickness
Penta Wood Products Site



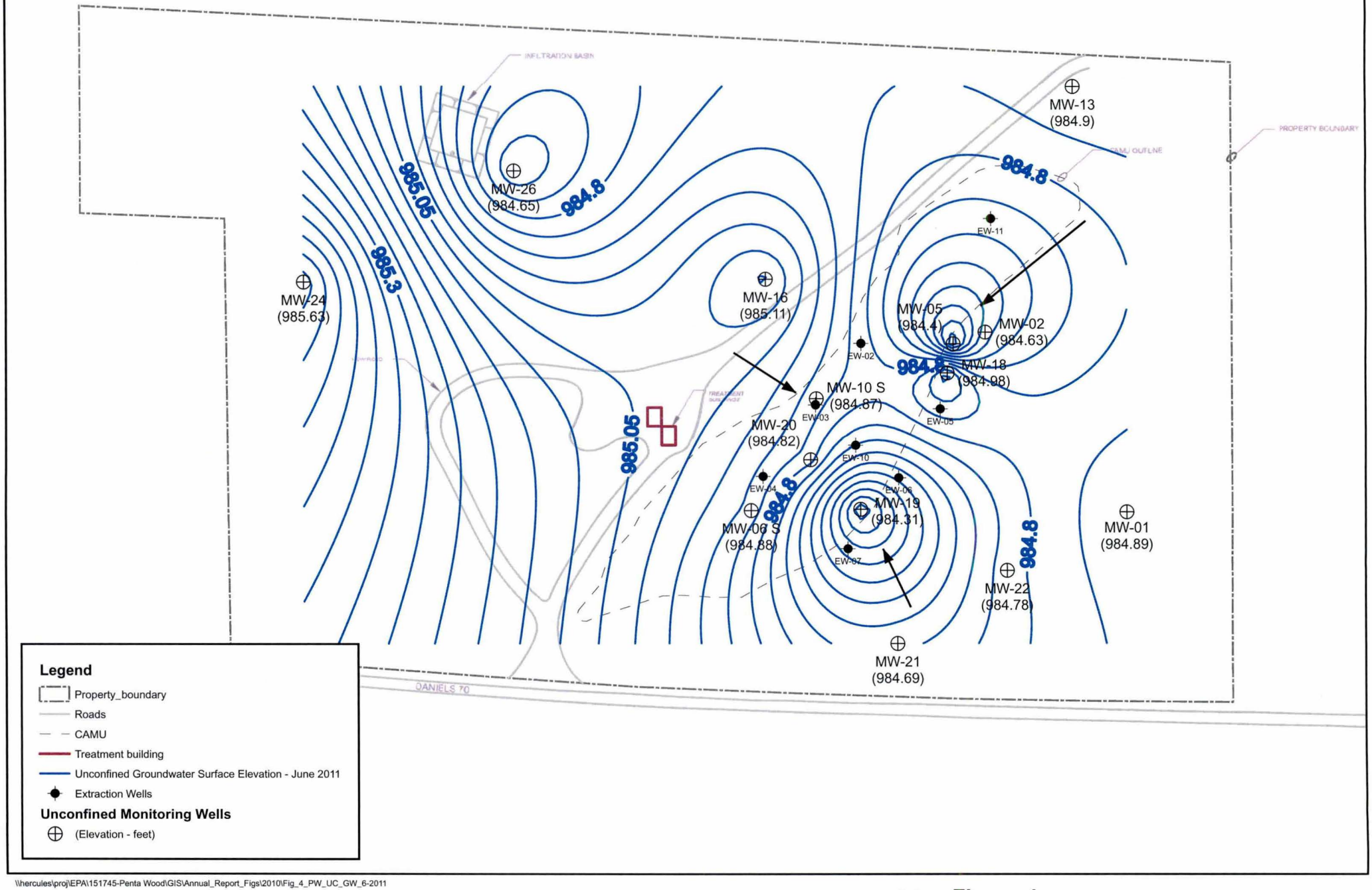
2.1.2 Capture Zone Analysis

The groundwater extraction system at the site was designed to create a depression in the water table promoting migration of contamination toward the extraction wells and to enhance the LNAPL recovery at the site. The capture effectiveness was primarily evaluated based on site-specific field data, including potentiometric surface maps and the calculated horizontal gradients as described in the following subsections.

2.1.2.1 Unconfined Aquifer

Potentiometric Surface. The water level elevations recorded in June 2011 and October 2011 continued to show a consistent capture zone in the unconfined aquifer resulting from the operation of the groundwater collection system. The June 2011 (Figure 4) and October 2011 (Figure 5) groundwater elevation contours indicate a groundwater divide existing beneath the site, running from the southwest to the northeast. The capture zone is bounded by MW-13 on the north, MW-16 on the west, and MW-22 on the east, as indicated by the lower water level elevations observed in the monitoring wells located within or adjacent to the Corrective Action Management Unit (CAMU).

The discharge of treated groundwater into the infiltration basin has continued to show minimal to no response on the unconfined aquifer. In the unconfined aquifer, some variability in the groundwater elevation was observed from 2010 to 2011, although the capture zone appeared to be largely intact. The variability of the water table surface is likely a function of both the influence of the treatment system's pumping wells and varying surface infiltration rates across the site.



Legend

- Property_boundary
- Roads
- CAMU
- Treatment building
- Unconfined Groundwater Surface Elevation - June 2011
- Extraction Wells

Unconfined Monitoring Wells

- (Elevation - feet)

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0 80 160 320 480 640 Feet

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Figure 4

Unconfined Groundwater Elevation - June 2011
2011 Annual Report
Pentawood Pruducts Superfund Site
Siren, Wisconsin

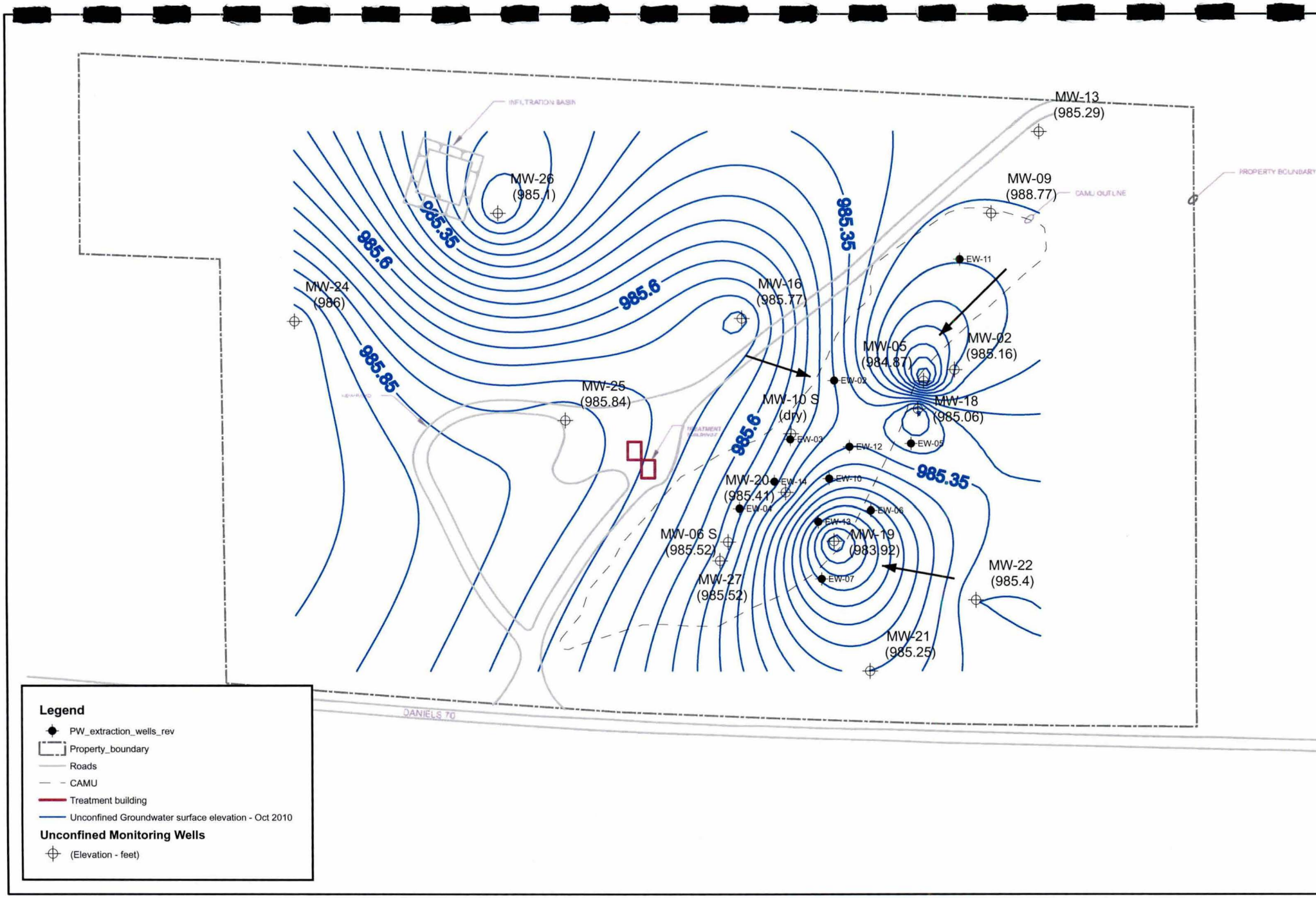

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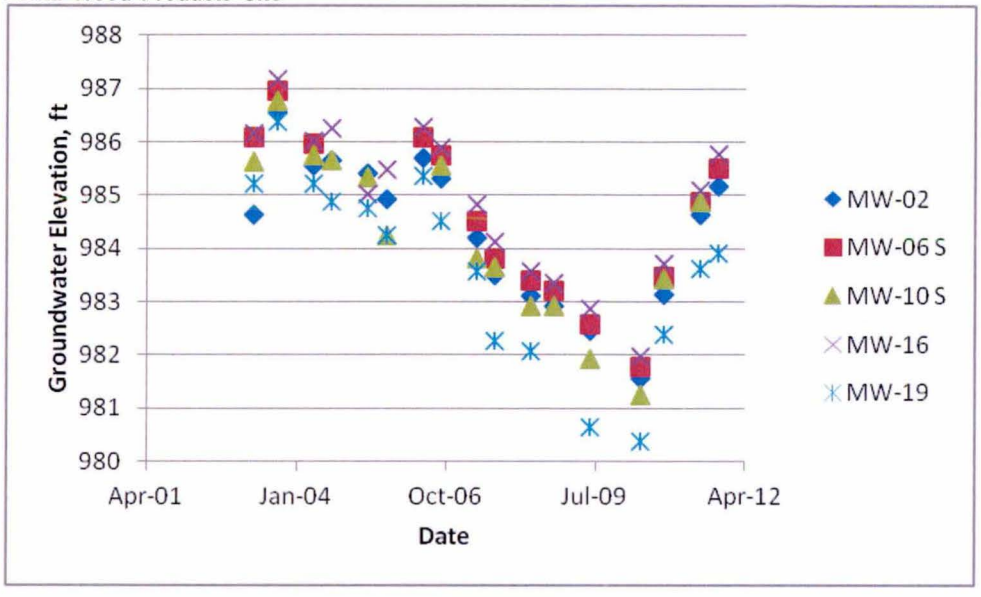
Figure 5
Unconfined Groundwater Elevation - October 2011
2011 Annual Report
Pentawood Pruducts Superfund Site
Siren, Wisconsin

Water levels in the unconfined aquifer were steadily declining from 2003 through 2009 largely due to reduced precipitation in the region, but in the past 2 years, rainfall totals have increased, and water table elevations have rebounded. During the summer and fall of 2011, increased rainfall raised the water table at the site approximately 2 to 3 feet. Figure 6 shows the trends in depth to groundwater in unconfined monitoring wells since 2002.

FIGURE 6
Amount of Water in Unconfined Wells
Penta Wood Products Site



Hydraulic Gradients. Horizontal hydraulic gradients were calculated using monitoring wells screened in the unconfined aquifer located inside and outside the capture zone created by the extraction wells. The gradients calculated for 2004 (which represents the treatment system operation shortly after startup), 2009, 2010, and 2011 are summarized in Table 2.

TABLE 2
Horizontal Hydraulic Gradients in the Unconfined Aquifer
Penta Wood Products Site

		Gradients							
Monitoring Well Outside Capture Zone	**Monitoring Well Inside Capture Zone**	**May 2004**	**June 2009**	**May 2010**	**June 2011**	**September 2004**	**October 2009**	**October 2010**	**October 2011**
MW-13	MW-05	0.0004 (outward)	0.00078	0.00048	0.0008	0.0011	0.00004	0.00059	0.0009
MW-6S	MW-19	0.0019	0.0024	0.0019	0.0056	--	0.0024 (outward)	0.0024	0.0072
MW-16	MW-10S	0.0009	0.0017	0.0010	0.00096	0.0015	0.0017	0.0011	--
MW-22	MW-19	0.0012	0.0021	0.0017	0.0036	0.0013	0.0020	0.0013	0.0046

The horizontal gradients indicate that hydraulic capture was maintained at similar levels in 2011 to historical levels. In general, the horizontal gradients were slightly greater than in previous years. MW-10S was dry and subsequently not measured. An increase in the inward gradient is expected due to the increased pumping of groundwater from the CAMU area as a result of the newly installed extraction wells. The calculated hydraulic gradients support the definition of the capture zone created by the extraction wells.

2.1.2.2 Semiconfined Aquifer

Potentiometric Surface. Groundwater in the semiconfined aquifer exhibited similar flow patterns between June 2011 (Figure 7) and October 2011 (Figure 8) with a groundwater divide that ran north-south beneath the site.

West of this divide, groundwater flow direction was to the west and northwest. Water levels recorded near the extraction wells in June and October 2011 indicate a localized groundwater depression on the eastern half of the divide that resulted from extraction well pumping. The continued treatment system optimization led to an increased localized depression in the area of the CAMU. Continued pumping is expected to maintain and enlarge the containment.

Hydraulic Gradients. Horizontal hydraulic gradients were calculated using monitoring wells screened in the semiconfined aquifer located inside and outside the capture zone created by the extraction wells. The gradients were calculated for 2004, 2009, 2010, and 2011. The calculated gradients are summarized in Table 3.

Operation of the extraction wells and continued treatment system optimization has resulted in an increased capture zone around the extraction wells in 2011 over previous years. MW-14 and MW-10 along with MW-23 and MW-10 showed slightly decreasing gradients in June and increased in October of 2011. In comparison, MW-12 and MW-10 had in increasing gradient in June and October of 2011. Overall all gradients showed an inward flow toward the plume.

TABLE 3
Horizontal Hydraulic Gradients in the Semiconfined Aquifer
Penta Wood Products Site

		Gradients							
Monitoring Well Outside Capture Zone	Monitoring Well Inside Capture Zone	May 2004	June 2009	May 2010	June 2011	September 2004	October 2009	October 2010	October 2011
MW-12	MW-10	-0.0005	0.0008	0.0010	0.0052	-0.0034	-0.0034	0.0009	0.0013
MW-14	MW-10	-0.0013	0.0008	0.0014	0.0009	0.0008	0.0006	0.0003	0.00088
MW-23	MW-10	-0.0005	0.0006	0.0009	0.00088	0.0007	0.0005	0.0005	0.00067

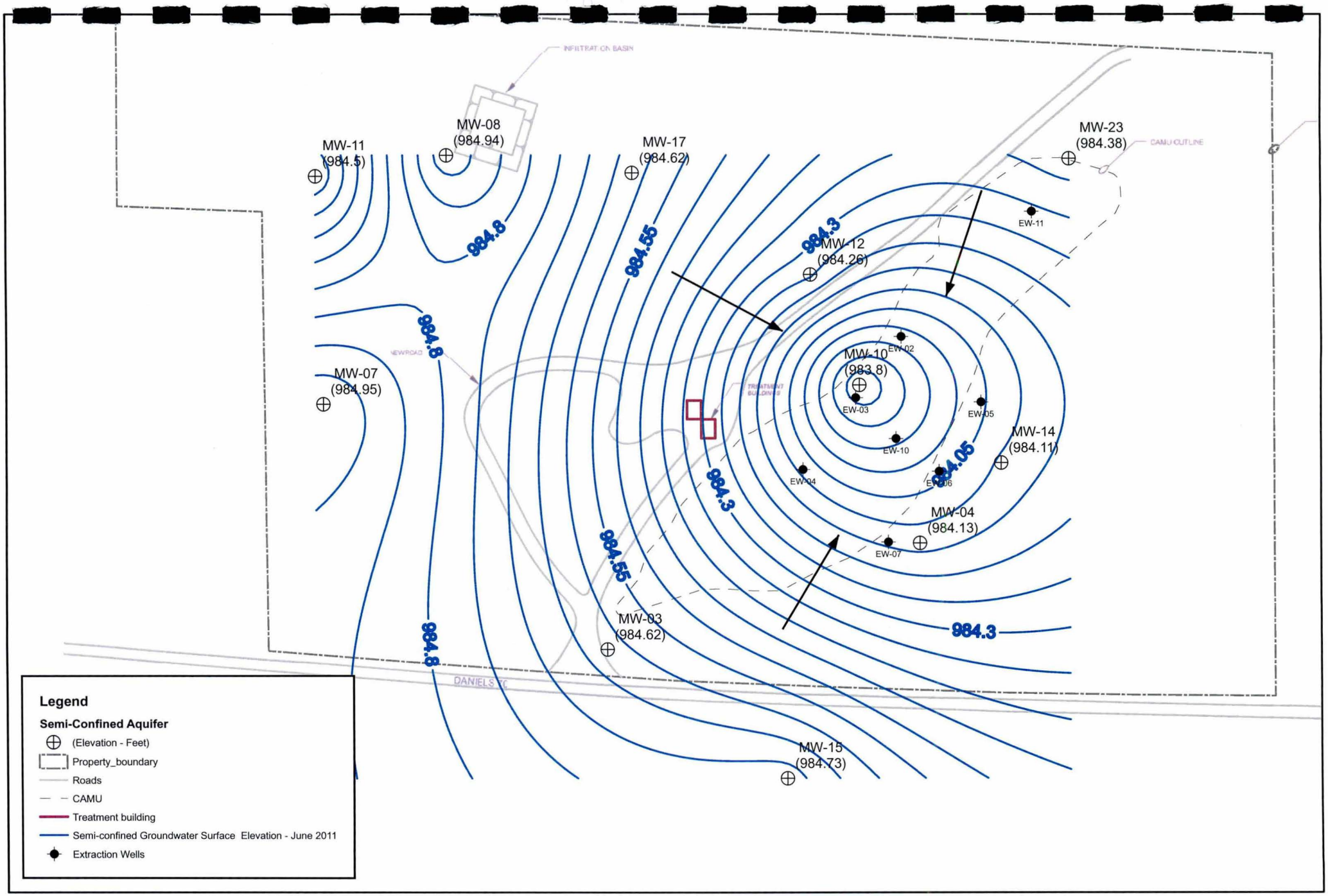


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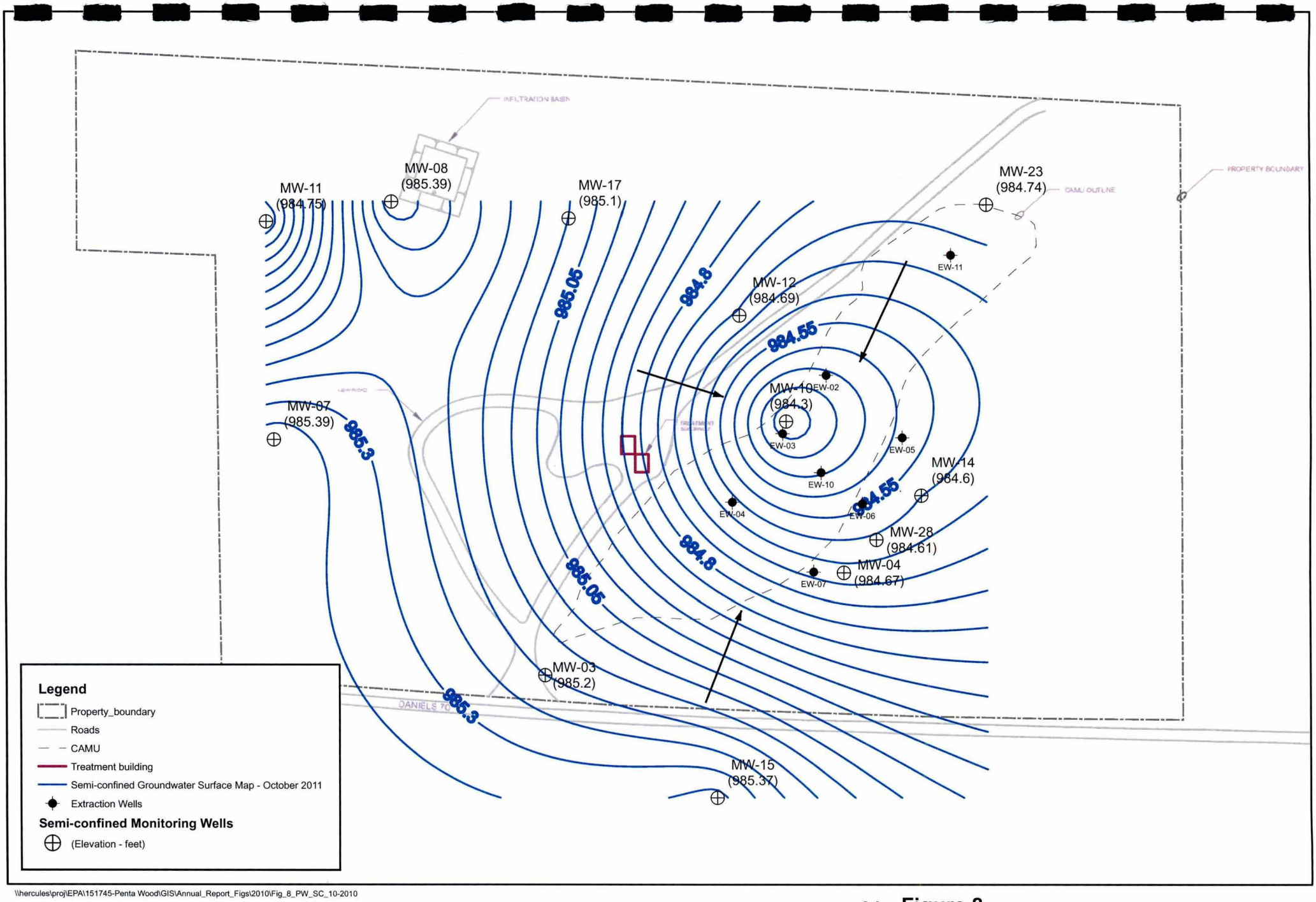
Figure 7

Semi-confined Groundwater Elevation - June 2011
2011 Annual Report
Pentawood Pruducts Superfund Site
Siren, Wisconsin



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0 80 160 320 480 640 Feet

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Figure 8

Semi-confined Groundwater Elevation - October 2011
2011 Annual Report
Pentawood Pruducts Superfund Site
Siren, Wisconsin

2.2 Groundwater Sampling and Analysis

Groundwater analytical data is collected to evaluate the performance of the RA at the site. The data is analyzed in accordance with the following objectives:

- Confirm that contaminants do not extend to residential drinking water wells.
- Evaluate the current monitoring data to determine whether the plume is declining in size since the February 2004 restart of the treatment system.
- Evaluate the infiltration basin area to determine the effect of re-infiltration on groundwater quality.
- Evaluate the influent data from the groundwater extraction system to determine the amount of PCP removed to date.
- Identify changes needed to groundwater monitoring strategy.

Environmental Monitoring Technologies of Morton Grove, Illinois, analyzed the semiannual samples (June 2011) and TestAmerica, Inc., of North Canton, Ohio analyzed the annual samples (October 2011). Quality control samples consisting of field blanks, duplicate samples, and matrix spike/matrix spike duplicate samples were collected at the frequency specified in the *Sampling and Analysis Plan* (CH2M HILL 2000; revised February 2005). All monitoring well and residential well sample result packages were submitted to the USEPA Environmental Services Assistance Team contractor for data validation. The data quality memorandums for the sampling events can be found in Appendix E.

2.2.1 Residential Well Sampling Procedures

Five residential wells and one onsite potable well were sampled during the semiannual sampling (June 2011) and annual sampling (October 2011).

Semiannual sampling (June 2011) results received from Environmental Monitoring Technologies showed that PCP, BTEX, and naphthalene were not detected in the onsite potable well or residential wells.

Annual sampling (October 2011) results from TestAmerica, Inc., showed that PCP, BTEX, and naphthalene were not detected in the onsite potable well or residential wells, except for RW01 had an estimated detection (below the project action limit of 0.1 micrograms per liter). Since the presence of PCP in the residential wells is unlikely and historical results have not shown confirmed PCP detections at the residential wells, RW01 was resampled on December 16, 2011. PCP was not detected in the reanalysis, and therefore, the initial result was rejected. The residential well sample information (names, addresses, and telephone numbers) and the analytical results were submitted under separate cover to Denise Boone, USEPA Work Assignment Manager, on August 8, 2011, and to Linda Martin, USEPA Work Assignment Manager, on January 10, 2012 (Appendix D).

2.2.2 Monitoring Well Sampling Procedures

For the semiannual sampling event conducted in June 2011, the following five monitoring wells were sampled:

- MW-12
- MW-15
- MW-19
- MW-22
- MW-26

MW-19 represents the unconfined groundwater in the LNAPL area; MW-15 is used to assess southern, off property contamination; MW-12 and MW-22 are used to assess the impacts of plant operation to the perimeter of the plume, particularly in the direction of residential wells; and MW-26 is used to monitor groundwater quality near the treated water infiltration basin. Sampling of the wells was started on June 28, 2011, and completed on June 30, 2011. All monitoring wells were purged of at least three well volumes before sampling. MW-22 was purged and sampled using disposable polyvinyl chloride bailers. The remaining monitoring wells were purged and

sampled with dedicated Grundfos pumps installed in 2005, except for MW-15, which had a new pump installed in June 2011.

For the annual sampling event conducted during October 2011, 16 monitoring wells were sampled. Two new monitoring wells (MW-27 and MW-28) were installed in early 2011 to replace the two monitoring wells in areas on the south side of the site (MW-06S, MW-4, and MW-14). MW-06S has frequently had low water levels, while MW-4 and MW-14 were installed deep in aquifer and will not intercept any contamination. The following monitoring wells were sampled for this event:

- MW-02
- MW-03
- MW-05
- MW-06S
- MW-07
- MW-09
- MW-10
- MW-12
- MW-15
- MW-16
- MW-17
- MW-19
- MW-22
- MW-26
- MW-27
- MW-28

Sampling of the wells was completed between October 18 and 20, 2011. Monitoring wells MW-03, MW-05, MW-07, MW-10, MW-12, MW-15, MW-17, MW-19, MW-26, MW-27, and MW-28, were purged and sampled with dedicated Grundfos© Redi-Flo 2 pumps, which were installed in 2005, except for MW-15, MW-27, and MW-28, which had new pumps installed in 2011.Wells MW-02, MW-06S, MW-09, MW-16, and MW-22 were purged and sampled using disposable polyvinyl chloride bailers.

Results of the semiannual and annual sampling events are discussed in the following subsections.

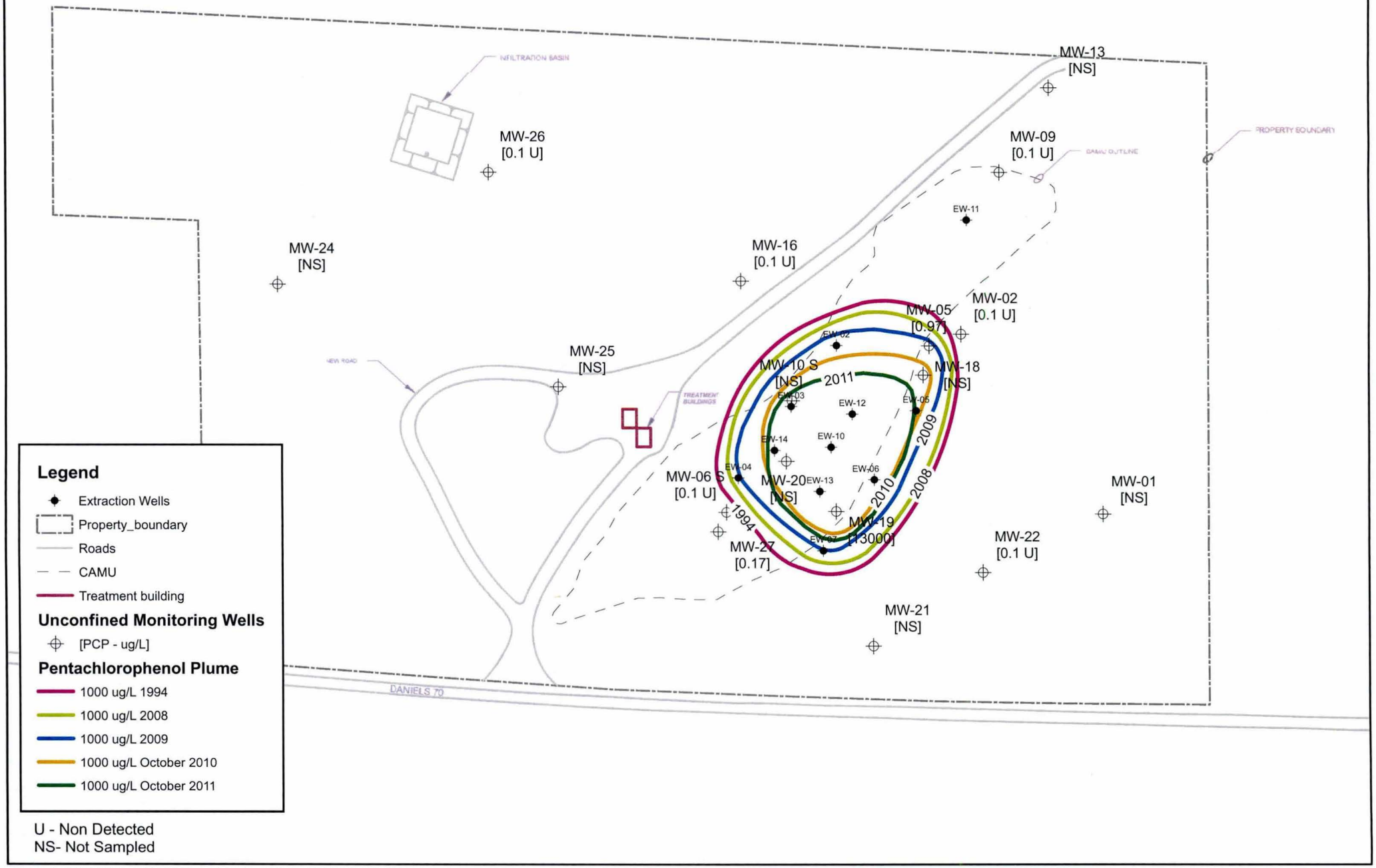
2.2.3 PCP Plume

The monitoring well analytical results tables presented in Appendix A are formatted into two unique tables: June 2011 semiannual sampling results and the October 2011 annual sampling results.

To observe PCP trends over time, the PCP concentration were contoured for the semiconfined and the unconfined aquifers. PCP concentration contours for the unconfined aquifer are presented in Figures 9 (1,000 µg/L) and 10 (1 µg/L). PCP concentration contours for the semiconfined aquifer are presented in Figures 11 (1,000 µg/L) and 12 (1 µg/L). Historical contours are presented to establish a baseline condition before the operation of the groundwater extraction and treatment system. Several previous contours are also presented to show changes in the contours over the last few years.

A comparison of the unconfined 1,000-µg/L PCP contour lines in Figure 9 for 2009, 2010, and 2011 shows that the high concentration plume has steadily shrunk from the 1994 baseline. In 2010, the levels of PCP in the most contaminated well in the sampling program dropped significantly—in MW-19, the level of PCP dropped from 31,800 µg/L to 4,470 µg/L—a drop of more than 85 percent.

The plume for the unconfined aquifer is showing steady decrease in aerial extent, likely due to a combination of the groundwater collection system drawing water towards the approximate center of the plume and biodegradation resulting from the availability of oxygen in groundwater around the plume perimeter. The large reductions in the unconfined plume size are evidence that the PCP LNAPL source is not continuing to contribute to the groundwater contamination outside the immediate LNAPL area.



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0 80 160 320 480 640 Feet

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Figure 9
Unconfined PCP Plume - 1000 ug/L
2011 Annual Report
Pentawood Products Superfund Site
Siren, Wisconsin

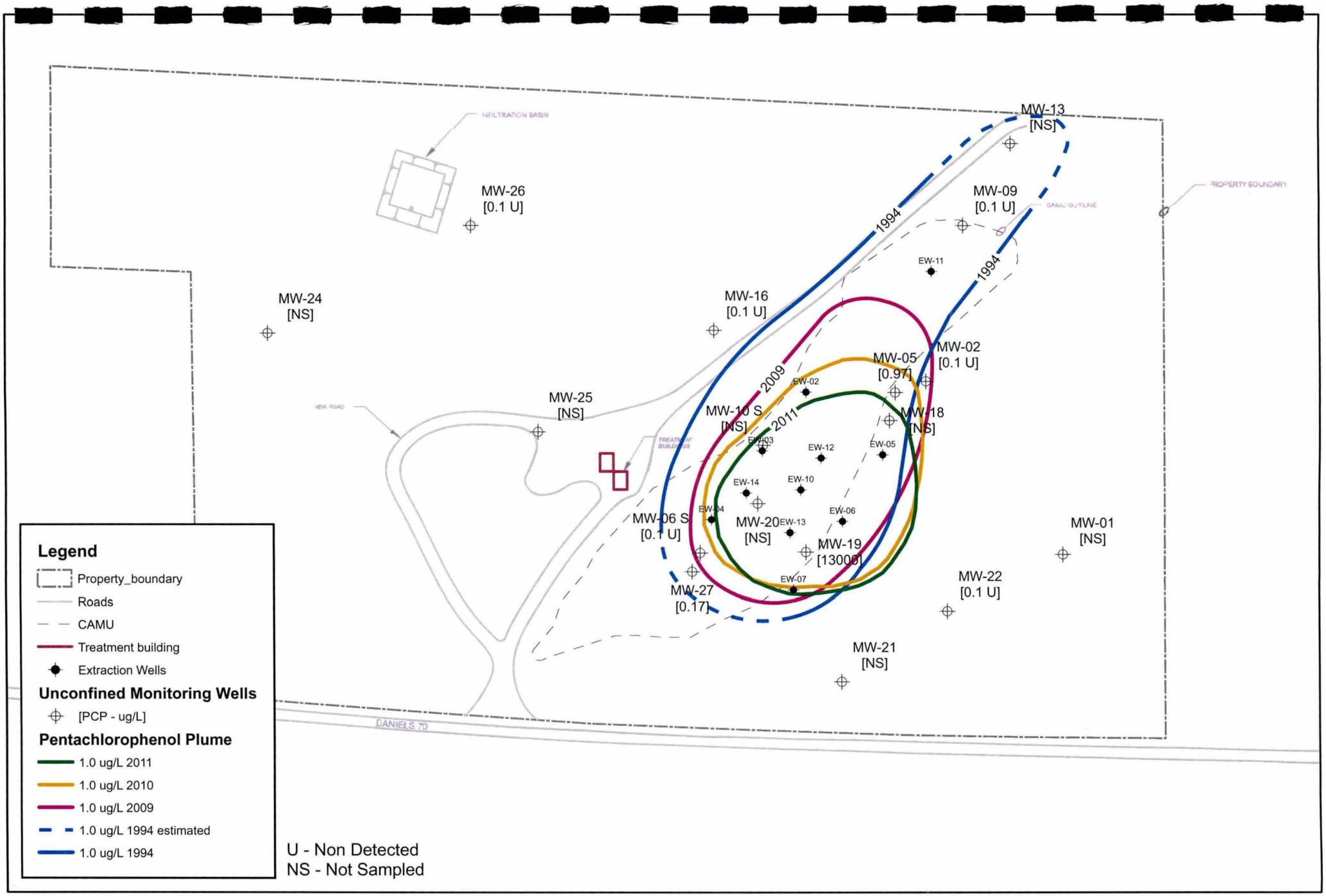

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Figure 10
Unconfined PCP Plume - 1.0 ug/L
2011 Annual Report
Pentawood Products Superfund Site
Siren, Wisconsin

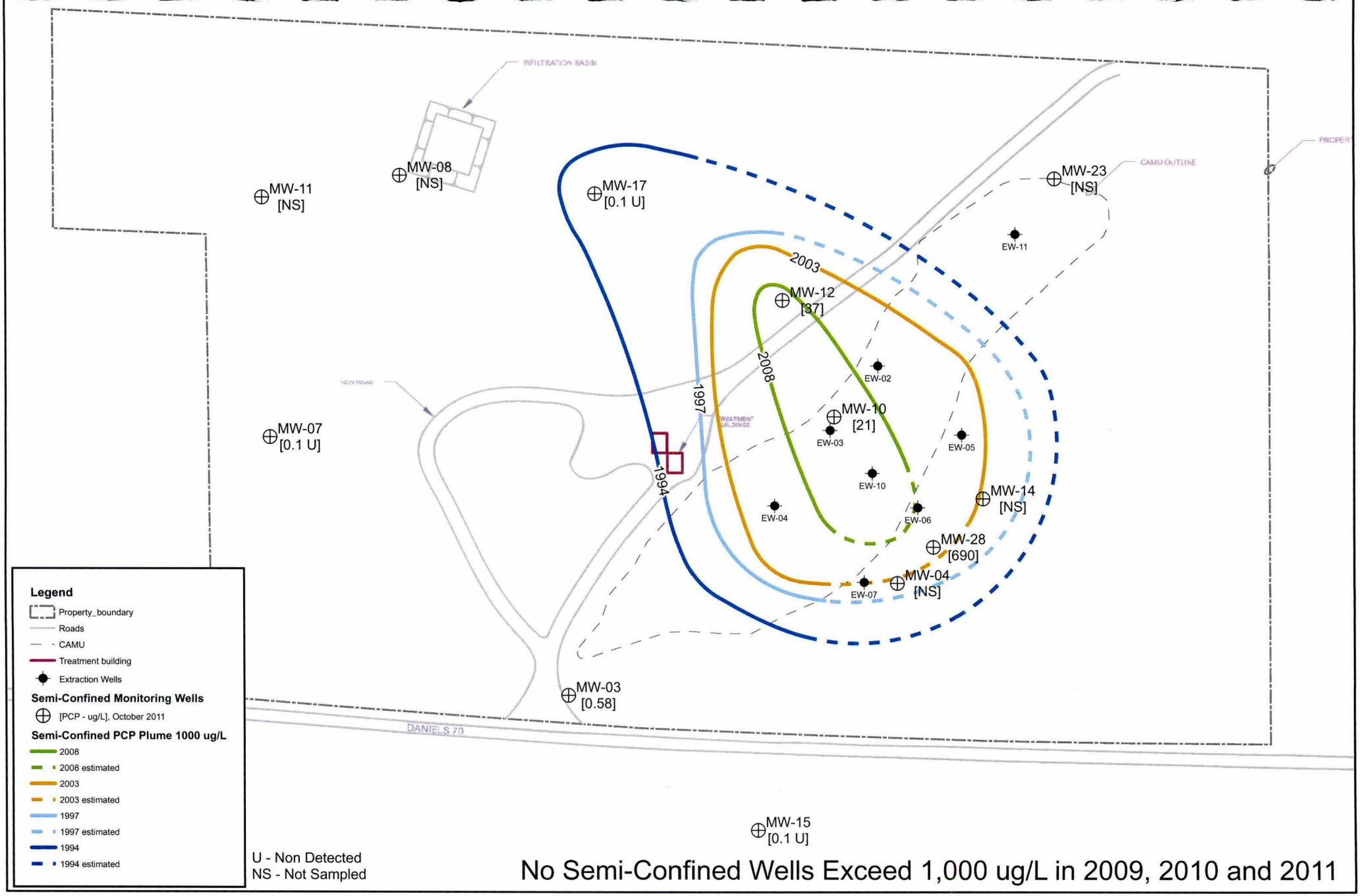

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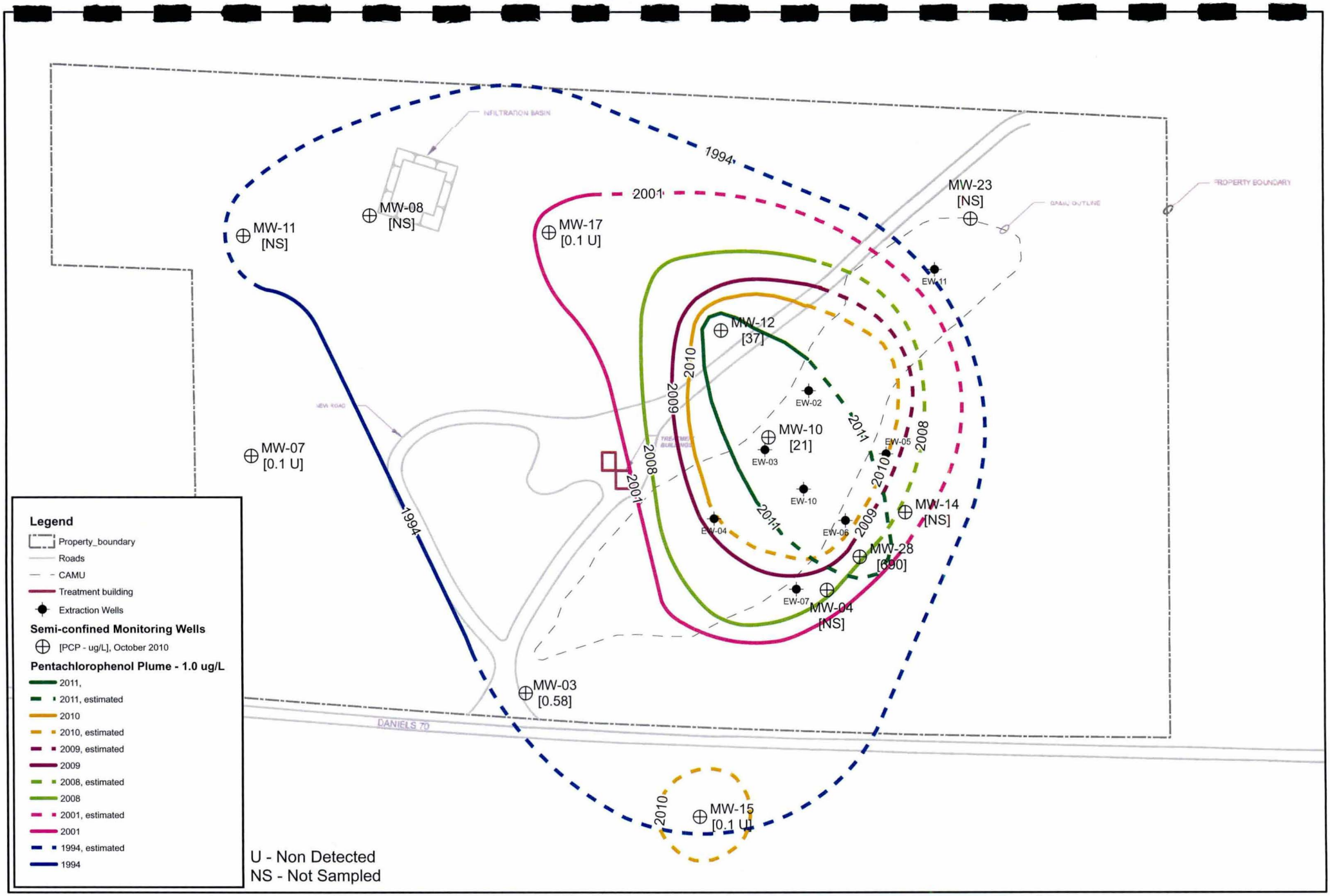
Figure 11
Semi-Confined PCP Plume - 1000 ug/L
2011 Annual Report
Pentawood Products Superfund Site
Siren, Wisconsin



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0 80 160 320 480 640 Feet

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Figure 12
Semi-Confined PCP Plume - 1.0 ug/L
2011 Annual Report
Pentawood Products Superfund Site
Siren, Wisconsin

A comparison of the semiconfined 1,000-µg/L PCP contour lines in Figure 11 shows that the high concentration plume in the semiconfined aquifer has shrunk significantly from the 1994 baseline. In October 2009, 2010, and 2011, all semiconfined wells at the site were reduced in concentration to below the 1,000 µg/L level.

The 1-µg/L plume in the semiconfined aquifer, as shown in Figure 12, shrunk in magnitude similar to the 1,000 µg/L, and is anticipated to continue to shrink. The newly installed monitoring well MW-28, had a PCP concentration of 690 µg/L in October 2011, which drew the contour line out slightly to the southeast. PCP trends are discussed below for individual monitoring wells within the PCP plume.

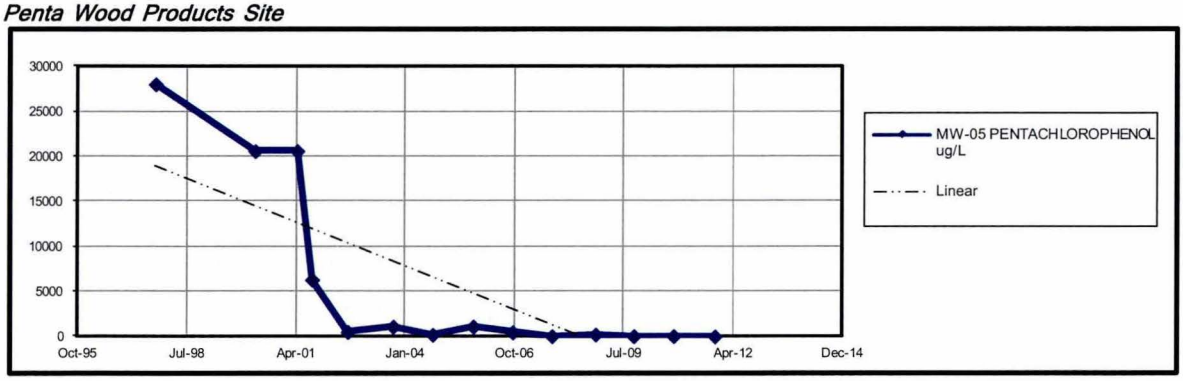
2.2.3.1 MW-15

MW-15 is a semiconfined well and is the southernmost well at the site. It is the last well between the site and adjacent residences. PCP was not detected in the well in both June and October 2011, which is consistent with historical results.

2.2.3.2 MW-05

PCP concentration in monitoring well MW-05 dropped sharply from 20,600 µg/L, before groundwater treatment system operation, to 0.97 µg/L in the most recent sample in October 2011 (Figure 13). PCP concentrations remain low in this area because nearby uncontaminated groundwater is being drawn radially toward extraction well EW-02 and EW-05 since their activation in February 2004, thereby purging the aquifer of PCP. Free product has never been observed in this well. MW-5 is considered an unconfined aquifer well and like similar wells has shown a significant decrease in PCP concentration.

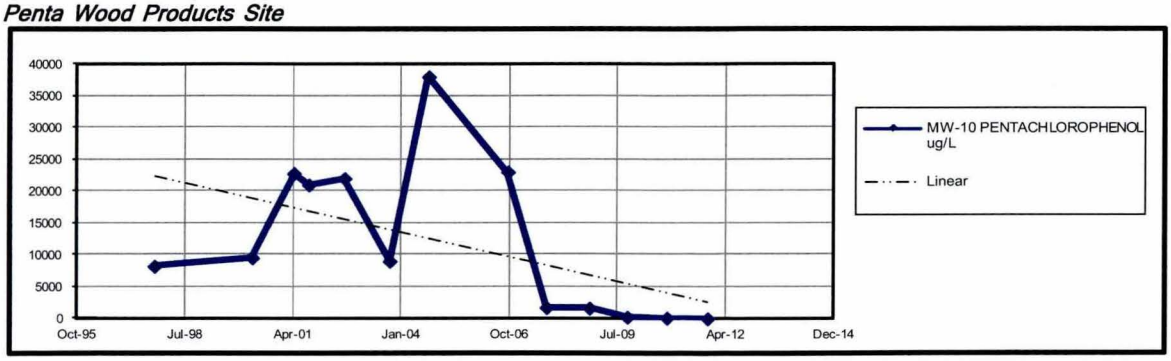
FIGURE 13
MW-05 PCP Concentration
Penta Wood Products Site



2.2.3.3 MW-10

PCP concentrations in MW-10 have declined dramatically from a high of 38,000 µg/L in February 2004 to a concentration of 21 µg/L in October 2011.

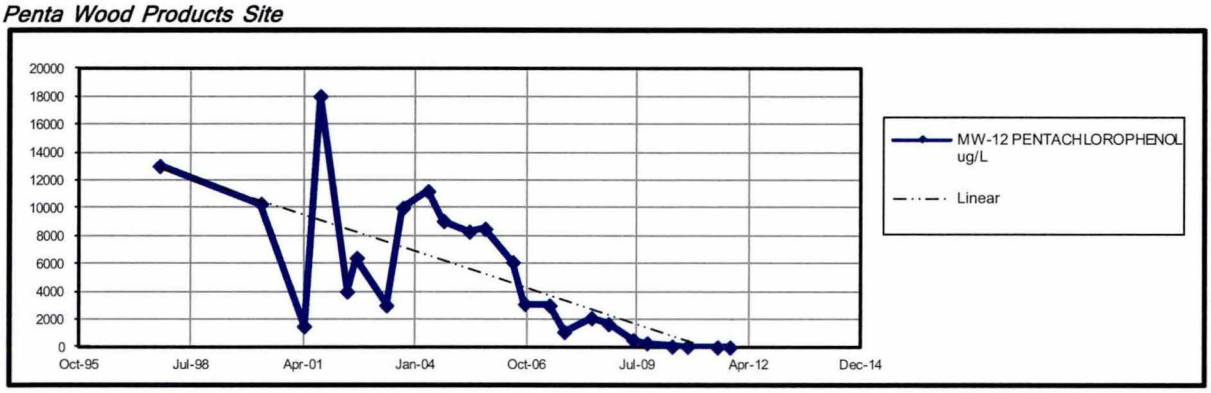
FIGURE 14
MW-10 PCP Concentration
Penta Wood Products Site



2.2.3.4 MW-12

Although monitoring well MW-12, located in the semiconfined aquifer, has shown fluctuations in PCP between groundwater collection periods, as shown in Figure 15, there is an overall decreasing trend in the PCP concentration. PCP has declined from the maximum concentration of 18,000 µg/L in September 2001 to 37 µg/L in the most recent sample in October 2011. Free product has never been observed in this well.

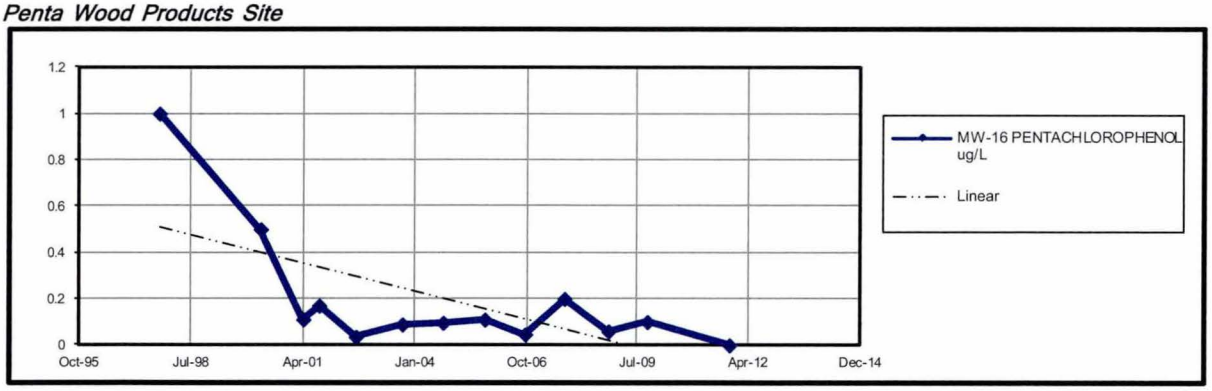
FIGURE 15
MW-12 PCP Concentration
Penta Wood Products Site



2.2.3.5 MW-16

Monitoring well MW-16 is an unconfined well located just outside the area where LNAPL is present. It has consistently had low concentrations of PCP, as shown in Figure 16. The highest concentration of PCP was observed at 0.2 µg/L in September 2006 and has been nondetect since 2009.

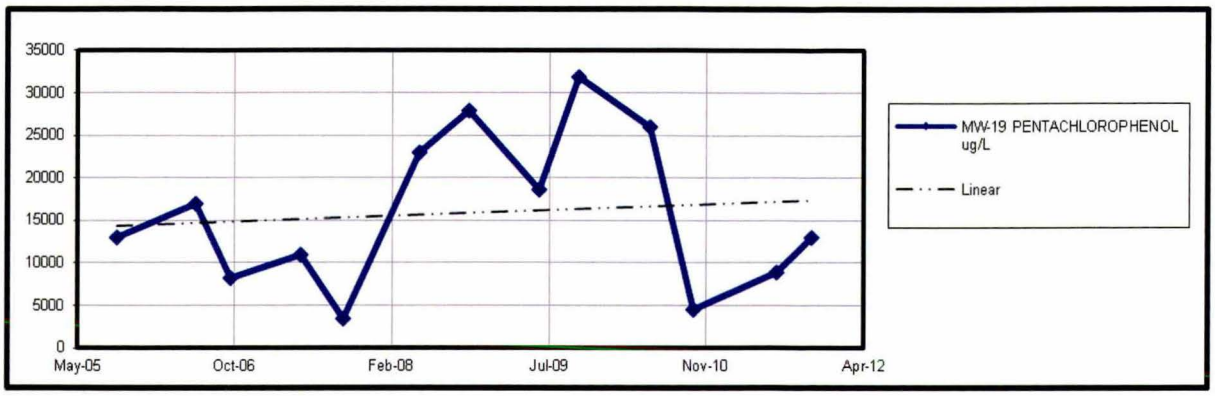
FIGURE 16
MW-16 PCP Concentration
Penta Wood Products Site



2.2.3.6 MW-19

LNAPL has been present in MW-19 since monitoring began, and entrainment of LNAPL droplets in the sample will have notable effects on PCP concentrations. The PCP concentrations were measured at 8,880 µg/L in June 2011 and 13,000 µg/L in October 2011, which is less than what was observed in 2009. Although variability of PCP concentrations in samples collected from wells with LNAPL is expected, in the most recent three sampling events the levels in PCP are lower than the previous two years.

FIGURE 17
MW-19 PCP Concentration
Penta Wood Products Site



2.2.3.7 Naphthalene

Naphthalene was detected in monitoring well MW-19 at a level above the reporting limit in 2011. Concentrations of 42.1 µg/L were observed in June 2011 and 2.8 µg/L in October 2011. The concentrations have been continually decreasing from 5,260 µg/L since 2000.

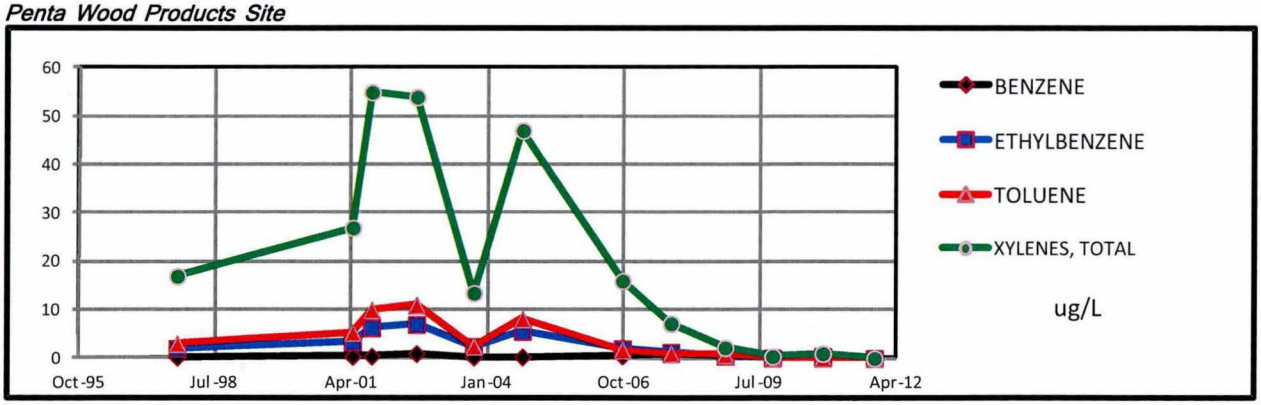
2.2.3.8 BTEX

BTEX compounds were detected above the reporting limits at one monitoring well, MW-19, in 2011. Benzene was not detected in any well.

2.2.3.9 MW-10

Since 2004, a consistent decrease in BTEX concentrations has been observed. The concentration of ethylbenzene has decreased from 5.58 µg/L in 2004 to nondetected in 2011, toluene has decreased from 8.09 µg/L in October 2004 to nondetected in October 2011 and xylene has decreased from 47.1 µg/L in 2004 to nondetected in October 2011.

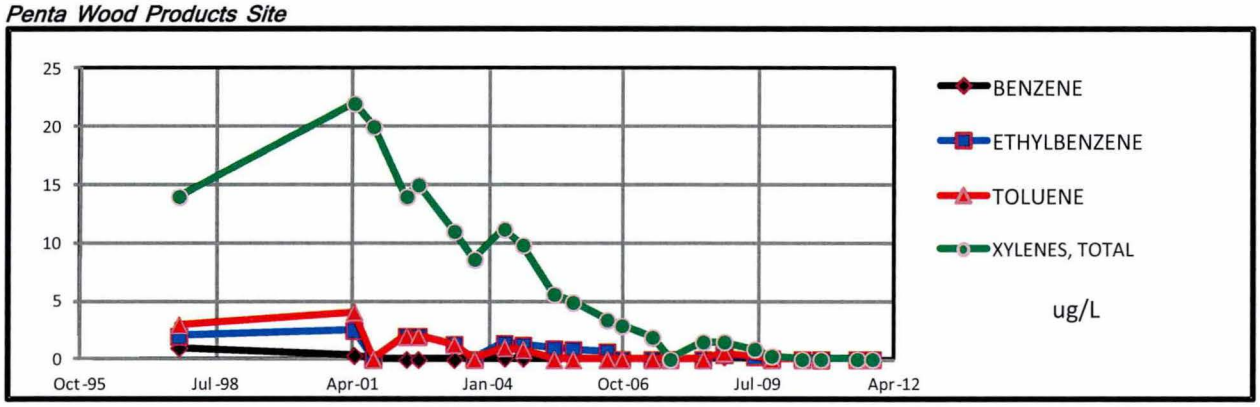
FIGURE 18
MW-10 BTEX Concentrations
Penta Wood Products Site



2.2.3.10 MW-12

The BTEX concentrations have shown steady declines especially over the last 5 years. The ethylbenzene concentration has declined from of 1.39 µg/L in 2004 to nondetected in 2011. Xylene concentration has declined from 11.2 µg/L in 2004 to nondetected in 2011.

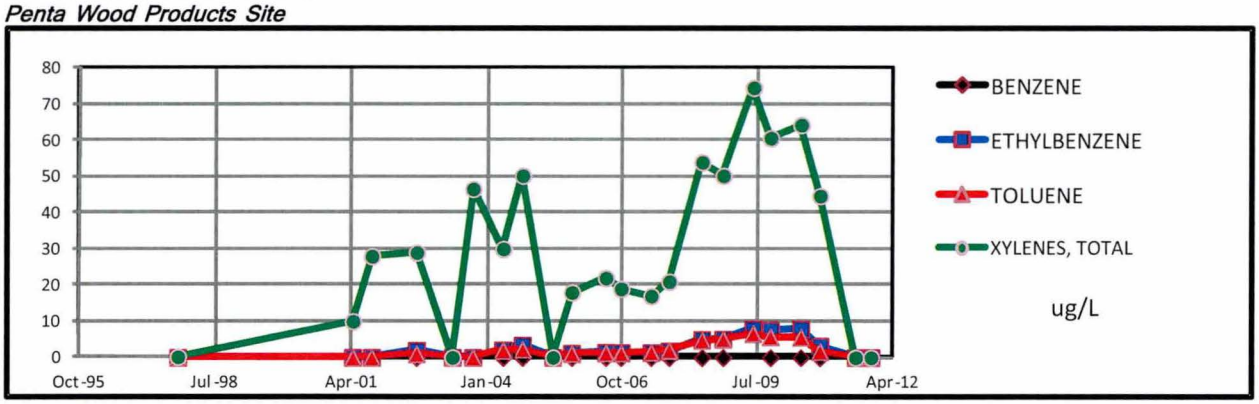
FIGURE 19
MW-12 BTEX Concentrations
Penta Wood Products Site



2.2.3.11 MW-19

The BTEX concentrations have variability over time most likely due to the presence of ongoing NAPL in the well. Ethylbenzene was detected at a concentration of 1.12 µg/L in June 2011 and 1.0 µg/L in October 2011. Toluene was detected at a concentration of 1.09 µg/L in June 2011 and 1.10 µg/L in October 2011. Xylenes were detected at a concentration of 22.7 µg/L in June 2011 and 23 µg/L in October 2011. The results from 2011 have shown reductions in concentrations of all analytes.

FIGURE 20
MW-19 BTEX Concentrations
Penta Wood Products Site



2.2.4 Dissolved Metals

In previous years, both total and dissolved metals analyses were performed on samples collected from monitoring wells. Suspended solids often have a significant impact on total metals concentrations; therefore, total metal concentrations may not be indicative of actual groundwater conditions. Beginning in 2006, total metals analyses were removed from the sampling plan. Dissolved arsenic, copper, iron, manganese, and zinc were sampled in June and October 2011.

2.2.4.1 Arsenic

Dissolved Arsenic was detected in several wells at the site; concentrations of arsenic for MW-05 (1.0 µg/L), MW-12 (1.1 µg/L), MW-17 (1.1 µg/L), and MW-27 (1.7 µg/L) were above the Wisconsin Department of Natural Resources (WDNR) Preventive Action Limit for arsenic of 1 µg/L but below the federal maximum contaminant level of 10 µg/L.

2.2.4.2 Copper

Dissolved copper was detected in one monitoring well in October 2011: MW-19, with a concentration of 12 µg/L, below the WDNR preventive action limit of 130 µg/L.

2.2.4.3 Iron

In June and October 2011, dissolved iron was detected above the WDNR Enforcement Standard (ES) of 0.3 milligrams per liter (mg/L) in the following wells: MW-03, MW-05, MW-12, and MW-22, with concentrations ranging from 0.314 mg/L (MW-12) to 2.6 mg/L (MW-05). In addition, dissolved iron was detected in MW-07 at 0.081 mg/L, MW-10 at 0.18 mg/L, MW-15 at 0.205 mg/L, MW-16 at 0.13 mg/L, MW-19 at 0.131 mg/L, and MW-26 at 0.274 mg/L, below the WDNR ES of 0.3 mg/L. Elevated iron concentrations are an indicator of natural attenuation. The iron concentrations reported in 2011 are very similar to the concentrations reported in 2010.

2.2.4.4 Manganese

In June and October 2011, dissolved manganese exceeded the WDNR ES of 0.05 mg/L at four wells (MW-05, MW-10, MW-12, and MW-19) ranging from 0.66 mg/L (MW-12) to 11 mg/L (MW-05). An additional six monitoring wells (MW-03, MW-06S, MW-07, MW-16, MW-22, and MW-28) had dissolved manganese detected at concentrations ranging from 0.006 mg/L to 0.041 mg/L below the WDNR ES of 0.05 mg/L. Elevated manganese concentrations are an indicator of natural attenuation. The manganese concentrations reported in 2010 and 2011 were similar to concentrations reported in 2010.

2.2.4.5 Zinc

Dissolved zinc was detected in MW-19 but was found at a concentration of 0.014 mg/L, below both the WDNR preventive action limit (2.5 mg/L) and ES (5.0 mg/L).

2.2.5 Natural Attenuation Parameters

Natural attenuation is a remediation approach that relies on natural processes that work to reduce mass and concentration of contaminants in soil and groundwater. Natural attenuation processes include dispersion, dilution, abiotic transformation, volatilization, sorption, and biodegradation. Biodegradation is often the most important process for compounds that can be transformed or reduced by indigenous microorganisms.

Appendix B contains a table presenting the natural attenuation parameters for each well as measured since 1997.

2.2.5.1 Oxidation/Reduction

Evaluation of the data generated during 2011 suggested that areas at the perimeter or outside the PCP plume are under slight to strong oxidizing conditions as shown by elevated oxidation-reduction potential (ORP). Overall, the ORP levels in 2011 are increasing from 2010; therefore, reductive dechlorination is most likely occurring. ORP measurements at wells in the most concentrated area of the PCP plume (greater than 1,000 µg/L) have not been able to be measured because of the possibility of LNAPL affecting the field measurements. It is expected that the wells within the most concentrated area of the PCP plume would exhibit reducing conditions.

2.2.5.2 Chloride

Elevated chloride concentrations are an indicator of PCP degradation. About 700 µg/L of chloride is produced for each 1,000 µg/L of PCP degraded. Generally, chloride is higher at the plume interior wells than at the perimeter wells. In 2011, the semiconfined wells had chloride levels ranging from 5.5 mg/L (MW-28) to 64 mg/L (MW-03). The unconfined wells ranged from 4.2 mg/L (MW-16) to 19 mg/L (MW-26, which is located near the infiltration basin). Historically, MW-03 and MW-21 reported the highest chloride levels, possibly because of their proximity to the highway where influence from seasonal road salting may have caused elevated chloride concentrations.

Since the beginning of groundwater extraction, correlation between PCP degradation and chloride production has been difficult because, as chloride is produced, it is removed by the extraction system, creating a net effect that is difficult to discern.

2.2.5.3 Nitrate

In 2011, nitrate levels remained relatively low, ranging from nondetectable (less than 0.1 mg/L) to 5.3 mg/L (MW-06S), and remaining comparable to concentrations observed in 2010.

2.2.5.4 Methane

Methane, a product of anaerobic degradation, was detected above the reporting limit in two wells, MW-03 (0.14 mg/L) and MW-7 (0.015 mg/L), in October 2011. In addition, detections were found in five wells (MW-05, MW-10, MW-19, MW-27, and MW-28) at low concentrations ranging from 0.00019 to 0.038 mg/L in October 2011. No detections were found in June 2011. The absence of methane at or above the detection limit in most wells suggests that degradation is occurring primarily under nonmethanogenic, anaerobic, or sulfate-reducing conditions.

2.2.5.5 Sulfate

Once oxygen and nitrate are depleted, sulfate can also be used as an electron acceptor. Sulfate continues to fluctuate within the plume and has not shown any clear trends. Sulfate levels in 2011 were similar to previous years.

2.2.6 Groundwater Quality near the Infiltration Basin

Large quantities of treated groundwater have been discharged at the site's infiltration basin since the beginning of operation. Approximately 144 million gallons (MG) of groundwater have been re-infiltrated from 2004 through 2011. The water would be expected to displace groundwater over a considerable area. The re-infiltration of the treated groundwater helps to maintain a water balance to offset the extracted volume of water.

2.2.6.1 Unconfined Aquifer

MW-26 is used to determine the effects that the infiltration basin has on the unconfined aquifer in the area. PCP, methane, nitrate, iron, and manganese concentrations in MW-26 have remained similar to background levels, as would be expected for the discharge of treated groundwater. Sulfate concentrations have increased from a background value of less than 10 mg/L to a high of 2,360 mg/L in June 2009, but in the most recent samples collected in October 2011 the sulfate levels were 200 mg/L.

The water discharged at the infiltration basin had been previously extracted from an area of high PCP concentrations and treated to remove dissolved PCP. Chloride does not change significantly during the treatment of the extracted groundwater. A baseline chloride concentration was not measured in MW-26 before the operation of the groundwater treatment system. However, chloride concentrations decreased from 30 mg/L in 2001 to 11 mg/L in 2003 while the treatment system was shut down for renovations. Chloride concentrations increased after the treatment system was restarted in 2004, and have ranged from 17 to 203 mg/L, with the most recent concentration of 19.0 mg/L in October 2011.

2.2.6.2 Semiconfined Aquifer

MW-17 is used to determine the effects of the infiltration basin on the semiconfined aquifer. MW-17 is sampled annually for PCP and natural attenuation parameters. PCP, methane, manganese, and iron in MW-17 have remained similar to background levels. Nitrate concentrations dropped in 2009 because the source area groundwater has minimal nitrate; however, they increased to 5.18 mg/L in 2010, which is similar to the levels experienced from 2005-2008. Nitrate dropped again in 2011 to 3.9 mg/L. Sulfate concentrations have remained close to the background value of 10 mg/L but did increase in 2011 to 24 mg/L. The water discharged at the infiltration basin was extracted from an area of high PCP concentrations and treated to remove dissolved PCP. Chloride does not change significantly during the treatment of the extracted groundwater. The background chloride level of 4.8 mg/L measured in 1997 has increased to 16 mg/L in October 2011.

Another benefit of re-infiltrating groundwater is that treatment results in aeration and re-oxygenation of the groundwater. A groundwater divide in the semiconfined aquifer exists at the location of the infiltration basin; therefore, a portion of this oxygenated water should flow towards the extraction wells and the PCP plume and provide a supply of oxygen for aerobic biodegradation of the PCP.

2.3 Summary

Groundwater treatment system operation and optimization has led to continuous capture of site contaminants. Similar to previous years, the capture zone can be observed in potentiometric surface maps from data collected in June 2011 and October 2011, in both the unconfined and semiconfined aquifers.

LNAPL was present in two unconfined aquifer wells (MW-18 and MW-19). In June 2011, the LNAPL thickness in MW-18 and MW-19 has declined from Fall 2010. The reduction in LNAPL thickness could be impacted by a rebounding water table but reductions in thickness may also be related to optimized LNAPL removal from site recovery wells. The thickness levels in both MW-18 and MW-19 rebounded in the October from the June 2011 measurements. The increase in LNAPL thickness is anticipated to be a result of the continuous operation of the new extraction wells.

Results from the residential well and potable well sampling in June 2011 and October 2011, indicate that PCP, BTEX, or naphthalene are not present in any residential wells or in the onsite potable well.

Large reductions in PCP concentrations in unconfined monitoring wells parallel the reduction in NAPL; this is evidence that reduction in the PCP source is occurring at the site. The PCP plume exceeding 1,000 µg/L has been steadily shrinking in the unconfined aquifer centered on the CAMU and in October 2011 is generally the same size as in 2010. The 1 µg/L plume in the unconfined aquifer has shrunk significantly since 1994, where it extended to MW-13 and currently occupies nearly the same footprint as the 1,000 µg/L plume.

The PCP plume in the semiconfined aquifer shrunk significantly in recent groundwater events. PCP concentrations have been less than 1,000 µg/L since 2009. The 1-µg/L plume in the semiconfined aquifer has shrunk significantly over time and now appears only around the CAMU area where the highest PCP groundwater contamination and the where LNAPL is present. The declining trends in the semiconfined aquifer continued in 2011, levels of PCP declining by up to 46 percent from the same time last year although the installation of MW-28 shows that contamination groundwater extends further to the east than previously thought.

Rapid reductions in PCP in the unconfined aquifer and reduction of LNAPL thickness show evidence of a reduction in the source at the site. Naphthalene and BTEX are also in decline in several wells in the area of elevated PCP. Evaluation of the natural attenuation parameters revealed similar conditions to those in 2010.

2.4 Recommendations

It is recommended that the reduced sampling program be continued in 2012. Two new monitoring wells were installed in 2011 (MW-27 and MW-28) and replaced the two monitoring wells in areas on the south side of the site (MW-6S and MW-10). Three new extraction wells were also installed in late 2010 and early 2011 to increase LNAPL extraction. As the groundwater table continues to rebound, MW-6S will be sampled during the annual round replacing MW-27. MW-28 will continue to be sampled to determine the trend due to detected contamination and to monitor the plume in this area of the site. We are also recommending that MW-20 be sampled during the October 2012 sampling event to confirm reductions seen is other wells in the CAMU area.

SECTION 3

Treatment System Operation and Maintenance

The treatment system at the Penta Wood Products Site consists of groundwater extraction and treatment, LNAPL recovery, and bioventing. The groundwater extraction system extracts and treats groundwater containing dissolved-phase PCP and depresses the groundwater table to contain groundwater contamination and allows LNAPL to collect near the extraction wells. The depressed groundwater also exposes additional LNAPL smear zone. The bioventing system was installed to provide oxygen for the aerobic biodegradation of residual diesel fuel petroleum hydrocarbons and PCP in the LNAPL smear zone.

Groundwater treatment system discharge monitoring is performed in accordance with the WPDES permit dated November 2007.

The following subsections describe the performance and activities related to the operation of the groundwater extraction and bioventing system.

3.1 Groundwater Extraction System

The groundwater extraction system was operated between September 27, 2000, and September 27, 2001. After 1 year of operation, the system was shut down and the groundwater treatment system was redesigned to include additional pretreatment. The groundwater treatment system was restarted on February 27, 2004, after construction activities were completed. The groundwater treatment system operated intermittently from February to mid-July 2004, and began consistent operation starting in late July 2004. From 2004 through 2011 the extraction system operated consistently with the exception of shutdowns for routine maintenance and service or as a result of system alarms. Three additional extraction wells were installed during the winter of 2010/2011 and began continuous operations on March 3, 2011, increasing the total volume of groundwater extracted and treated through the system. The construction report for the installation of these three wells is located in Appendix F.

The following section describes the groundwater extraction system performance, which includes the estimates of groundwater and PCP extracted, operational and maintenance items, and a discussion of the LNAPL and groundwater extraction wells.

3.1.1 Groundwater Extraction and LNAPL Removal Performance

The estimated PCP mass removed from the groundwater in 2011 was approximately 295 pounds and 8,070 pounds since the groundwater extraction began in 2000 (Table 4).

In addition to the PCP mass removed through groundwater extraction, PCP mass is removed through the extraction of LNAPL. The volume of liquid waste that was extracted through the LNAPL recovery system can be used to make a rough estimate of the mass of PCP removed by LNAPL extraction. The plant recovered approximately 46,252 gallons of liquid waste in the separator through 2011. Before 2008, approximately one-half of the liquid waste was water. Continued optimization of the system resulted in less water in the waste oil storage tank and disposed of offsite. The estimated amount of LNAPL extracted from the subsurface is based on the volume accumulated in the storage tank through the year. In 2011, approximately 2,500 gallons of LNAPL was recovered. Assuming an LNAPL density of 0.84 grams per cubic centimeter and a PCP concentration of 5 percent—this volume equates to about 876 pounds of PCP present in LNAPL removed in 2011 (Table 5). LNAPL recovery rates decreased in 2011 declining at the same time drilling was starting so the decline is likely due to agitation of the water table from drilling and installation of extraction wells. The majority of this accumulation occurred in the latter half of the year when extraction of LNAPL was running as designed.

TABLE 4
PCP Mass Removed with the Groundwater Extraction System
Penta Wood Products Site

Operation Period	Volume of Groundwater Extracted (gallons)	Average PCP Influent Concentration (µg/L)	PCP Mass Removed (lbs)
09/27/00 to 12/18/00	11,712,960[a]	12,535	1,224
02/02/01 to 02/08/01	691,200[a]	12,535	72
03/16/01 to 06/10/01	9,288,000[a]	10,356	802
06/15/01 to 09/27/01	6,822,720[a]	7,535	429
		Total PCP Mass Removed from 2000 to 2001	2,527
02/27/04 to 12/31/04	18,548,154	9,227	1,427[b]
01/01/05 to 12/31/05	21,374,796	7,300	1,301[b]
01/01/06 to 12/31/06	14,759,392	6,425	791[b]
01/01/07 to 12/31/07	16,551,336	3,557	491
01/01/08 to 12/31/08	18,118,696	3,255	492
01/01/09 to 12/31/09	18,533,648	2,883	445
01/01/10 to 12/31/10	18,561,632	1,948	301
01/01/11 to 12/31/11	17,796,668	1,985	295
		Total PCP Mass Removed 2000 to 2011	8,070

[a] Volumes are estimated
[b] Values were revised based on measured volumes. Values previously reported were based on estimated volumes.

TABLE 5
PCP Mass Removed from the Free Product Recovery System
Penta Wood Products Site

Operation Period	Amount of Liquid Extracted (gal)	Amount of LNAPL Extracted (gal)	Amount of Fuel Oil Removed[c] (gal)	Amount of PCP Removed[d] (gal)	Amount of PCP Removedd (lb)
2004	7,640	3,820[a]	3,629	191	1,338
2005	3,404	1,702[a]	1,617	85	596
2006	7,550	3,775[a]	3,586	189	1,322
2007	11,079	5,540[a]	5,263	277	1,940
2008	4,002	4,002[b]	3,802	200	1,402
2009	5,090	5,090[b]	4,836	255	1,783
2010	4,987[e]	4,987[b]	4,738	249	1,747
2011	2,500	2,500[b]	2,375	125	876
Total	**46,252**	**31,416**	**29,845**	**1,571**	**11,004**

[a] Assumes 50% of the extracted liquid is LNAPL.
[b] Assumes 100% of the extracted liquid is LNAPL based on system optimization and observations of waste in storage tank.
[c] Assumes LNAPL is 95% of the fuel oil.
[d] Assumes LNAPL is 5% PCP.
[e] Includes LNAPL recovered with absorbent socks.

In accordance with the WPDES permit, PCP concentrations in the influent were measured quarterly and are summarized in Table 6. Influent concentrations have continued to decrease year after year. From September 2010 to October 2011, the PCP concentrations have decreased by approximately 10 percent from 1,830 µg/L to

1,600 µg/L. The PCP concentrations in March and June 2011 were elevated over the PCP concentrations from last year but dropped as the year went on, which could be due to the addition of the three new wells adding higher levels of contamination initially.

TABLE 6
Quarterly PCP Influent Concentrations
Penta Wood Products Site

Date	Influent PCP Concentration (µg/L)
March 2011	2,470
June 2011	2,170
August 2011	1,700
October 2011	1,600

As a result of the system operation, there has been a significant reduction in the annual average PCP influent concentrations since the system was initially started in 2004 (result in November 2004 was 9,140 µg/L).

The remaining PCP mass in the aquifer matrix is adsorbed on the aquifer matrix, dissolved in the groundwater, and present in the LNAPL residual zone. The estimated PCP remaining in the aquifer matrix (such as soil) and dissolved in the groundwater is shown in Table 7. The estimated PCP mass remaining in the LNAPL is shown in Table 8. It should be noted that the contaminant mass estimates are based on many simplifying assumptions and are expected to be accurate only to within a one order-of-magnitude range. As a result, the estimates are intended for general comparisons of the relative significance of contaminant mass in different media. Table 8 summarizes the PCP mass estimates (remaining and removed) for 2011.

Since the system was restarted in 2004, the system has extracted over 144 MG of groundwater, or approximately 8 pore volumes. In 2011, the system extracted about 17.8 MG (over 1 pore volume) and groundwater extraction rates averaged 66 gallons per minute (gpm) while the system was operating. The effective extraction rate over 2011, which includes time when the extraction wells were not operating, was 47 gpm. With consistent operation, the groundwater extraction system maintained capture of the PCP plume as discussed in the previous section.

Three new extraction wells were installed in late 2010/early 2011 and began operating in March 2011. The extraction wells consist of a groundwater extraction well nested with a LNAPL recovery well. The screen intervals of the groundwater extraction wells are at similar elevations to the existing extraction wells; typically 20 feet to 40 feet below the water surface. Operating the three new groundwater extraction wells increased the average treatment system influent rate from 50 gpm in 2010 to approximately 66 gpm in 2011. The new LNAPL extraction wells were screened across the water table covering the LNAPL smear zone to provide additional LNAPL removal. During the first six months after installation of the three new extraction wells, no LNAPL was detected in the wells and the recovery pumps were not operated. The absence of LNAPL in these new extraction wells could also be caused by the drilling agitation during the well installation.

In 2008 and 2009, the extraction of LNAPL from existing wells was increased by the optimization of recovery pumps and along with taking advantage of a low water table recorded historically high levels of LNAPL removal. During the installation of the wells during the winter and spring of 2011 agitation from drilling caused LNAPL recovery to drop dramatically, typical production levels did not return until late in the year.

3.1.2 Groundwater Treatment System Operation and Maintenance

Continued groundwater treatment system optimization has led to a reduction in carbon changeout frequency, eliminating the need for partial carbon changeouts, and decreasing disposal costs. Optimization of the dosage and monitoring of the pretreatment chemical addition resulted in reduced solids loading to the carbon vessels and extended the operating time between carbon changeouts. The treatment system can operate 16 to 20 weeks and treat 8 MG of water before requiring a changeout of the lead carbon vessel. A total of three carbon changeouts were completed in 2011.

3.1.3 LNAPL Extraction Wells Operation and Maintenance

LNAPL removal performance was improved by routinely adjusting the LNAPL pump depth to account for water level fluctuations. The LNAPL pumps have the intake at the top of the pumps and if the water level changes significantly, the pump depth may be too deep or shallow and pump only water or not pump at all. Therefore, the LNAPL pumps were raised or lowered on a monthly basis in the spring, summer and fall of 2011, to ensure the pump was at the appropriate depth within the extraction well. The three new LNAPL recovery pumps were put into service in 2011, these pumps will be adjusted on the same schedule as the current pumps.

TABLE 7
Estimate of PCP Mass Remaining in Soil and Groundwater for 2011
Penta Wood Products Site

Contaminant	Parameter	Unconfined MW-10S, 19, 20 (Area 1)	Unconfined MW-6S, PW01 (Area 2)	Unconfined MW-3 (Area 3)	Unconfined MW-16 (Area 4)	Semiconfined MW-5,10,18 (Area 1)	Semiconfined MW-6, PW-01 (Area 2)	Semiconfined MW-3 (Area 3)	Semiconfined MW-12 (Area 4)	Total Contaminant Mass (lb)
	Aquifer Media Volume (ft^3):	3,540,000	2,790,000	1,800,000	6,100,000	5,900,000	4,650,000	3,000,000	10,200,000	
	Aquifer Water Volume (ft^3):	1,416,000	1,116,000	720,000	2,440,000	2,360,000	1,860,000	1,200,000	4,080,000	
Mass in 2011 (7^{th} Year Following Groundwater Extraction System restarted in February 2004) Based on Groundwater Sampling in October 2011										
PCP	Conc. (µg/L)	13000		0.58		21.0		0.58	37.0	
K_d[a] = 0.60	Mass in soil (lb)	3,076	0	0.07	0	8.26	0	0.12	25.15	3,110
	Mass in GW (lb)	1,146	0.0	0.026	0.0	3.09	0.0	0.04	9.40	1,159
	Total Mass (lb)	**4,213**	**0.0**	**0.1**	**0.0**	**11.34**	**0.0**	**0.16**	**34.55**	**4,259**

[a]K_d from Hydrogeologic Investigation, December 1994.
Contaminant mass estimates are based on many simplifying assumptions and are expected to be accurate only to within a one order-of-magnitude range. As a result, they are intended as general comparisons of the relative significance of contaminant mass in different media.
Soil density = 1.78 g/cm^3; ft^3 = cubic feet; GW = groundwater

TABLE 8
Summary of 2011 PCP Mass Estimates
Penta Wood Products Site

Penta Wood Products Site	PCP Mass (lb)	Notes
PCP Mass Remaining		
LNAPL Residual Zone	6,000	Based on original mass less the mass estimated from recovered LNAPL.
Soil (Saturated zone – Adsorbed)	3,101	Based on groundwater concentration and a PCP K_d of 0.6.
Groundwater (saturated zone – dissolved)	1,159	Based on weighted average groundwater concentrations.
Total PCP Mass Remaining	10,260	
PCP Mass Removed		
Removed by LNAPL Recovery System through 2011	11,004	Assuming LNAPL is 5% PCP and based on actual LNAPL recovered.
Removed by GW Extraction System through 2011	8,070	Estimate was revised based on actual GW extraction volumes and concentrations from 2004 through 2011 (see Table 4).
	19,074	

Note: Remaining contaminant mass estimates are based on many simplifying assumptions and are expected to be accurate only to within a one order-of-magnitude range. As a result, they are intended as general comparisons of the relative significance of contaminant mass in different media.

GW = groundwater

3.2 Bioventing System

The bioventing system was installed to provide oxygen for the aerobic biodegradation of residual diesel fuel petroleum hydrocarbons and PCP in the LNAPL smear zone. As the groundwater extraction system extracts and treats groundwater containing dissolved phase PCP, the groundwater table is depressed, which exposes more of the LNAPL smear zone to the air supplied by the bioventing system.

The bioventing system was first started September 24, 2007. Due to the increases of methane and the frozen ground surface (which prevents upward release of the methane and may result in a lateral spreading of the methane to nearby residences), the bioventing system is shut down during the winter months. The system is restarted after the spring ground thaw. In June 2009, the bioventing operation was modified to reduce the operating time to 5 days per month. Evaluation of the monitoring data showed that oxygen levels can reach saturation levels within the first several days of blower operation in the majority of the unsaturated zone and during 1 month of not operating, only a small decrease in the oxygen levels are observed. The effectiveness of the bioventing, therefore, is not compromised by this pulsed operation, which can provide a reduction in operation costs through the lowered energy consumption. Under these parameters, the bioventing system was restarted on May 9, 2011, and operated 5 days per month through October 24, 2011, when the bioventing system was shut down for the winter.

3.2.1 Soil Gas Monitoring

Since startup of the bioventing system, carbon dioxide and methane levels have decreased in the bioventing wells; however, the oxygen levels at SG-07S and SG-22 located within the wood chip area have remained at low percentages relative to the other monitored wells. Intermediate wells, deep wells, and shallow wells located outside of the wood chip area have exhibited similar changes in gas composition including increasing oxygen levels and decreasing carbon dioxide levels throughout the months of bioventing activity. The soil gas well SG-22 screen has become clogged resulting in reduced air flow to this location. The results for this well have been qualified estimated and flagged "J" as a result. Attempts to identify the fouling material have been inconclusive. Additional attempts to identify the material and to clear the screen will be made in the spring to allow for soil gas monitoring in this well again.

Oxygen has generally stabilized for each well at approximately 20 percent. Methane has not been detected or has been found at low concentrations in these wells after the initial startup. No major temperature changes have been observed that would cause concern for a potential fire hazard. Table 9 provides a summary of the baseline measurements prior to startup, measurements right after the bioventing system was turned on after the winter, and measurements 1 month prior to winter shutdown.

TABLE 9
Bioventing System Soil Gas Measurement Summary
Penta Wood Products Site

	O_2 (%)			CO_2 (%)			CH_4 (%)		
Well ID	Baseline (09/21/07)	Startup from Winter Shutdown (05/09/11)	1 Month Prior to Winter Shutdown (09/19/11)	Baseline (09/21/07)	Startup from Winter Shutdown (05/09/11)	1 Month Prior to Winter Shutdown (09/19/11)	Baseline (09/21/07)	Startup from Winter Shutdown (05/09/11)	1 Month Prior to Winter Shutdown (09/19/11)
Shallow									
SG-04S	21.2	20.6	20.3	0.1	0.1	0.8	0.1	0.0	0.2
SG-05S	17.8	19.8	19.4	1.7	0.4	1.4	0.0	0.0	0.0
SG-06S	17	20.9	20.8	2.3	0.0	0.0	0.0	0.0	0.0
SG-07S	4.3	1.6	6.2	28.5	25.5	22.8	14.1	23.4	9.6
SG-22	0.9[a]	7.8	20.9 J	27.3	13.9	0.7 J	18.3[a]	3.5	0.0 J
Intermediate									
SG-04I	1.4	8.4	20.2	14.9	5.1	1.4	0.0	0.0	0.0
SG-05I	9.2	19.1	20.6	8.1	0.3	0.3	0.0	0.0	0.0
SG-06I	12.8	20.8	20.9	5.5	0.1	0.0	0.0	0.0	0.0
SG-07I	12.5	16.1	19.8	7.9	2.1	0.5	0.0	0.0	0.0
Deep									
SG-04D	1.7	10.9	20.2	14.6	5.8	0.2	0.0	0.0	0.0
SG-05D	1.6	19.1	20.6	14.7	0.3	0.1	0.0	0.0	0.0
SG-06D	6.1	20.5	20.7	11.7	0.1	0.0	0.0	0.0	0.0
SG-07D	2.0	18.7	20.2	16.5	1.1	0.2	0.0	0.0	0.0
Perimeter									
SG-23 (3 feet)	18.3	21.1	21.1	1.7	0.0	0.0	0.0	0.0	0.0
SG-24 (5 feet)	19.1	21.1	20.9	0.7	0.0	0.0	0.0	0.0	0.0
SG-25 (5 feet)	17.9	Not connected[a]	20.9	2.3	0.0	0.0	0.0	0.0	0.0
SG-26 (5 feet)	21.3	21.1	21.2	0.0	0.0	0.0	0.0	0.0	0.0

[a] Repaired on May 10, 2011; J: Estimated due to clogging

3.2.2 Bioventing System Operation and Maintenance

Process measurements, such as air injection well flow rates and pressures, and vacuum before and pressure after the air injection blower are monitored periodically during the bioventing operation. Measured pressures in each well stabilize at approximately 1 pound per square inch. Air flow rates for the deep bioventing wells (BV-02, BV-03, BV-04, BV-05, BV-06, BV-07, and BV-11) were set between 300 and 430 standard cubic feet per minute (scfm). Air flow rates for each of the shallow bioventing wells (BV-08 and BV-09) were set at approximately 160 scfm. Deep wells were designed for a maximum flow of 500 scfm and shallow wells for a maximum of 200 scfm.

The bioventing system was restarted on May 9, 2011, after the spring ground thaw. The system was shut down for the winter on October 24, 2011.

3.3 Summary

The groundwater extraction system was operated continuously with limited down time for maintenance. More than 17.8 MG of groundwater, or over 1 pore volume, were removed from the extraction zone in 2011. An estimated 295 pounds of dissolved-phase PCP from groundwater was removed. Approximately 876 pounds of LNAPL was extracted from the subsurface. Continued attention to optimization of system operations has led to increased operation of the groundwater extraction system and enhancement of the groundwater capture. The capture zone observed in 2010 was maintained in 2011.

Influent concentrations of PCP from the groundwater extraction wells has declined over time from approximately 9,227 µg/L in 2004 to approximately 1,985 µg/L in 2011, resulting in an overall decline in mass of PCP removed from the groundwater extraction. The average flow rates have increased from 50 gpm to 66 gpm due to the addition of three new extraction wells. The total amount of PCP removed from the environment by the LNAPL recovery and groundwater extraction systems through 2011 is over 19,000 pounds. A majority of this mass is estimated to be recovered from the LNAPL.

The bioventing system operated for approximately 6 months in 2011. During that time, shallow wells within the wood chip area indicated decreases in methane and carbon dioxide concentrations, and oxygen concentrations increased slightly. The intermediate and deep wells, and shallow wells located outside of the wood chip area exhibited similar changes in gas composition with each other and followed the pattern of increasing oxygen levels and decreasing carbon dioxide levels throughout the months of bioventing activity. Oxygen generally stabilized for each well at approximately 20 percent. Methane was not detected or was found at low concentrations in all of the wells.

The bioventing system was shut down for the winter because of concerns about methane migration within the frozen ground surface. However, based on the relatively low oxygen utilization rate observed during previous years, the oxygen is not expected to drop below the 5 percent minimum level for aerobic biodegradation in the deep and intermediate zones while the bioventing is down for the winter months.

3.4 Recommendations

The bioventing system should continue to operate in 2012, in conjunction with the LNAPL recovery to maximize the LNAPL reductions. Soil gas monitoring will be performed and the bioventing system will be restarted in the spring after the snow melt and the ground thaws. Soil gas measurements will be monitored during startup of the bioventing system in the spring and will then be measured at the start of the monthly operation. The bioventing operation will continue to operate 5 days per month.

Opportunities for continued optimization of the groundwater extraction and treatment system and LNAPL recovery operations will be evaluated throughout the year. The LNAPL recovery pumps will be adjusted monthly to maximize LNAPL recovery from the subsurface. The treatment system will continue to operate through 2012.

SECTION 4

Waste Generation and Disposal Summary

The RA activities at the site result in the generation of hazardous waste. Hazardous waste management procedures for the Penta Wood Products Site (USEPA ID No. WID006176945) are outlined in the *Waste Handling Plan* (CH2M HILL 2005). Table 10 summarizes the amount and type of waste generated in 2011.

TABLE 10
2011 Detailed Hazardous Waste Generation Summary
Penta Wood Products Site

Manifest #	Date	Filter Cake (lbs)	Carbon (lbs)	LNAPL (lbs)	Yearly Total (lbs)
008002230JJK	1/11/2011	24,428			
008002232JJK	1/25/2011	24,055			
008003106JJK	1/25/2011		26,000		
008003107JJK	2/15/2011	24,360			
008003140JJK	4/5/2011	16,580			
008173565JJK	5/18/2011	29,260			
008173569JJK	5/31/2011	19,460			
008839155JJK	8/16/2011	34,040			
008840478JJK	8/16/2011		21,927		
008496976JJK	8/29/2011	37,280			
008907439 JJK	9/28/2011	30,540			
008908635JJK	10/18/2011		26,320		
008908952JJK	11/2/2011	26,680			
008907733JJK	12/14/2011	26,220			
2011 Total (lbs):		**292,903**	**74,247**	**0**	**367,150**

Table 11 summarizes the amount of waste generated and disposed of offsite from 2000 to 2011.

TABLE 11
Hazardous Waste Generation Summary
Penta Wood Products Site

Date	Filter Cake (lbs)	Misc. Debris (lbs)	Carbon (lbs)	LNAPL (lbs)	Water (gal)	Yearly Total (lbs)
2000	0	200	6,000	5,009*		11,209
2001	0	400	56,100	6,166*		62,666
2002	0	1,400	48,000	10,790*	27,756	87,946
2003	0	600	0	3,083*	1,376	5,059
2004	155,960	3,200	102,000	53,522*		314,682
2005	178,784	1,290	104,860	23,847*		308,924
2006	112,640	1,200	136,520	52,892*		303,252
2007	174,020	2,200	245,377	77,615*		517,387

TABLE 11
Hazardous Waste Generation Summary
Penta Wood Products Site

Date	Filter Cake (lbs)	Misc. Debris (lbs)	Carbon (lbs)	LNAPL (lbs)	Water (gal)	Yearly Total (lbs)
2008	211,402	3,176	70,007	28,036		312,621
2009	233,840	1,116	49,757	35,659		320,372
2010	210,940	0	81,227	34,937		327,104
2011	292,903	0	74,247	0		367,150

*Volume shows represents amount disposed of offsite and is estimated to be approximately 50% pure LNAPL and 50 percent mixture of water and emulsified LNAPL.

The optimization of the extraction and treatment system and LNAPL recovery system has impacted the hazardous waste generated at the site. The amount of filter cake generated is directly related to the amount of water treated and has increased since March 2011 when the new extraction wells began operation. There was a small decrease in filter cake production in 2011 due to decreased pumping due to shutdowns during the construction and upgrading of the treatment system. No liquid waste was removed from the site in 2011 due to declining LNAPL thickness in the first part of the year. LNAPL recovery has increased in the second half of the year. Liquid waste has been accumulating and it is anticipated that liquid waste will be disposed of offsite in 2012 that will be equal to or greater than the amount in 2010.

SECTION 5

Site Inspection and Maintenance

5.1 Community Relations

No community relations issues were encountered in 2011.

5.2 Site Condition

Erosion at the site was almost entirely halted because of erosion control features that are maintained on the site. Additional grass seed and fertilizer was placed around the site to increase the vegetative cover. The grass around the monitoring wells, bioventing wells, and extraction wells was also mowed to maintain accessibility in more frequently travelled areas and to minimize biological hazards in these areas.

Final site restoration from the installation of the three new extraction wells was performed by HIS Constructors, Inc., in the spring of 2011. The site driveway was inspected and required some maintenance, including adding material and regrading. The area to the west of the treatment building had few trees; therefore, additional red and white pine trees were planted in the spring of 2011. The survival rate of the red and white pines to the west of the site is approximately 80 percent.

5.3 Health and Safety

A health and safety audit was performed on August 26, 2010. The health and safety action items found in the 2010 audit and discussed in the 2010 annual report were all addressed in 2011. There was no official health and safety audit performed in 2011.

5.4 Recommendation

To proactively review site operations and evaluate compliance with the health and safety procedures and regulatory requirements, a health and safety audit will be performed in 2012. A quality audit will be performed during the spring groundwater sampling event to ensure that proper procedures are being used during the event.

SECTION 6

References

CH2M HILL. 1998. *Feasibility Study Report.* Penta Wood Products RI/FS.

CH2M HILL. 2000. *Sampling and Analysis Plan*. Revised April 2001.

CH2M HILL. 2005. *Waste Handling Plan*. Revised March, 2012.

CH2M HILL. 2010. *Field Sampling Plan.*

Appendix A
Analytical Results

Appendix A is located on the CD on the inside back cover of this report.

Appendix B

Natural Attenuation Data

Appendix B is located on the CD on the inside back cover of this report.

Appendix C
Groundwater Elevations and Observations, and LNAPL Measurements

Well	Casing Dia. (inches)	Approx. Well Depth (ft)	TOC Elev. (ft MSL)	Aquifer[a]	June 2011			October 2011		
					Depth to Water (ft) DTW	DTB	Comments (DTP = Depth to Product)	Depth to Water (ft) DTW	DTB	Comments (DTP = Depth to Product)
MW-01	2	97	1072.32	UC	87.43	95.45		89.87		
MW-02	2	85	1064.85	UC	80.22	84.3		79.69		
MW-03	4	182	1129.50	SC	144.88	174.5		144.30		
MW-04	4	187	1087.81	SC	103.68	188		103.14		
MW-05	4	118	1071.73	UC	87.33	114.2		86.86		
MW-06 S	2	129.05	1108.63	UC	123.75	128.9		123.11		
MW-07	4	140.5	1096.39	SC	111.44	140.34		111.00		
MW-08	4	160	1091.28	SC	106.34	159.42		105.89		
MW-09	2	54	1020.71	UC	45.75	53.55		31.94		
MW-10	4	131	1089.74	SC	105.94	135.75		105.44		
MW-10 S	2	115.23	1090.43	UC	105.56	114.00				
MW-11	2	155.5	1085.58	SC	101.08	158.99		100.83		
MW-12	2	135	1081.99	SC	97.73	109		86.90		
MW-13	2	27	1006.10	UC	21.2	29.6		20.81		
MW-14	2	175	1078.50	SC	94.39	175.1		93.90		
MW-15	2	170	1127.22	SC	142.49	171.82		141.85		
MW-16	2	106.5	1081.92	UC	96.81	105.4		96.15		
MW-17	2	134	1084.50	SC	99.88	115.6		99.40		
MW-18	6	116	1072.44	UC	87.82	113.00	DTP=87.4[b]	87.38		DTP=86.85[d]
MW-19	2	112	1088.17	UC	104.54	114.35	DTP=103.75[c]	104.25		DTP=103.18[e]
MW-20	2	107.5	1097.76	UC	112.94	120.53		112.35		
MW-21	2	114.9	1095.70	UC	111.01	114.78		110.45		
MW-22	2	105.16	1084.70	UC	99.92	103.92		99.30		
MW-23	2	125	1017.57	SC	33.19	128.7		32.83		
MW-24	2	125	1084.10	UC	98.47	108.2		98.10		
MW-25	2	117.8	1095.24	UC	(Dry)	118.8		109.40		
MW-26	2	141	1087.07	UC	102.42	141		101.97		
MW-27			1111	UC	126.12			125.48		
MW-28			1083.1	SC	99.07			98.49		

[a] UC=Unconfined aquifer; SC=semiconfined aquifer

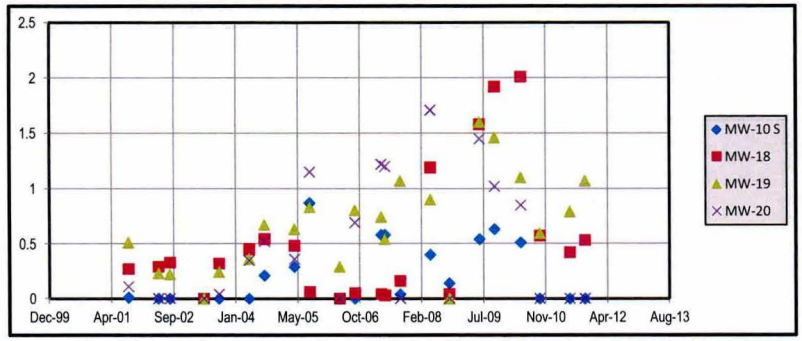
[b]MW-18 NAPL thickness in ft 0.42

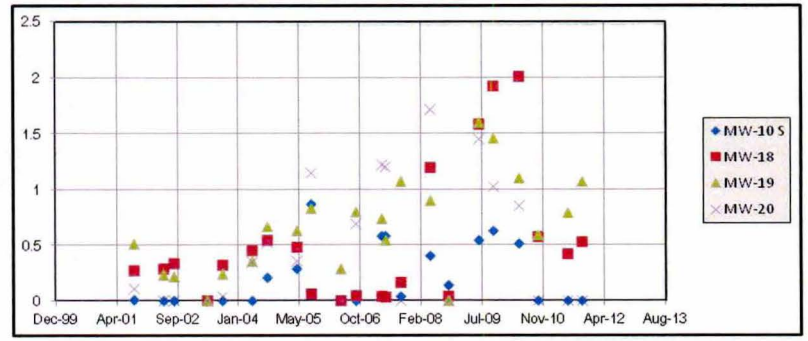
[c]MW-19 NAPL thickness in ft 0.79

[d]MW-18 NAPL thickness in ft 0.53

[e]MW-19 NAPL thickness in ft 1.07

Data Source for Graph	Sep-01	May-02	Aug-02	May-03	Sep-03	May-04	Sep-04	May-05	Sep-05	May-06	Sep-06	Apr-07	May-07	Sep-07	May-08	Oct-08	Jun-09	Oct-09	May-10	Oct-10	Jun-11	Oct-11
MW-10 S	0.01	0	0	0	0	0	0.21	0.29	0.87	0	0	0.58	0.58	0.04	0.4	0.14	0.54	0.63	0.51	0	0	0
MW-18	0.27	0.29	0.33	0	0.32	0.45	0.54	0.48	0.06	0	0.05	0.04	0.03	0.16	1.19	0.04	1.58	1.92	2.01	0.57	0.42	0.53
MW-19	0.51	0.23	0.22	0	0.2416	0.36	0.67	0.63	0.83	0.29	0.8	0.74	0.54	1.07	0.9	0	1.6	1.46	1.1	0.59	0.79	1.07
MW-20	0.11	0	0	0	0.04	0.35	0.52	0.36	1.15	0	0.69	1.22	1.2	0	1.71	0	1.45	1.02	0.85	0	0	0





Appendix D

Residential Well Memorandums

CH2M HILL
135 South 84th Street
Suite 400
Milwaukee, WI 53214
Tel 414.272.2426
Fax 414.272.4408

CH2MHILL

August 8, 2010

Ms. Denise Boone
Remedial Project Manager (SR-6J)
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL 60604-3507

Subject: Subcontract No. 599, June 2011 Sampling Results
Penta Wood Products Site, Town of Daniels, Wisconsin
Long-Term Response Action (LTRA)
WA No. 132-LRLR-05WE, Contract No. EP-S5-06-01

Dear Denise:

Please find the enclosed results of the residential and potable well semi-annual groundwater sampling event that took place between June 27, 2011 and June 30, 2011. This sampling event included the analysis of pentachlorophenol (PCP), benzene, ethylbenzene, toluene, xylene (BTEX), and naphthalene. The following table provides information on the residential wells where samples were collected.

LTRA Residential Well Information

Penta Wood Products Site – Town of Daniels, Wisconsin

Location ID	Resident Name	Resident Address	Resident Phone Number	WI Well No.
RW01	Bill Ellis (formerly Skold)	8713 Daniels 70	(715) 349-5840	SX 303
RW02	LaVonne Brethorst	8627 Daniels 70	(715) 349-5237	Unknown
RW03	Ken and Sheri Nelson	Daniels 70 (same driveway as V. Engstrom)	(715) 349-8070	JB 251
RW04	Vayne Engstrom	8526 Daniels 70	(715) 349-5212	AN 547
RW05	Timothy Tjader	8783 Daniels 70	(715) 349-5192	Unknown

All analyses were performed by Environmental Monitoring & Technologies, Inc. (EMT) of Morton Grove, Illinois. Analytical results were received by CH2M HILL on July 30, 2011 and were submitted under a cover letter dated August 8, 2011 to the United States Environmental Protection Agency (USEPA) for validation. The following summary is based on a review of the data before receiving final validation results from USEPA.

The results of the June 2011 semi-annual groundwater sampling event showed no detections of BTEX, naphthalene or PCP in any of the residential wells.

If you have any questions or comments, please contact me at 414.272.1052, ext. 40227, or Keli McKenna at ext. 40561.

Sincerely,

CH2M HILL

Shannon M. Olson

Shannon Olson
Project Chemist

Enclosure

cc: Pat Vogtman, PO/USEPA Region 5 (w/o enclosure)
Parveen Vij, CO/USEPA Region 5 (w/o enclosure)
Phil Richard/WDNR
Keli McKenna, SM/CH2M HILL, Milwaukee
Mike Niebauer, ASM/CH2M HILL, Milwaukee
Phil Smith, RTL/CH2M HILL, Milwaukee
Ike Johnson, PM/CH2M HILL, Milwaukee
Dan Plomb, DPM/CH2M HILL, Milwaukee
Jewelle Keiser, QAM/CH2M HILL, Milwaukee
Dave Shekoski, Sample Coordinator/CH2M HILL, Milwaukee
Cherie Wilson, AA/CH2M HILL, Milwaukee

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin • Morton Grove, IL 60053-3203
847.967.6666 • 800.246.0663 • fax: 847.967.6735 • www.emt.com

Report of Laboratory Analysis

RW-01

CLIENT: CH2M HILL
Lab Order: 11070011
Project: 344511/Penta Wood Products Site
Lab ID: 11070011-01

Client Sample ID: 11CP05-10
Report Date: 7/11/2011
Collection Date: 6/30/2011 11:55:00 AM
Matrix: Groundwater

Analyses	Result	EMT Reporting Limit	Qual	Units	MDL	Date Analyzed	Batch	DF	Analyst
Semivolatile Organic Compounds GC/MS		**Method:**		**SW 8270D / SW3510C**					
Naphthalene	< 1.	1.		µg/L	0.409	7/4/11 06:43	67187	1.00	MNN
Surrogates:									
2-Fluorobiphenyl	113	20-140		%REC	0	7/4/11 06:43	67187	1.00	MNN
4-Terphenyl-d14	131	20-140		%REC	0	7/4/11 06:43	67187	1.00	MNN
Nitrobenzene-d5	116	20-140		%REC	0	7/4/11 06:43	67187	1.00	MNN
Solvent Extractable Compounds by HPLC		**Method:**		**SW 8321 / SW3510C**					
Pentachlorophenol	< 0.1	0.1		µg/L	0.0702	7/5/11	67190	1.00	LBI
Surrogates:									
3,5-Dichlorobenzoic Acid	63.9	40-140		%REC	0	7/5/11	67190	1.00	LBI
Volatile Organic Compounds by GC/MS		**Method:**		**SW 8260B / SW5030A**					
Benzene	< 0.1	0.1		µg/L	0.0400	7/9/11 06:27	67294	1.00	JL
Ethylbenzene	< 0.4	0.4		µg/L	0.0300	7/9/11 06:27	67294	1.00	JL
Toluene	< 0.4	0.4		µg/L	0.0434	7/9/11 06:27	67294	1.00	JL
Xylenes, Total	< 1.	1.		µg/L	0.120	7/9/11 06:27	67294	1.00	JL
Surrogates:									
4-Bromofluorobenzene	97.0	75-135		%REC	0	7/9/11 06:27	67294	1.00	JL
Fluorobenzene	98.3	75-135		%REC	0	7/9/11 06:27	67294	1.00	JL
Toluene-d8	99.0	75-135		%REC	0	7/9/11 06:27	67294	1.00	JL

Qualifiers:

B - Analyte detected in the associated Method Blank
E - Estimated
H - Holding Time Exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
J - Analyte detected below quantitation limits

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8100 North Austin • Morton Grove, IL 60053-3203
847.967.6666 • 800.246.0663 • fax: 847.967.6735 • www.emt.com

Report of Laboratory Analysis

RW-01 FR

CLIENT: CH2M HILL
Lab Order: 11070011
Project: 344511/Penta Wood Products Site
Lab ID: 11070011-02

Client Sample ID: 11CP05-11
Report Date: 7/11/2011
Collection Date: 6/30/2011 11:55:00 AM
Matrix: Groundwater

Analyses	Result	EMT Reporting Limit	Qual	Units	MDL	Date Analyzed	Batch	DF	Analyst
Semivolatile Organic Compounds GC/MS		**Method:**		**SW 8270D / SW3510C**					
Naphthalene	< 1.	1.		µg/L	0.410	7/4/11 07:26	67187	1.00	MNN
Surrogates:									
2-Fluorobiphenyl	84.3	20-140		%REC	0	7/4/11 07:26	67187	1.00	MNN
4-Terphenyl-d14	136	20-140		%REC	0	7/4/11 07:26	67187	1.00	MNN
Nitrobenzene-d5	82.8	20-140		%REC	0	7/4/11 07:26	67187	1.00	MNN
Solvent Extractable Compounds by HPLC		**Method:**		**SW 8321 / SW3510C**					
Pentachlorophenol	< 0.1	0.1		µg/L	0.0706	7/5/11	67190	1.00	LBI
Surrogates:									
3,5-Dichlorobenzoic Acid	54.2	40-140		%REC	0	7/5/11	67190	1.00	LBI
Volatile Organic Compounds by GC/MS		**Method:**		**SW 8260B / SW5030A**					
Benzene	< 0.1	0.1		µg/L	0.0400	7/9/11 07:01	67294	1.00	JL
Ethylbenzene	< 0.4	0.4		µg/L	0.0300	7/9/11 07:01	67294	1.00	JL
Toluene	< 0.4	0.4		µg/L	0.0434	7/9/11 07:01	67294	1.00	JL
Xylenes, Total	< 1.	1.		µg/L	0.120	7/9/11 07:01	67294	1.00	JL
Surrogates:									
4-Bromofluorobenzene	99.2	75-135		%REC	0	7/9/11 07:01	67294	1.00	JL
Fluorobenzene	103	75-135		%REC	0	7/9/11 07:01	67294	1.00	JL
Toluene-d8	99.5	75-135		%REC	0	7/9/11 07:01	67294	1.00	JL

Qualifiers:

B - Analyte detected in the associated Method Blank
E - Estimated
H - Holding Time Exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
J - Analyte detected below quantitation limits

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Report of Laboratory Analysis

CLIENT: CH2M HILL
Lab Order: 11070011
Project: 344511/Penta Wood Products Site
Lab ID: 11070011-03

Client Sample ID: 11CP05-12 RW-02
Report Date: 7/11/2011
Collection Date: 6/30/2011 10:25:00 AM
Matrix: Groundwater

Analyses	Result	EMT Reporting Limit	Qual	Units	MDL	Date Analyzed	Batch	DF	Analyst
Semivolatile Organic Compounds GC/MS		**Method:**		**SW 8270D / SW3510C**					
Naphthalene	< 1.	1.		µg/L	0.410	7/4/11 08:09	67187	1.00	MNN
Surrogates:									
2-Fluorobiphenyl	93.8	20-140		%REC	0	7/4/11 08:09	67187	1.00	MNN
4-Terphenyl-d14	128	20-140		%REC	0	7/4/11 08:09	67187	1.00	MNN
Nitrobenzene-d5	92.3	20-140		%REC	0	7/4/11 08:09	67187	1.00	MNN
Solvent Extractable Compounds by HPLC		**Method:**		**SW 8321 / SW3510C**					
Pentachlorophenol	< 0.1	0.1		µg/L	0.0702	7/5/11	67190	1.00	LBI
Surrogates:									
3,5-Dichlorobenzoic Acid	69.7	40-140		%REC	0	7/5/11	67190	1.00	LBI
Volatile Organic Compounds by GC/MS		**Method:**		**SW 8260B / SW5030A**					
Benzene	< 0.1	0.1		µg/L	0.0400	7/9/11 07:34	67294	1.00	JL
Ethylbenzene	< 0.4	0.4		µg/L	0.0300	7/9/11 07:34	67294	1.00	JL
Toluene	< 0.4	0.4		µg/L	0.0434	7/9/11 07:34	67294	1.00	JL
Xylenes, Total	< 1.	1.		µg/L	0.120	7/9/11 07:34	67294	1.00	JL
Surrogates:									
4-Bromofluorobenzene	102	75-135		%REC	0	7/9/11 07:34	67294	1.00	JL
Fluorobenzene	104	75-135		%REC	0	7/9/11 07:34	67294	1.00	JL
Toluene-d8	103	75-135		%REC	0	7/9/11 07:34	67294	1.00	JL

Qualifiers:

B - Analyte detected in the associated Method Blank
E - Estimated
H - Holding Time Exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
J - Analyte detected below quantitation limits

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Report of Laboratory Analysis

CLIENT: CH2M HILL
Lab Order: 11070011
Project: 344511/Penta Wood Products Site
Lab ID: 11070011-04

Client Sample ID: 11CP05-13 RW-03
Report Date: 7/11/2011
Collection Date: 6/30/2011 11:12:00 AM
Matrix: Groundwater

Analyses	Result	EMT Reporting Limit	Qual	Units	MDL	Date Analyzed	Batch	DF	Analyst
Semivolatile Organic Compounds GC/MS		**Method:**		**SW 8270D / SW3510C**					
Naphthalene	< 0.99	0.99		µg/L	0.407	7/4/11 08:52	67187	1.00	MNN
Surrogates:									
2-Fluorobiphenyl	122	20-140		%REC	0	7/4/11 08:52	67187	1.00	MNN
4-Terphenyl-d14	126	20-140		%REC	0	7/4/11 08:52	67187	1.00	MNN
Nitrobenzene-d5	112	20-140		%REC	0	7/4/11 08:52	67187	1.00	MNN
Solvent Extractable Compounds by HPLC		**Method:**		**SW 8321 / SW3510C**					
Pentachlorophenol	< 0.1	0.1		µg/L	0.0700	7/5/11	67190	1.00	LBI
Surrogates:									
3,5-Dichlorobenzoic Acid	68.5	40-140		%REC	0	7/5/11	67190	1.00	LBI
Volatile Organic Compounds by GC/MS		**Method:**		**SW 8260B / SW5030A**					
Benzene	< 0.1	0.1		µg/L	0.0400	7/9/11 08:08	67294	1.00	JL
Ethylbenzene	< 0.4	0.4		µg/L	0.0300	7/9/11 08:08	67294	1.00	JL
Toluene	< 0.4	0.4		µg/L	0.0434	7/9/11 08:08	67294	1.00	JL
Xylenes, Total	< 1.	1.		µg/L	0.120	7/9/11 08:08	67294	1.00	JL
Surrogates:									
4-Bromofluorobenzene	101	75-135		%REC	0	7/9/11 08:08	67294	1.00	JL
Fluorobenzene	104	75-135		%REC	0	7/9/11 08:08	67294	1.00	JL
Toluene-d8	101	75-135		%REC	0	7/9/11 08:08	67294	1.00	JL

Qualifiers:

- B - Analyte detected in the associated Method Blank
- E - Estimated
- H - Holding Time Exceeded
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- J - Analyte detected below quantitation limits

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Report of Laboratory Analysis

CLIENT: CH2M HILL
Lab Order: 11070011
Project: 344511/Penta Wood Products Site
Lab ID: 11070011-05

Client Sample ID: 11CP05-14 RW-04
Report Date: 7/11/2011
Collection Date: 6/30/2011 10:50:00 AM
Matrix: Groundwater

Analyses	Result	EMT Reporting Limit	Qual	Units	MDL	Date Analyzed	Batch	DF	Analyst
Semivolatile Organic Compounds GC/MS		**Method:**		**SW 8270D / SW3510C**					
Naphthalene	< 0.99	0.99		µg/L	0.407	7/4/11 09:35	67187	1.00	MNN
Surrogates:									
2-Fluorobiphenyl	120	20-140		%REC	0	7/4/11 09:35	67187	1.00	MNN
4-Terphenyl-d14	141	20-140	S	%REC	0	7/4/11 09:35	67187	1.00	MNN
Nitrobenzene-d5	107	20-140		%REC	0	7/4/11 09:35	67187	1.00	MNN
Solvent Extractable Compounds by HPLC		**Method:**		**SW 8321 / SW3510C**					
Pentachlorophenol	< 0.1	0.1		µg/L	0.0703	7/5/11	67190	1.00	LBI
Surrogates:									
3,5-Dichlorobenzoic Acid	65.0	40-140		%REC	0	7/5/11	67190	1.00	LBI
Volatile Organic Compounds by GC/MS		**Method:**		**SW 8260B / SW5030A**					
Benzene	< 0.1	0.1		µg/L	0.0400	7/9/11 03:02	67294	1.00	JL
Ethylbenzene	< 0.4	0.4		µg/L	0.0300	7/9/11 03:02	67294	1.00	JL
Toluene	< 0.4	0.4		µg/L	0.0434	7/9/11 03:02	67294	1.00	JL
Xylenes, Total	< 1.	1.		µg/L	0.120	7/9/11 03:02	67294	1.00	JL
Surrogates:									
4-Bromofluorobenzene	98.3	75-135		%REC	0	7/9/11 03:02	67294	1.00	JL
Fluorobenzene	99.6	75-135		%REC	0	7/9/11 03:02	67294	1.00	JL
Toluene-d8	100	75-135		%REC	0	7/9/11 03:02	67294	1.00	JL

Qualifiers:

B - Analyte detected in the associated Method Blank
E - Estimated
H - Holding Time Exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
J - Analyte detected below quantitation limits

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Report of Laboratory Analysis

RW-05

CLIENT: CH2M HILL
Lab Order: 11070011
Project: 344511/Penta Wood Products Site
Lab ID: 11070011-06

Client Sample ID: 11CP05-15
Report Date: 7/11/2011
Collection Date: 6/30/2011 11:31:00 AM
Matrix: Groundwater

Analyses	Result	EMT Reporting Limit	Qual	Units	MDL	Date Analyzed	Batch	DF	Analyst
Semivolatile Organic Compounds GC/MS		**Method:**		**SW 8270D / SW3510C**					
Naphthalene	< 0.99	0.99		µg/L	0.406	7/4/11 10:18	67187	1.00	MNN
Surrogates:									
2-Fluorobiphenyl	128	20-140		%REC	0	7/4/11 10:18	67187	1.00	MNN
4-Terphenyl-d14	134	20-140		%REC	0	7/4/11 10:18	67187	1.00	MNN
Nitrobenzene-d5	117	20-140		%REC	0	7/4/11 10:18	67187	1.00	MNN
Solvent Extractable Compounds by HPLC		**Method:**		**SW 8321 / SW3510C**					
Pentachlorophenol	< 0.1	0.1		µg/L	0.0700	7/5/11	67190	1.00	LBI
Surrogates:									
3,5-Dichlorobenzoic Acid	73.5	40-140		%REC	0	7/5/11	67190	1.00	LBI
Volatile Organic Compounds by GC/MS		**Method:**		**SW 8260B / SW5030A**					
Benzene	< 0.1	0.1		µg/L	0.0400	7/9/11 08:41	67294	1.00	JL
Ethylbenzene	< 0.4	0.4		µg/L	0.0300	7/9/11 08:41	67294	1.00	JL
Toluene	< 0.4	0.4		µg/L	0.0434	7/9/11 08:41	67294	1.00	JL
Xylenes, Total	< 1.	1.		µg/L	0.120	7/9/11 08:41	67294	1.00	JL
Surrogates:									
4-Bromofluorobenzene	102	75-135		%REC	0	7/9/11 08:41	67294	1.00	JL
Fluorobenzene	101	75-135		%REC	0	7/9/11 08:41	67294	1.00	JL
Toluene-d8	103	75-135		%REC	0	7/9/11 08:41	67294	1.00	JL

Qualifiers:

B - Analyte detected in the associated Method Blank
E - Estimated
H - Holding Time Exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
J - Analyte detected below quantitation limits

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Report of Laboratory Analysis

CLIENT: CH2M HILL
Lab Order: 11070011
Project: 344511/Penta Wood Products Site
Lab ID: 11070011-07

Client Sample ID: 11CP05-01 DW-01
Report Date: 7/11/2011
Collection Date: 6/30/2011 12:45:00 PM
Matrix: Groundwater

Analyses	Result	EMT Reporting Limit	Qual	Units	MDL	Date Analyzed	Batch	DF	Analyst
Semivolatile Organic Compounds GC/MS		**Method:**		**SW 8270D / SW3510C**					
Naphthalene	< 1.	1.		µg/L	0.409	7/4/11 11:01	67187	1.00	MNN
Surrogates:									
2-Fluorobiphenyl	116	20-140		%REC	0	7/4/11 11:01	67187	1.00	MNN
4-Terphenyl-d14	135	20-140		%REC	0	7/4/11 11:01	67187	1.00	MNN
Nitrobenzene-d5	118	20-140		%REC	0	7/4/11 11:01	67187	1.00	MNN
Solvent Extractable Compounds by HPLC		**Method:**		**SW 8321 / SW3510C**					
Pentachlorophenol	< 0.1	0.1		µg/L	0.0698	7/5/11	67190	1.00	LBI
Surrogates:									
3,5-Dichlorobenzoic Acid	67.0	40-140		%REC	0	7/5/11	67190	1.00	LBI
Volatile Organic Compounds by GC/MS		**Method:**		**SW 8260B / SW5030A**					
Benzene	< 0.1	0.1		µg/L	0.0400	7/9/11 03:37	67294	1.00	JL
Ethylbenzene	< 0.4	0.4		µg/L	0.0300	7/9/11 03:37	67294	1.00	JL
Toluene	< 0.4	0.4		µg/L	0.0434	7/9/11 03:37	67294	1.00	JL
Xylenes, Total	< 1.	1.		µg/L	0.120	7/9/11 03:37	67294	1.00	JL
Surrogates:									
4-Bromofluorobenzene	98.3	75-135		%REC	0	7/9/11 03:37	67294	1.00	JL
Fluorobenzene	99.7	75-135		%REC	0	7/9/11 03:37	67294	1.00	JL
Toluene-d8	98.1	75-135		%REC	0	7/9/11 03:37	67294	1.00	JL

Qualifiers:

B - Analyte detected in the associated Method Blank
E - Estimated
H - Holding Time Exceeded
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
J - Analyte detected below quantitation limits

CH2M HILL
135 South 84th Street
Suite 400
Milwaukee, WI 53214
Tel 414.272.2426
Fax 414.272.4408

CH2MHILL

January 10, 2012

Ms. Linda Martin
Remedial Project Manager (SR-6J)
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL 60604-3507

Subject: Subcontract No. 599, October 2011 Sampling Results
Penta Wood Products Site, Town of Daniels, Wisconsin
Long-Term Response Action (LTRA)
WA No. 132-LRLR-05WE, Contract No. EP-S5-06-01

Dear Linda:

Please find the enclosed results of the residential and potable well annual groundwater sampling event that took place between October 18, 2011 and October 20, 2011. This sampling event included the analysis of pentachlorophenol (PCP), benzene, ethylbenzene, toluene, xylene (BTEX), and naphthalene. The following table provides information on the residential wells where samples were collected.

LTRA Residential Well Information
Penta Wood Products Site – Town of Daniels, Wisconsin

Location ID	Resident Name	Resident Address	Resident Phone Number	WI Well No.
RW01	Bill Ellis (formerly Skold)	8713 Daniels 70	(715) 349-5840	SX 303
RW02	LaVonne Brelhorst	8627 Daniels 70	(715) 349-5237	Unknown
RW03	Ken and Sheri Nelson	Daniels 70 (same driveway as V. Engstrom)	(715) 349-8070	JB 251
RW04	Vayne Engstrom	8526 Daniels 70	(715) 349-5212	AN 547
RW05	Timothy Tjader	8783 Daniels 70	(715) 349-5192	Unknown

All analyses were performed by TestAmerica Laboratories, Inc. of North Canton, Ohio. Analytical results were received by CH2M HILL on December 13, 2011. During a review of the preliminary results, CH2M HILL's project chemist observed an estimated detection of PCP at 0.040 micrograms per liter (below the project action limit of 0.1 micrograms per liter) in residential well RW01 (12CP01-44). The field replicate (12CP01-45) reported an estimated detection of PCP at 0.039 micrograms per liter. Since the presence of PCP in the residential wells is not likely and historic results have not shown confirmed PCP detections at the residential wells, RW01 was resampled on December 16. PCP was not detected in the reanalysis; therefore, the initial result was rejected for project use.

The annual groundwater results were submitted under a cover letter on December 15, 2011 to the U.S. Environmental Protection Agency (USEPA) for validation. The resampling results of RW01 was submitted for validation under a separate cover letter on January, 9th 2012. The following summary is based on a review of the data before receiving final validation results from USEPA.

The results of the October 2011 annual groundwater sampling event showed no detections of BTEX, naphthalene or PCP in any of the residential wells.

If you have any questions or comments, please contact me at 414.272.1052, ext. 40227, or Mike Niebauer at 608.298.7770.

Sincerely,

CH2M HILL

Allison Karpela on behalf of Shannon Olson

Shannon Olson
Project Chemist

Enclosure

cc: Pat Vogtman, PO/USEPA Region 5 (w/o enclosure)
Rhonda Flynn, CO/USEPA Region 5 (w/o enclosure)
Phil Richard/WDNR
Mike Niebauer, SM/CH2M HILL, Milwaukee
Shannon Olson, ASM/CH2M HILL, Milwaukee
Keli McKenna, RTL/CH2M HILL, Milwaukee
Ike Johnson, PM/CH2M HILL, Milwaukee
Dan Plomb, DPM/CH2M HILL, Milwaukee
Paul Arps, QAM/CH2M HILL, Milwaukee
Dave Shekoski, Sample Coordinator/CH2M HILL, Milwaukee
Cherie Wilson, AA/CH2M HILL, Milwaukee

Client: CH2M Hill, Inc.
Project/Site: Penta Wood Products Site

TestAmerica Job ID: 240-5138-1

Client Sample ID: 12CP01-01
Date Collected: 10/18/11 14:30
Date Received: 10/20/11 09:20

DW-01

Lab Sample ID: 240-5138-2
Matrix: Water

8

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.50	U	0.50	0.13	ug/L			11/01/11 00:16	1
Ethylbenzene	1.0	U	1.0	0.17	ug/L			11/01/11 00:16	1
Toluene	1.0	U	1.0	0.13	ug/L			11/01/11 00:16	1
Xylenes, Total	2.0	U	2.0	0.28	ug/L			11/01/11 00:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*63 - 129*		*11/01/11 00:16*	*1*
4-Bromofluorobenzene (Surr)	*94*		*66 - 117*		*11/01/11 00:16*	*1*
Toluene-d8 (Surr)	*107*		*74 - 115*		*11/01/11 00:16*	*1*
Dibromofluoromethane (Surr)	*90*		*75 - 121*		*11/01/11 00:16*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	0.19	U	0.19	0.096	ug/L		10/22/11 07:56	10/26/11 16:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*69*		*28 - 110*	*10/22/11 07:56*	*10/26/11 16:49*	*1*
2-Fluorophenol (Surr)	*75*		*10 - 110*	*10/22/11 07:56*	*10/26/11 16:49*	*1*
2,4,6-Tribromophenol (Surr)	*68*		*22 - 120*	*10/22/11 07:56*	*10/26/11 16:49*	*1*
Nitrobenzene-d5 (Surr)	*64*		*27 - 111*	*10/22/11 07:56*	*10/26/11 16:49*	*1*
Phenol-d5 (Surr)	*74*		*10 - 110*	*10/22/11 07:56*	*10/26/11 16:49*	*1*
Terphenyl-d14 (Surr)	*86*		*37 - 119*	*10/22/11 07:56*	*10/26/11 16:49*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	0.032	J	0.094	0.015	ug/L		10/24/11 17:20	11/02/11 18:16	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*54*		*32 - 140*	*10/24/11 17:20*	*11/02/11 18:16*	*4*
2,4-Dichlorophenylacetic acid	*52*		*32 - 140*	*10/24/11 17:20*	*11/02/11 18:41*	*4*

Client Sample ID: 12CP01-44
Date Collected: 10/20/11 08:50
Date Received: 10/22/11 09:45

RW-01

Lab Sample ID: 240-5191-5
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.50	U	0.50	0.13	ug/L			11/02/11 17:36	1
Ethylbenzene	1.0	U	1.0	0.17	ug/L			11/02/11 17:36	1
Toluene	1.0	U	1.0	0.13	ug/L			11/02/11 17:36	1
Xylenes, Total	2.0	U	2.0	0.28	ug/L			11/02/11 17:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*105*		*63 - 129*		*11/02/11 17:36*	*1*
4-Bromofluorobenzene (Surr)	*104*		*66 - 117*		*11/02/11 17:36*	*1*
Toluene-d8 (Surr)	*108*		*74 - 115*		*11/02/11 17:36*	*1*
Dibromofluoromethane (Surr)	*95*		*75 - 121*		*11/02/11 17:36*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	0.19	U	0.19	0.095	ug/L		10/26/11 08:20	10/28/11 15:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*45*		*28 - 110*	*10/26/11 08:20*	*10/28/11 15:33*	*1*
2-Fluorophenol (Surr)	*51*		*10 - 110*	*10/26/11 08:20*	*10/28/11 15:33*	*1*
2,4,6-Tribromophenol (Surr)	*30*		*22 - 120*	*10/26/11 08:20*	*10/28/11 15:33*	*1*
Nitrobenzene-d5 (Surr)	*46*		*27 - 111*	*10/26/11 08:20*	*10/28/11 15:33*	*1*
Phenol-d5 (Surr)	*50*		*10 - 110*	*10/26/11 08:20*	*10/28/11 15:33*	*1*
Terphenyl-d14 (Surr)	*77*		*37 - 119*	*10/26/11 08:20*	*10/28/11 15:33*	*1*

~~Method: 8151A~~ - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	~~0.040~~	~~J~~	0.095	0.015	ug/L		10/26/11 18:10	~~11/02/11 16:12~~	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*62*		*32 - 140*	*10/26/11 18:10*	*11/02/11 15:46*	*4*
2,4-Dichlorophenylacetic acid	*61*		*32 - 140*	*10/26/11 18:10*	*11/02/11 16:12*	*4*

Rejected, Result from reanalysis was used

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: Penta Wood Products Site

TestAmerica Job ID: 240-7070-1

Client Sample ID: 12CP01-50
Date Collected: 12/16/11 09:19
Date Received: 12/17/11 09:45

RW-01RE

Lab Sample ID: 240-7070-1
Matrix: Water

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	0.096	U	0.096	0.015	ug/L		12/22/11 08:27	12/27/11 09:14	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*30*	*X*	*32 - 140*	*12/22/11 08:27*	*12/27/11 09:14*	*4*
2,4-Dichlorophenylacetic acid	*32*		*32 - 140*	*12/22/11 08:27*	*12/27/11 09:39*	*4*

8

Client Sample ID: 12CP01-45
Date Collected: 10/20/11 08:55
Date Received: 10/22/11 09:45

RW-01 FR

Lab Sample ID: 240-5191-6
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.50	U	0.50	0.13	ug/L			11/02/11 17:59	1
Ethylbenzene	1.0	U	1.0	0.17	ug/L			11/02/11 17:59	1
Toluene	1.0	U	1.0	0.13	ug/L			11/02/11 17:59	1
Xylenes, Total	2.0	U	2.0	0.28	ug/L			11/02/11 17:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*63 - 129*		*11/02/11 17:59*	*1*
4-Bromofluorobenzene (Surr)	*100*		*66 - 117*		*11/02/11 17:59*	*1*
Toluene-d8 (Surr)	*104*		*74 - 115*		*11/02/11 17:59*	*1*
Dibromofluoromethane (Surr)	*94*		*75 - 121*		*11/02/11 17:59*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	0.19	U	0.19	0.095	ug/L		10/26/11 08:20	10/28/11 15:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*36*		*28 - 110*	*10/26/11 08:20*	*10/28/11 15:49*	*1*
2-Fluorophenol (Surr)	*41*		*10 - 110*	*10/26/11 08:20*	*10/28/11 15:49*	*1*
2,4,6-Tribromophenol (Surr)	*21*	*X*	*22 - 120*	*10/26/11 08:20*	*10/28/11 15:49*	*1*
Nitrobenzene-d5 (Surr)	*36*		*27 - 111*	*10/26/11 08:20*	*10/28/11 15:49*	*1*
Phenol-d5 (Surr)	*39*		*10 - 110*	*10/26/11 08:20*	*10/28/11 15:49*	*1*
Terphenyl-d14 (Surr)	*51*		*37 - 119*	*10/26/11 08:20*	*10/28/11 15:49*	*1*

~~Method: 8151A~~ - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	0.039	J	0.095	0.015	ug/L		10/26/11 18:10	11/02/11 17:02	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*64*		*32 - 140*	*10/26/11 18:10*	*11/02/11 16:37*	*4*
2,4-Dichlorophenylacetic acid	*62*		*32 - 140*	*10/26/11 18:10*	*11/02/11 17:02*	*4*

Rejected, Result from reanalysis was used

Client: CH2M Hill, Inc.
Project/Site: Penta Wood Products Site

TestAmerica Job ID: 240-7070-1

Client Sample ID: 12CP01-51
Date Collected: 12/16/11 09:22
Date Received: 12/17/11 09:45

RW-01FR RE

Lab Sample ID: 240-7070-2
Matrix: Water

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	0.031	J	0.096	0.015	ug/L		12/22/11 08:27	12/27/11 10:29	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*30*	*X*	*32 - 140*	*12/22/11 08:27*	*12/27/11 10:04*	*4*
2,4-Dichlorophenylacetic acid	*40*		*32 - 140*	*12/22/11 08:27*	*12/27/11 10:29*	*4*

8

Client Sample ID: 12CP01-46
Date Collected: 10/20/11 14:57
Date Received: 10/22/11 09:45

RW-02

Lab Sample ID: 240-5191-3
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.50	U	0.50	0.13	ug/L			11/02/11 16:51	1
Ethylbenzene	1.0	U	1.0	0.17	ug/L			11/02/11 16:51	1
Toluene	1.0	U	1.0	0.13	ug/L			11/02/11 16:51	1
Xylenes, Total	2.0	U	2.0	0.28	ug/L			11/02/11 16:51	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*105*		*63 - 129*		*11/02/11 16:51*	*1*
4-Bromofluorobenzene (Surr)	*105*		*66 - 117*		*11/02/11 16:51*	*1*
Toluene-d8 (Surr)	*108*		*74 - 115*		*11/02/11 16:51*	*1*
Dibromofluoromethane (Surr)	*91*		*75 - 121*		*11/02/11 16:51*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	0.20	U	0.20	0.099	ug/L		10/26/11 08:20	10/28/11 15:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*56*		*28 - 110*	*10/26/11 08:20*	*10/28/11 15:00*	*1*
2-Fluorophenol (Surr)	*63*		*10 - 110*	*10/26/11 08:20*	*10/28/11 15:00*	*1*
2,4,6-Tribromophenol (Surr)	*38*		*22 - 120*	*10/26/11 08:20*	*10/28/11 15:00*	*1*
Nitrobenzene-d5 (Surr)	*54*		*27 - 111*	*10/26/11 08:20*	*10/28/11 15:00*	*1*
Phenol-d5 (Surr)	*61*		*10 - 110*	*10/26/11 08:20*	*10/28/11 15:00*	*1*
Terphenyl-d14 (Surr)	*75*		*37 - 119*	*10/26/11 08:20*	*10/28/11 15:00*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	0.095	U	0.095	0.015	ug/L		10/26/11 18:10	11/02/11 11:11	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*50*		*32 - 140*	*10/26/11 18:10*	*11/02/11 10:46*	*4*
2,4-Dichlorophenylacetic acid	*50*		*32 - 140*	*10/26/11 18:10*	*11/02/11 11:11*	*4*

Client: CH2M Hill, Inc.
Project/Site: Penta Wood Products Site

TestAmerica Job ID: 240-5191-2

Client Sample ID: 12CP01-47
Date Collected: 10/20/11 13:50
Date Received: 10/22/11 09:45

RW-03

Lab Sample ID: 240-5191-7
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.50	U	0.50	0.13	ug/L			11/02/11 18:21	1
Ethylbenzene	1.0	U	1.0	0.17	ug/L			11/02/11 18:21	1
Toluene	1.0	U	1.0	0.13	ug/L			11/02/11 18:21	1
Xylenes, Total	2.0	U	2.0	0.28	ug/L			11/02/11 18:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*63 - 129*		*11/02/11 18:21*	*1*
4-Bromofluorobenzene (Surr)	*104*		*66 - 117*		*11/02/11 18:21*	*1*
Toluene-d8 (Surr)	*107*		*74 - 115*		*11/02/11 18:21*	*1*
Dibromofluoromethane (Surr)	*92*		*75 - 121*		*11/02/11 18:21*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	0.19	U	0.19	0.096	ug/L		10/26/11 08:20	10/28/11 16:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*56*		*28 - 110*	*10/26/11 08:20*	*10/28/11 16:06*	*1*
2-Fluorophenol (Surr)	*64*		*10 - 110*	*10/26/11 08:20*	*10/28/11 16:06*	*1*
2,4,6-Tribromophenol (Surr)	*31*		*22 - 120*	*10/26/11 08:20*	*10/28/11 16:06*	*1*
Nitrobenzene-d5 (Surr)	*58*		*27 - 111*	*10/26/11 08:20*	*10/28/11 16:06*	*1*
Phenol-d5 (Surr)	*62*		*10 - 110*	*10/26/11 08:20*	*10/28/11 16:06*	*1*
Terphenyl-d14 (Surr)	*76*		*37 - 119*	*10/26/11 08:20*	*10/28/11 16:06*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	0.095	U	0.095	0.015	ug/L		10/26/11 18:10	11/02/11 17:51	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*66*		*32 - 140*	*10/26/11 18:10*	*11/02/11 17:26*	*4*
2,4-Dichlorophenylacetic acid	*69*		*32 - 140*	*10/26/11 18:10*	*11/02/11 17:51*	*4*

Client: CH2M Hill, Inc.
Project/Site: Penta Wood Products Site

TestAmerica Job ID: 240-5191-2

Client Sample ID: 12CP01-48
Date Collected: 10/20/11 15:20
Date Received: 10/22/11 09:45

RW-04

Lab Sample ID: 240-5191-4
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.50	U	0.50	0.13	ug/L			11/02/11 17:14	1
Ethylbenzene	1.0	U	1.0	0.17	ug/L			11/02/11 17:14	1
Toluene	1.0	U	1.0	0.13	ug/L			11/02/11 17:14	1
Xylenes, Total	2.0	U	2.0	0.28	ug/L			11/02/11 17:14	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*105*		*63 - 129*		*11/02/11 17:14*	*1*
4-Bromofluorobenzene (Surr)	*101*		*66 - 117*		*11/02/11 17:14*	*1*
Toluene-d8 (Surr)	*105*		*74 - 115*		*11/02/11 17:14*	*1*
Dibromofluoromethane (Surr)	*92*		*75 - 121*		*11/02/11 17:14*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	0.19	U	0.19	0.095	ug/L		10/26/11 08:20	10/28/11 15:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*51*		*28 - 110*	*10/26/11 08:20*	*10/28/11 15:16*	*1*
2-Fluorophenol (Surr)	*56*		*10 - 110*	*10/26/11 08:20*	*10/28/11 15:16*	*1*
2,4,6-Tribromophenol (Surr)	*36*		*22 - 120*	*10/26/11 08:20*	*10/28/11 15:16*	*1*
Nitrobenzene-d5 (Surr)	*50*		*27 - 111*	*10/26/11 08:20*	*10/28/11 15:16*	*1*
Phenol-d5 (Surr)	*56*		*10 - 110*	*10/26/11 08:20*	*10/28/11 15:16*	*1*
Terphenyl-d14 (Surr)	*74*		*37 - 119*	*10/26/11 08:20*	*10/28/11 15:16*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	0.095	U	0.095	0.015	ug/L		10/26/11 18:10	11/02/11 15:21	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*54*		*32 - 140*	*10/26/11 18:10*	*11/02/11 14:57*	*4*
2,4-Dichlorophenylacetic acid	*56*		*32 - 140*	*10/26/11 18:10*	*11/02/11 15:21*	*4*

Client: CH2M Hill, Inc.
Project/Site: Penta Wood Products Site

TestAmerica Job ID: 240-5191-2

Client Sample ID: 12CP01-49
Date Collected: 10/20/11 16:15
Date Received: 10/22/11 09:45

RW-05

Lab Sample ID: 240-5191-2
Matrix: Water

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.50	U	0.50	0.13	ug/L			11/02/11 16:28	1
Ethylbenzene	1.0	U	1.0	0.17	ug/L			11/02/11 16:28	1
Toluene	1.0	U	1.0	0.13	ug/L			11/02/11 16:28	1
Xylenes, Total	2.0	U	2.0	0.28	ug/L			11/02/11 16:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*106*		*63 - 129*		*11/02/11 16:28*	*1*
4-Bromofluorobenzene (Surr)	*109*		*66 - 117*		*11/02/11 16:28*	*1*
Toluene-d8 (Surr)	*109*		*74 - 115*		*11/02/11 16:28*	*1*
Dibromofluoromethane (Surr)	*96*		*75 - 121*		*11/02/11 16:28*	*1*

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	0.19	U	0.19	0.096	ug/L		10/26/11 08:20	10/28/11 14:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*50*		*28 - 110*	*10/26/11 08:20*	*10/28/11 14:43*	*1*
2-Fluorophenol (Surr)	*57*		*10 - 110*	*10/26/11 08:20*	*10/28/11 14:43*	*1*
2,4,6-Tribromophenol (Surr)	*40*		*22 - 120*	*10/26/11 08:20*	*10/28/11 14:43*	*1*
Nitrobenzene-d5 (Surr)	*49*		*27 - 111*	*10/26/11 08:20*	*10/28/11 14:43*	*1*
Phenol-d5 (Surr)	*54*		*10 - 110*	*10/26/11 08:20*	*10/28/11 14:43*	*1*
Terphenyl-d14 (Surr)	*72*		*37 - 119*	*10/26/11 08:20*	*10/28/11 14:43*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	0.095	U	0.095	0.015	ug/L		10/26/11 18:10	11/02/11 10:21	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*56*		*32 - 140*	*10/26/11 18:10*	*11/02/11 09:56*	*4*
2,4-Dichlorophenylacetic acid	*49*		*32 - 140*	*10/26/11 18:10*	*11/02/11 10:21*	*4*

Appendix E

Data Quality Memorandums

Data Usability Evaluation of the Groundwater Samples Collected at the Penta Wood Products Site, Siren, Wisconsin

PREPARED FOR: U.S. Environmental Protection Agency

PREPARED BY: Shannon Olson/CH2M HILL

DATE: June 13, 2012

Introduction

The objective of the Data Quality Evaluation memorandum is to assess the data quality of analytical results for samples collected during the semiannual and annual groundwater field investigations conducted at the Penta Wood Products Site in Siren, Wisconsin, from June 28 to June 30, from October 18 to October 20 and December 16, 2011. Samples were collected and analyzed with the objective to assess existing groundwater contaminant concentrations and monitor the ongoing natural attenuation process. Individual method requirements and guidelines from the Quality Assurance Project Plan (QAPP) (CH2M HILL, February 2005), *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (June 2008) and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (January 2010) were used in this assessment.

This report is intended as a general data quality assessment designed to summarize data issues.

Analytical Data

The following are the analytical laboratory analyses for samples collected:

- Semiannual Sampling Event - June 2011
    - Five residential wells (RW-01, RW-02, RW-03, RW-04 and RW-05), one potable well (DW-01) and one field replicate (FR) were analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX), pentachlorophenol (PCP) and naphthalene.
    - Five monitoring wells (MW-12, MW-15, MW-19, MW-22 and MW-26), one matrix spike/matrix spike duplicate (MS/MSD) and one FR were analyzed for BTEX, PCP, naphthalene, dissolved metals (arsenic, copper, iron, manganese and zinc), methane, alkalinity, chloride, sulfate, nitrate, sulfide, total organic carbon (TOC) and hardness.

  - Two equipment/field blanks and fifteen trip blanks were collected during the sampling event to evaluate field sampling and decontamination procedures.

- Annual Sampling Event - October 2011
  - Five residential wells (RW-01, RW-02, RW-03, RW-04 and RW-05), one potable well (DW-01) and one FR were analyzed for BTEX, PCP and naphthalene.
  - Sixteen monitoring wells (MW-02, MW-03, MW-05, MW-06S, MW-07, MW-09, MW-10, MW-12, MW-15, MW-16, MW-17, MW-19, MW-22, MW-26, MW-27 and MW-28), one MS/MSD and two FR's were analyzed for BTEX, PCP, naphthalene, dissolved metals (arsenic, copper, iron, manganese and zinc), methane, alkalinity, chloride, sulfate, nitrate, sulfide, TOC and hardness.
  - Three equipment/field blanks and two trip blanks were collected during the sampling event to evaluate field sampling and decontamination procedures.

The semiannual samples were analyzed by Environmental Monitoring Technologies (EMT) of Morton Grove, Illinois and CT Laboratories (CT) of Baraboo, Wisconsin. Test America, Inc. (TA) of North Canton, Ohio analyzed the annual samples. All monitoring well and residential well sample result packages were reviewed by the USEPA Environmental Services Assistance Team (ESAT) contractor. Attachment 1 contains the case narratives prepared by Techlaw ESAT during data reviews. The findings of the reviews are summarized below.

Samples were collected and shipped by overnight carrier to the laboratories for analysis. Selected samples were analyzed for one or more of the analytes/methods in Table 1.

TABLE 1
Analytical Parameters

Parameter	Method	Laboratory
BTEX	SW-846 8260B	EMT/TA
PCP	SW-846 8321/SW-846 8151	EMT/TA
Naphthalene	SW-846 8260C	EMT/TA
Dissolved Metals	SW-846 6020	EMT/TA
Methane	RSK-175	CT/TA
Alkalinity	EPA 310.1	EMT/TA
Chloride	SW-846 9056/EPA 325.2	EMT/TA
Sulfate	SW-846 9056/EPA 375.4	EMT/TA
Nitrate	SW-846 9056/EPA 300.0	EMT/TA
Sulfide	EPA 376.2/EPA 376.1	EMT/TA
Total Organic Carbon	SW-846 9060	EMT/TA
Hardness	Calculated	NA

NA = not applicable

The ESAT assessment of data included a review of the following:

- Chain-of-custody documentation
- Holding-time compliance
- Required QC samples at the specified frequencies
- Flagging for method blanks
- Laboratory control spiking samples
- Surrogate spike recoveries for organic analyses
- Analytical spike data
- MS/MSD samples on a site/location basis
- Calibration data
- Equipment/Field blank samples
- Field duplicate samples
- Trip blank samples

Findings

The following sections summarize the data validation findings and usability of the final reportable results. The sample numbers and locations do not include quality assurance/QC samples.

BTEX Data

BTEX data were assessed from 31 groundwater samples collected at 21 locations. The data were analyzed through EMT and/or TA, and 100 percent were reviewed by the USEPA contractor, ESAT.

In summary of the BTEX data, "U" or "J" qualifiers were applied to sample results that were potentially affected by QC deficiencies. "J" qualifiers were applied to sample results that were reported between the method detection limit (MDL) and the reporting limit (RL).

None of the reported BTEX results were rejected. One hundred percent of the data, as qualified, can be used to make project decisions.

SVOC Data

Naphthalene and PCP data were assessed from 31 groundwater samples collected at 21 locations. The data were analyzed through EMT and/or TA, and 100 percent were reviewed by the USEPA contractor, ESAT.

In summary of the naphthalene and PCP data, "U", "UJ" or "J" qualifiers were applied to sample results that were potentially affected by QC deficiencies. One PCP surrogate for samples 12CP01-50 and 12CP01-51, was recovered below the lower control limit. Detected parent sample results were qualified and flagged "J" as estimated in quantity, and non-detected sample results were qualified and flagged "UJ" as undetected and estimated in quantity. "J" qualifiers were also applied to sample results that were reported between the MDL and the RL.

None of the reported naphthalene and PCP results were rejected. One hundred percent of the data, as qualified, can be used to make project decisions.

Methane Data

Methane data were assessed for 21 groundwater samples collected at 16 locations. The data were analyzed through CT and/or TA, and 100 percent were reviewed by the USEPA contractor, ESAT.

In summary of the methane data, "U" or "J" qualifiers were applied to sample results that were potentially affected by QC deficiencies. All samples must be analyzed within 12 hours of the daily continuing calibration. Samples 12CP01-27, 12CP01-31, 12CP01-32, 12CP01-39, 12CP01-42 and 12CP01-43 exceeded this requirement. Detected parent sample results were qualified and flagged "J" as estimated in quantity. "J" qualifiers were also applied to sample results that were reported between the MDL and the RL.

None of the reported methane results were rejected. One hundred percent of the data, as qualified, can be used to make project decisions.

Metal Data

Metal data were assessed for 21 groundwater samples collected at 16 locations. The data were analyzed through EMT and/or TA, and 100 percent were reviewed by the USEPA contractor, ESAT.

In summary of the metal data, "U", "UJ" or "J" qualifiers were applied to sample results that were potentially affected by QC deficiencies. The arsenic concentration for the low level check standard was found above the RL. Detected results for samples 11CP05-02 thru 11CP05-09 were qualified and flagged "J" as estimated in quantity, and non-detected sample results were qualified and flagged "UJ" as undetected and estimated in quantity. The preparation blank and/or continuing calibration blanks detected copper, iron and zinc above the MDL for the samples collected during the October annual groundwater event, indicating possible contamination. Sample results less than five times the amount found in any blank were raised to the laboratory RL and qualified as "U," not detected above the MDL and considered not detected. Sample results found to be greater than five times the amount found in the blank were qualified and flagged "J" as estimated in quantity. "J" qualifiers were also applied to sample results that were reported between the MDL and the RL.

None of the reported metal results were rejected. One hundred percent of the data, as qualified, can be used to make project decisions.

Wet Chemistry Data

Wet chemistry data were assessed for 21 groundwater samples collected at 16 locations. The data were analyzed through EMT and/or TA, and 100 percent were reviewed by the USEPA contractor, ESAT.

In summary of the metal data, "U", "UJ" or "J" qualifiers were applied to sample results that were potentially affected by QC deficiencies. Nitrate was analyzed past the 48-hour hold time for several samples collected during both the June semi-annual and the October annual groundwater sampling events. Detected parent sample results were

qualified and flagged "J" as estimated in quantity. An RL check is required to be met before samples can be analyzed for the alkalinity method. Samples 12CP01-02, 12CP01-03 and 12CP01-33 were qualified and flagged "UJ" as undetected and estimated in quantity due a lack this RL check. The laboratory control spike and the continuing calibration verification for chloride were recovered greater than control limits. Detected results for samples 11CP05-02, 11CP05-03 and 11CP05-08 were qualified and flagged "J" as estimated in quantity. The continuing calibration blanks detected chloride and TOC above the MDL for the samples collected during both groundwater events, indicating possible contamination. Sample results found to be greater than five times the amount found in the blank were qualified and flagged "J" as estimated in quantity. The equipment blank detected chloride and sulfide above the MDL for the samples collected during the October annual groundwater event, indicating possible contamination. Sample results less than five times the amount found in the blank were raised to the laboratory RL and qualified as "U," not detected above the MDL and considered not detected. "J" qualifiers were also applied to sample results that were reported between the MDL and the RL.

None of the reported wet chemistry results were rejected. One hundred percent of the data, as qualified, can be used to make project decisions.

Overall Assessment

The final activity in the data quality evaluation is an assessment of whether the data meet the data quality objectives. The goal of the assessment was to demonstrate that a sufficient number of representative samples were collected, and the resulting analytical data can be used to support the decision making process. The following summary highlights the data evaluation findings for the above-defined events:

1. The completeness objective of 90 percent was met for all method/analyte combinations.
2. The precision and accuracy of the data, as measured by field and laboratory QC indicators, indicate that the data quality objectives were met.

References

CH2M HILL. 2005. *Quality Assurance Project Plan, Penta Wood Products Long-Term Response Action, Town of Daniels, Wisconsin.* February.

USEPA. 2008. *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review.* June.

USEPA. 2010. *Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review.* January.

Data Usability Evaluation of the Treatment System Samples Collected at the Penta Wood Products Site, Siren, Wisconsin

PREPARED FOR: U.S. Environmental Protection Agency

PREPARED BY: Shannon Olson/CH2M HILL

DATE: June 13, 2012

This memorandum presents the data usability evaluation of the treatment system samples collected during 2011 conducted at the Penta Wood Products Site in Siren, Wisconsin. The sampling was performed by CH2M HILL. The analyses were performed by Environmental Monitoring Technologies (EMT) of Morton Grove, Illinois, Pace Analytical Services, Inc. (PA) of Minneapolis, Minnesota and Test America, Inc. (TA) of North Canton, Ohio.

The onsite treatment system is monitored per the Wisconsin Pollutant Discharge Elimination System (WPDES) permit WI-0061531-01-0, and is therefore required to collect the following:

- Quarterly sampling of the influent for pentachlorophenol (PCP) by SW-846 8321 or by SW-846 8151
- Weekly sampling of the effluent for PCP by SW-846 8321 or by SW-846 8151
- Monthly sampling of the effluent for naphthalene by SW-846 8270C and diesel range organics (DRO) by Wisconsin DRO method or by SW-846 8015
- Quarterly sampling of the effluent for chloride by SW-846 9056 or EPA 325.2 and total metals (arsenic, copper, iron, manganese and zinc) by SW-846 6020
- Annual sampling of the effluent for benzene, toluene, ethylbenzene and xylenes (BTEX) by SW-846 8260B, phenol by SW-846 8270C and 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) by SW-846 8290

One hundred percent of the data set underwent a forms review by CH2M HILL staff to assess the accuracy and precision of the data. Individual method requirements and guidelines from the Quality Assurance Project Plan (QAPP) (CH2M HILL, February 2005), *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (June 2008) and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (January 2010) were used in this assessment. Completeness of the data set was then derived. Data qualifiers were added by CH2M HILL validators when the QC statistics indicated a possible bias to specific compounds or analytes associated with a particular method and sample batch.

Standard data qualifiers were used as a means of classifying the data as to their conformance to QC requirements. The applied data qualifiers are defined as follows:

[U] The sample target was analyzed for, but was not detected above the level of the associated limit of detection or quantitation.

[UB] The analyte was detected in the associated blank above the level of the associated limit of detection or quantitation. The associated data were found to be less than five times the concentration detected in the blank and were qualified as not detected at the concentration measured.

[J] The associated value is an estimated quantity. This qualifier was appended when the data indicated the presence of a specific target analyte but was below the stated reporting (or quantitation) limit, and/or when quality control statistics alluded to an analytical bias.

[UJ] The component was analyzed for, but was not detected at a level equal to or greater than the level of detection or quantification (often the reporting limit). This flag is used when QC measurements indicate a possible low bias in the analytical data.

[R] Rejected. The data were of insufficient quality to be deemed acceptable as reported or otherwise qualified.

Findings

The overall summaries of the data validation are contained in the following sections.

Holding Time and Preservation

The preparation holding time for PCP was exceeded for sample 12CP03-03. The non-detect result in the associated sample was qualified and flagged "UJ" as undetected and estimated in quantity.

Calibration

Initial and continuing calibration analyses were performed as required by the methods. All acceptance criteria were met with the following exception:

The percent difference for the continuing calibration verification (CCV) for sample 12CP03-13 exceeded acceptance criteria for PCP. The non-detect result in the parent sample was qualified and flagged "UJ" as undetected and estimated in quantity.

Blanks

Method blanks were analyzed at the required frequency and were free of contamination with the following exceptions:

DRO was detected at a concentration greater than the method detection limit (MDL) in the method blank associated with samples 11CP04-38 and 11CP04-43. The data were qualified as not detected at the concentration measured and flagged "UB" when the associated sample concentrations were less than five times the concentration detected in the blanks.

Chloride, copper, iron and zinc were detected at concentrations greater than the MDL in the method blank, initial calibration blank (ICB) and/or continuing calibration blank (CCB) associated with sample 12CP03-03. Arsenic, copper, manganese and zinc were detected at concentrations greater than the MDL in the ICB and/or CCB associated with sample 11CP04-18. Chloride, copper, iron, manganese and zinc were detected at concentrations greater than the MDL in the method blank, ICB and/or CCB associated with samples 11CP04-34 and 11CP04-43. The data were qualified as not detected at the concentration measured and flagged "UB" when the associated sample concentrations were less than five times the concentration detected in the blanks. Sample

results found to be greater than five times the amount found in the blank or were nondetect were not qualified.

Surrogates

Surrogates were added to all samples for the methods requiring their use and all acceptance criteria were met with the following exceptions:

Both PCP surrogates were recovered below the lower control limit for sample 12CP03-13. There was not enough volume remaining to reanalyze the sample to obtain a result where the surrogates were recovered within acceptance criteria. The non-detect result in the parent sample was qualified and flagged "UJ" as undetected and estimated in quantity.

The surrogate associated with phenol was recovered below the lower control limit for sample 11CP04-18. The non-detect result in the parent sample was qualified and flagged "UJ" as undetected and estimated in quantity.

Internal Standards

Internal standards were added to the method, and all acceptance criteria were met.

Laboratory Control Samples

Laboratory control spike/laboratory control spike duplicates (LCS/LCSDs) were analyzed as required and all accuracy and precision criteria were met with the following exception:

PCP reported a relative percent difference (RPD) greater than the control limits in a LCS/LCSD for sample 11CP04-14. The data were not qualified because the associated sample did not contain reportable levels of PCP.

Matrix Spike

Matrix spike/matrix spike duplicates (MS/MSDs) were analyzed as required and all accuracy and precision criteria were met with the following exceptions:

The recovery for chloride was recovered less than the lower control limit in the MS and MSD for sample 12CP03-03. The parent sample was qualified as an estimated detect and flagged "J".

PCP reported a RPD greater than the control limit in a MS/MSD for samples 11CP04-10 and 11CP04-18. The data were not qualified because the parent sample did not contain reportable levels of PCP.

Post Digestion Spikes

Post digestion spikes were analyzed according to methods requiring their use and all acceptance criteria were met with the following exception:

The post-digestion spike associated with sample 11CP04-18 was recovered greater than the upper control limit for manganese. The parent sample was qualified as an estimated detect and flagged "J".

Chain of Custody

Required procedures were followed and were free of errors.

Overall Assessment

The goal of this assessment is to demonstrate that a sufficient number of representative samples were collected and the resulting analytical data can be used to support the decision making process. The following summary highlights the PARCC findings for the above-defined events:

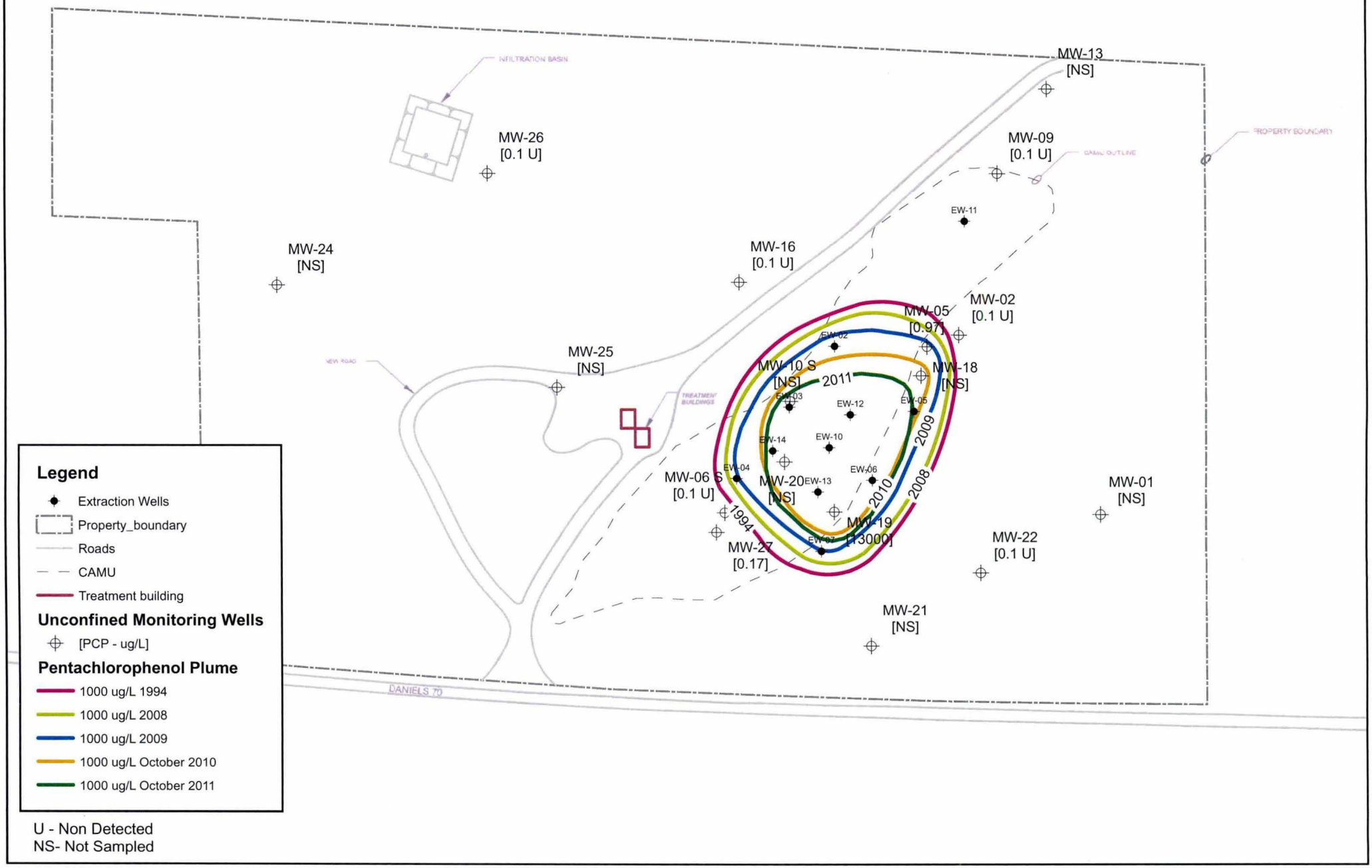
- Precision of the data was verified through the review of the field and laboratory data quality indicators that include LCS/LCSD and MS/MSD RPDs. Precision was acceptable.
- Accuracy of the data was verified through the review of the calibration data, LCS/LCSD, MS/MSD, post-digestion spike and surrogate recoveries. Accuracy was generally acceptable with a few analytes being qualified as estimated detected results due to calibration, MS/MSD, post-digestion spike and surrogate issues. Data users should consider the impact to any result that is qualified as estimated as it may contain a bias which could affect the decision-making process.
- Representativeness of the data was verified through the sample's collection, storage and preservation procedures, verification of holding-time compliance and evaluation of method and calibration blank data. The laboratory did not note any discrepancies with sample collection, storage or preservation procedures. The preparation hold time criterion for PCP was exceeded in one sample, resulting in the data being qualified as estimated. All other data were reported from analyses within the USEPA-recommended holding time. The method and calibration blank samples were generally free of contamination with DRO, copper and zinc being qualified as nondetected results in a few samples due to low-level detections in the blanks.
- Comparability of the data was ensured through the use of standard USEPA analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number of measurements planned. Completeness is expressed as the percentage of valid or usable measurements compared to planned measurements. Valid data are defined as all data that are not rejected for project use. All data are considered valid. The completeness goal of 90 percent was met for all method/analyte combinations.

References

CH2M HILL. 2005. *Quality Assurance Project Plan, Penta Wood Products Long-Term Response Action, Town of Daniels, Wisconsin.* February.

USEPA. 2008. *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review.* June.

USEPA. 2010. *Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review.* January.



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CH2MHILL

0 80 160 320 480 640 Feet

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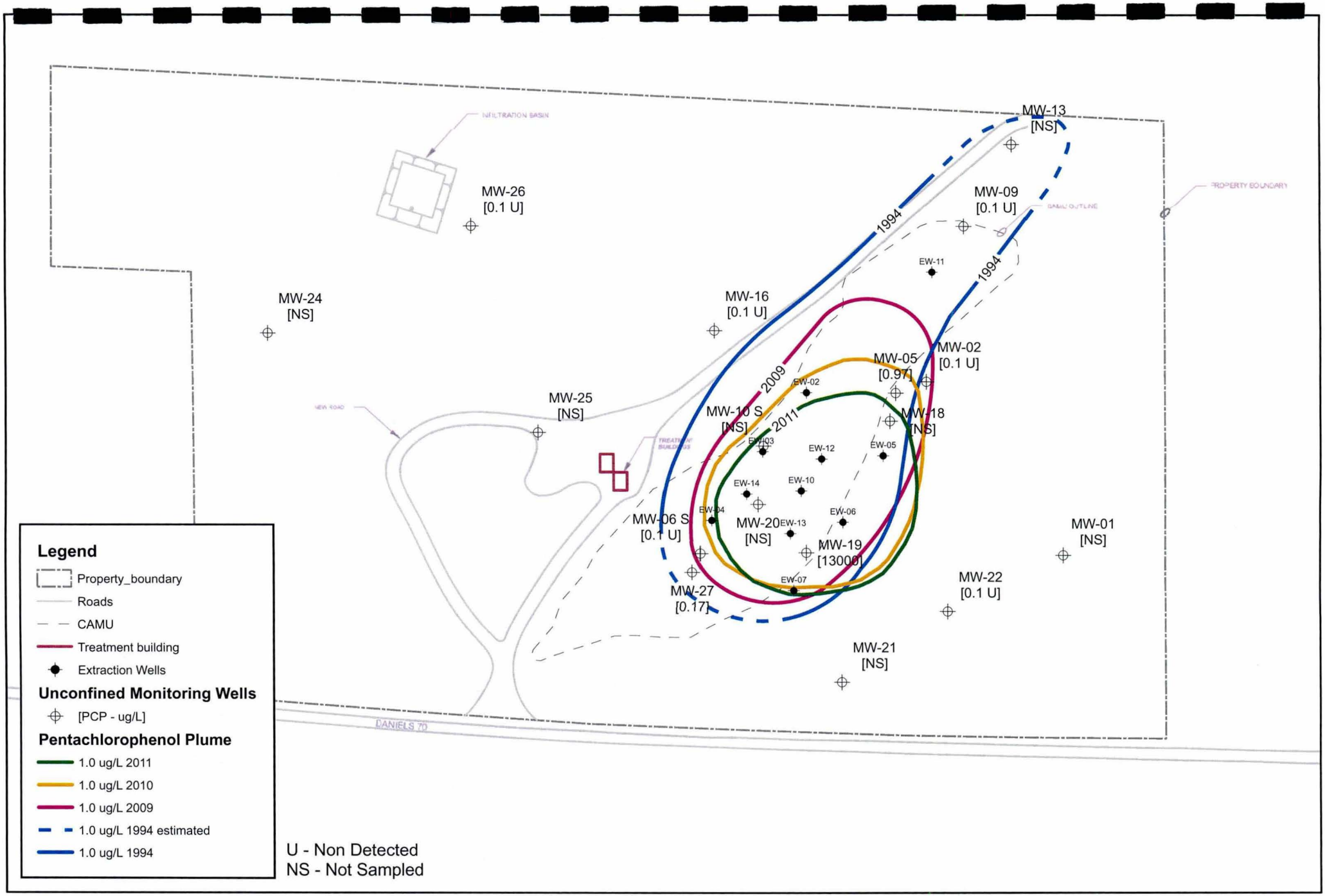
Figure 9
Unconfined PCP Plume - 1000 ug/L
2011 Annual Report
Pentawood Products Superfund Site
Siren, Wisconsin



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CH2MHILL

0 80 160 320 480 640 Feet

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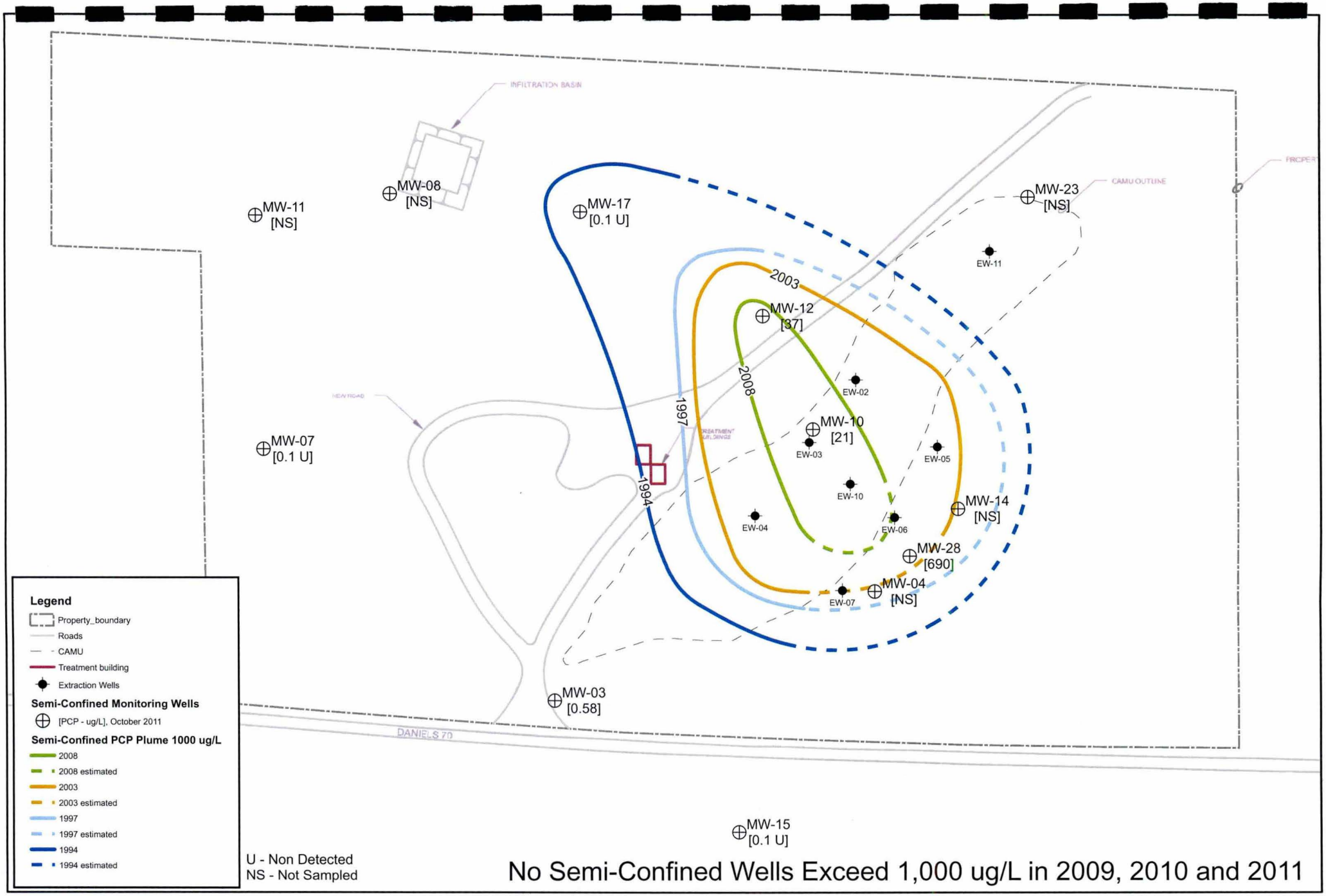
Figure 10
Unconfined PCP Plume - 1.0 ug/L
2011 Annual Report
Pentawood Products Superfund Site
Siren, Wisconsin



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CH2MHILL

0 75 150 300 450 600 Feet

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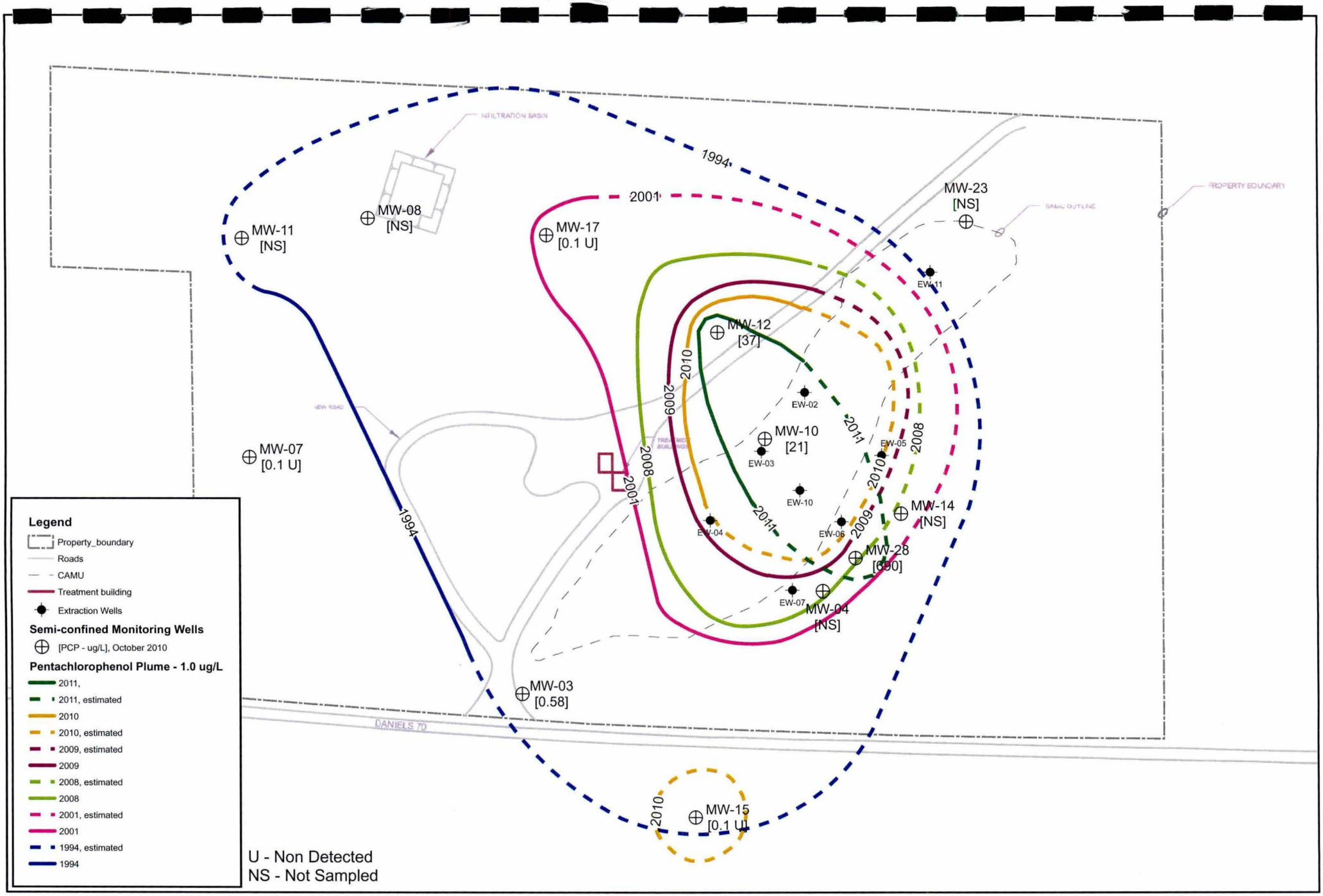
Figure 11
Semi-Confined PCP Plume - 1000 ug/L
2011 Annual Report
Pentawood Products Superfund Site
Siren, Wisconsin



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CH2MHILL

0 80 160 320 480 640 Feet

N

Figure 12
Semi-Confined PCP Plume - 1.0 ug/L
2011 Annual Report
Pentawood Products Superfund Site
Siren, Wisconsin

Appendix F

Well Construction Report

Construction Report

Penta Wood Products Superfund Site Extraction/LNAPL Recovery Well and Conveyance System Installation

Prepared for

March 2012

CH2MHILL®

Contents

Acronyms and Abbreviations

CAMU	corrective action management unit
CLP	contract laboratory program
PW	Penta Wood Products Superfund Site
RA	remedial action
WDNR	Wisconsin Department of Natural Resources

SECTION 1

Introduction

CH2M HILL, Inc. has been contracted by the United States Environmental Protection Agency (USEPA), Region 5 to perform additional remediation activities for the Penta Wood Products Site in Siren, Wisconsin conducted under USEPA Region 5 Contract No. EP-S5-06-01. The additional remedial activities consisted of installing three nested groundwater extraction/LNAPL recovery wells including integration of the new wells into the existing treatment system. The work was completed between November 8th, 2010 and March 3rd, 2011.

1.1 Site Description

The Penta Wood Products site is an inactive wood treating facility located at 8682 Daniels 70 (former State Route 70), Daniels Township, Siren, Wisconsin, 54872. The existing groundwater and free product treatment and extraction system was installed in 2001. Additional upgrades were required before the system was fully operational in 2004 and has been fully operational since. In 2010 the WDNR and USEPA agreed that installation of three additional extraction well nests would enhance the remediation occurring at the site prior to transfer of the operations to the WDNR in August of 2014. Two additional monitoring wells were also installed to supplement the existing monitoring network.

The site stratigraphy consists of an upper sand, a glacial till, and a lower sand. The upper sand is fairly continuous across the site extending from the surface or beneath the fill material to depths of 90 to 120 feet. The upper sand consists of well graded sand with some minor amounts (<10 percent) of silt and clay, well graded sand with silt, poorly graded sand, or poorly graded sand with gravel. During previous site work, discontinuous lenses of till up to 25 feet in thickness were encountered within the upper sand between elevations of 975 and 1,002 feet mean sea level (MSL), or depths of about 65 or 70 feet.

1.2 Construction Activities

The following is a summary of the major activities:

- Mobilization.
- Utility locate activities (for well drilling locations).
- Pilot hole drilling and soil sampling at three locations.
- Installation of three extraction well nests which each include a free product recovery well and a groundwater extraction well.
- Installation of two groundwater monitoring wells.
- Development of all wells installed.
- Construction of well completions for groundwater monitoring wells.
- Installation and testing of LNAPL recovery pumps and groundwater extraction well pumps, including pitless adaptors.
- Excavation of trenches for the installation of well vaults and piping to the treatment facility.
- Installation of piping from the well heads to the treatment system including floor slab penetration for the piping.
- Installation of piping instrumentation.
- Reprogrammed the PLC to incorporate the new wells into the system.
- Site restoration and demobilization.

Table 2-1 presents a chronological summary of major events and dates associated with the 2010/2011 construction activities.

TABLE 2-1
2010/2011 Construction Activities

Date	Activity
8-Nov-10	Mobilized drilling rig for soil borings; completed initial health and safety briefing
22-Nov-10	Completed first soil boring at EW-14
1-Dec-10	Began installation of the nested extraction wells.
7-Dec-10	Completed soil borings at EW-13 and 12
20-Dec-10	Completed installation of MW-27 and MW-28
30-Dec-10	Completed installation of nested extraction well at EW-14
10-Jan-11	Earthworks mobilized to the site.
17-Jan-11	Installed conveyance piping to EW-14
19-Jan-11	Completed installation of well EW-13; conveyance piping was extended to EW-13
24-Jan-11	All electrical conduits, VFD's, PLC's were installed in the building
2-Feb-11	Completed installation of the nest well at EW-12
3-Feb-11	Placed vault for EW-12; placed conveyance piping to EW-12
4-Feb-11	Completed piping manifold for LNAPL and groundwater inside the building. Completed hydrostatic testing on the piping
10-Feb-11	Completed installation of pitless adapters on all wells
18-Feb-11	Installation and wiring of all pumps was completed
3-Mar-11	PLC was reprogrammed to incorporate the new extraction wells and new extraction wells were put into service

SECTION 2

Pre-Construction Activities

Pre-construction activities conducted prior to the start of field work include the completion of the design for the installation of the three extraction wells, procurement of subcontractors and utility clearance. The design was completed to incorporate the new extraction wells into the existing system. A required pre-bid site meeting was held on October 20, 2010 for the two solicited subcontracts; drilling and earthworks. The procurement was completed as a lowest technically acceptable bid. HIS Constructors was awarded the earthworks subcontract and Layne Christensen was awarded the drilling subcontract.

Site preparation activities were performed according to the project specifications and the contractor's approved work plan. The following subsections provide additional details of the site preparation activities performed during the project. Preparation for the start of construction activities included the following items:

- Establishment of staging areas
- Utility clearance
- Review of submittals
- Review of Health and Safety Plans

2.1 Design

CH2M HILL designed system modifications associated with installing and connecting three additional groundwater extraction and LNAPL recovery wells. The design was completed using similar construction to the existing extraction wells and conveyance system which has been used successful at the site to date.

The extraction wells were installed within the area where LNAPL was known to be present historically. Locations EW-12, EW-13 and EW-14 corresponded with monitoring wells with elevated levels of PCP and measurable amounts of LNAPL. The monitoring wells MW-27 and MW-28 were installed as replacements to ensure that delineation of the edges of the PCP plume is continuing to occur.

2.2 Utility Clearance

The utility clearance was completed by calling Diggers Hotline; several utilities visited the site and confirmed that no public utilities were located on the east side of the treatment system building. A third party clearance was not completed due to documented underground piping previously installed by CH2MHILL. The earthworks subcontractor located and exposed the existing piping prior to using heavy equipment.

2.3 Mobilization

On November 8, 2010 Layne Christensen (Layne) mobilized a rotosonic drilling rig to the site to begin installation of the pilot holes; the Barber rig was mobilized on December 1st to begin installation of the extraction wells. HIS Construction Inc. (HIS) mobilized to the site on January 4th, 2011 to begin the earthworks portion of the work. Layne set up a staging area northwest of the treatment system at the site where they constructed a decontamination pad and materials lay down area. HIS used the same area for a lay down area. Sensitive equipment including PIDs and 4 gas meters were stored inside the treatment system building.

Submittals were reviewed prior to work taking place; this included review of health and safety plans and project plans and materials submittals all which were compared to the engineering plans. Hazardous waste and health and safety certifications were reviewed for all workers at the site and copies were kept on site during the entire field effort. Additional reviews were required for wielding and crane lifting which were required for operation of the Barber rig and installation of the extraction wells. The well locations at the site were identified and marked by CH2M HILL to ensure proper location.

SECTION 3

Construction Activities

3.1 Well Installation

The following well installation and associated tasks occurred throughout the project.

3.1.1 Monitoring Well Installation

Two monitoring wells were installed, one located in the semi-confined aquifer (MW-28) and one in the unconfined aquifer (MW-27). MW-27 was a replacement well for MW-6S which has been found to be dry more frequently due to declining water tables at the site. MW-27 is important to define the southern boundary of the plume in the unconfined aquifer. MW-28 characterizes the semi-confined aquifer in the eastern direction and is a replacement for MW-10 which is screened much lower in the aquifer and would not effectively detect contamination in this direction.

The monitoring wells were installed using a rotary sonic drilling rig and continuous cores were collected for soil logging. Soil logs and construction diagrams are located in Appendix A and Appendix B respectively. The wells were constructed of 2 inch Schedule 80 PVC with a slot size of 0.01-inch. The #2 sand pack was installed in the annulus with a #20 fine sand seal and 3 feet of bentonite seal installed using bentonite chips. The remaining annulus above the seal is comprised of bentonite slurry. The completion was an above ground pipe with protective bollards. The first attempt at installing the well in MW-27 ended with the well breaking at depth, the broken well was removed and the boring was over-drilled and set in the hole successfully.

3.1.2 Soil Boring Advancement

Soil borings were advanced prior to the installation of the three extraction wells (EW-12, EW-13, and EW-14) to determine proper well screen intervals and for collection of soil samples. The soil borings were advanced using a sonic drill rig (SDC500-28E). Soils were collected continuously in ten foot intervals; soils were logged for soil characteristics. Each. In addition, head space monitoring was performed on each 10 foot soil interval using a 14.5 eV PID. The highest head space samples from the upper fill area, the vadose zone and the smear zone were submitted to the lab for analysis for PCP and TPH oil. The upper fill area is typically the upper 10 feet of soil where woodchips could be encountered. The vadose zone is typically from 10 bgs to 100 feet bgs. (10-15 feet above the water table). The smear zone is typically the 10 feet above and 10 feet below the water table or usually 100 to 120 feet bgs. The soil samples collected during the advancement of the soil borings were compared to historical soil samples to determine the progress on cleaning up the contamination with the soil at the site. The soil boring at EW-14 was initially advanced to 85 feet before encountering refusal and the location was moved over 10 feet and was re-attempted, this boring was named AT-14A.

3.1.3 Extraction Well Installation

Once the soil borings were completed at each well location a DR-24 Barber rig was mobilized to each site to install the extraction wells. The extraction wells were drilled several feet from the original soil boring location to avoid complications with installing the wells in the soil boring location.

The Barber rig advanced a temporary 16 inch diameter steel casing to a total depth of 50 ft below the groundwater surface or approximately 145-165 ft bgs. The groundwater extraction well and the LNAPL recovery wells were nested in the same borehole. The screen for the LNAPL recovery well was completed across the groundwater table with approximately 15 feet above the water and 15 feet below the water. The groundwater extraction well was installed approximately 30 below the elevation of the groundwater. Construction of each nested extraction well consists of a 6 inch groundwater extraction well and a 4-inch LNAPL recovery within a single16-inch borehole. The groundwater extraction wells are typically installed with the top of the screen 40 feet below the water table.

The 4-inch LNAPL recovery wells were installed across the water table; fifteen feet above and fifteen feet below the water table. Specific well construction details are located in Appendix B.

The temporary casing advanced to total depth was welded in 20 foot section as the drill was advanced. Due to health and safety concerns associated with the methane present in the subsurface, additional precautions were taken when welding the casing in place including monitoring of the air space for elevated levels of explosive gases. A supply of nitrogen gas (inert gas) was available to pump into the casing to replace air with explosion potential prior to welding. No explosive environments were encountered and nitrogen was not used.

During the installation of the LNAPL recovery pump in EW-13, an obstruction was identified which prevented the installation of the pump. A downhole video camera was brought in to identify the obstruction. It was determined that the screen had been bent inward likely by a boulder during construction. The screen was deformed but still intact and would function as designed. The well construction details were submitted to the WDNR on July 25, 2011; a copy of these submittals including pump installation is located in Appendix C.

3.1.4 Well Development

Each pair of groundwater extraction/LNAPL recovery wells were developed by pumping and surging. Each well was bailed to removed fines; wells were then surged to improve connection between the screen and the sand pack. Alternately the well was pumped until remaining sand, silt and turbidity were removed. Turbidity was measured routinely and pumping was continued until turbidity was reduced below 10 NTUs or the well was pumped for 5 hours. The 6 – inch groundwater extraction wells were purged of approximately 1000 gallons of water and the 4 – inch LNAPL recovery wells were purged of approximately 300 gallons. The 2-inch monitoring wells were developed for 30 min and were purged of 100 gallons each. All development water was treated with the treatment system.

3.1.5 Waste Management

Soil cutting were consolidated into roll off containers. Water was decanted off the top and treated through the treatment system. Once dewatered, the soil cuttings were consolidated in the conveyance piping trenches. The soils were covered with two feet of clean earthen cap in accordance with the previous cover design.

3.2 Waste Water Conveyance Construction

3.2.1 Installation of Pumps

Three 2 HP 460 volt grundfos Redi-flo4 groundwater extraction pumps were installed in the 6" groundwater extraction wells and three AP4+ pneumatic pumps were installed in the nested LNAPL recovery wells. The groundwater extraction pumps were installed with 1.25" galvanized steel piping and connected with MAAS-Midwest type model 6J1.25N pitless adapters to convey groundwater below ground to the treatment system. The LNAPL pumps were installed with ¾" HDPE piping water from the groundwater surface piped below ground to the treatment system.

When installing the LNAPL pump in EW-13 it was discovered that the designed pump with an outer diameter of 3.6 inches was not able to be installed in the well due to an obstruction in the well. A downhole video camera was brought in to determine what sort of obstruction was occurring in the well. After viewing the obstruction with the camera it was determined that although the screen was bent inward. It was determined that the screen was deformed but was still intact and will function as designed. A QED pump model # AP2T with an outer-diameter of 1.75" was used to replace the designed pump. The pump was able to fit past the damaged portion of the screen to the groundwater surface and was an acceptable replacement.

3.2.2 Excavation and Installation of Piping

The conveyance piping for each well was buried in trenches extending 7 feet deep to bury the piping below the frost line. A well vault that extends 8 feet deep and is 4'6" in diameter was installed for each nested extraction well. The conveyance piping was placed in a second 6-inch HDPE pipe from the well vault to the building for containment purposes. The HDPE containment pipe buried in each trench extends from each of the well vaults to

the treatment system carrying a ¾"free product pipe and a 1 ½"groundwater pipe. Electrical wiring was buried at 4 feet deep in the same trench. The piping was brought up to the building where the pipes enter the building through a slab penetration. The HDPE was electro-fused together once the penetrations into the building were made. Each of the pipes was pressure tested to ensure there are no leaks.

3.2.3 Pump Installation

The individual HDPE lines from each well are equipped with a flowmeter, check valve, and sample tap prior to connecting to the main manifold inside the treatment building.

The groundwater extraction pumps and the LNAPL recovery pumps are controlled by the existing programmable logic controller (PLC). The pumping rate of each of the groundwater extraction wells will be adjusted with variable frequency drives (VFD). The LNAPL recovery pumps are situated at the water table and will be adjusted regularly to ensure maximum LNAPL recovery. The groundwater pumps are set approximately three feet above the top of the screen to allow for water to flow across the motor of the pump to allow for proper cooling. Actual depths are located in Appendix D.

3.3 Treatment System Upgrades

The treatment system maximum designed flow rate is 126 gpm but was previously operating at approximately 60 gpm. The new wells will operate at the same flow rate as the older wells resulting in a total flow rate of for the current system of approximately 85 gpm.

LNAPL collected from the recovery wells is pumped to an oil/water separator in the treatment building which transfers oil to an outside storage tank and excess water back into the influent groundwater treatment stream. The previous flow from the four operating LNAPL recovery wells was approximately 5 gpm. The additional LNAPL pumps operate at approximately 1 gpm for a total flow rate to the oil/water separator of 8 gpm. The LNAPL wells after installation did not immediately have measureable amounts of LNAPL so the new LNAPL pumps were not turned on.

3.4 Restoration

The excavated trench material was placed back into the trenches as backfill. The existing CAMU cover (2 feet of clean material) was removed and stockpiled until it could be placed back over the excavation to maintain the cover within the CAMU. Drill cuttings were dewatered and then consolidated in the CAMU under the clean cover.

Disturbed areas from earthworks activities re-seeded with a selected grass mixture that included quick-growing grasses for early stabilization and slow-growing grasses more suitable to site conditions. The grasses were covered with straw to protect the seeds and allow for quick germination.

Appendix A

Boring Logs and Well Construction Details

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
344511	EW-12 SHEET 1 OF 2

SOIL BORING LOG

PROJECT : Extraction Well Installation 2011, Siren, WI LOCATION : Siren, WI

ELEVATION : DRILLING CONTRACTOR : Layne Christensen

DRILLING METHOD AND EQUIPMENT : SDC500-28E, Sonic

WATER LEVELS : 102.0 ft below ground surface START : 12/2/2010 END : 12/7/2010 LOGGER : Haas/Lippincott

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (in)	SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLLIC LOG	PID (ppm)	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
10				**SAND (SP)** 0-18' - brown, moist, (loose), fill with wood chips			
20				**SAND (SM)** 18-53' - reddish brown, moist, (loose), little silt, cobbles			oil sheen observed in sample @ 45' PID (25'): 5ppm PID (34'): 7ppm PID (43'): 13ppm
	25.0	12.0	25-26'			5	
30	33.0	12.0	33-34'			7	
40	42.0	12.0	42-43'			13	
50							
	58.0			**SAND (SM)** 53-58' - brown, moist, (dense), with some silt, cobbles and pebbles			
60		12.0	58-59'	**SAND (SP)** 58-82' - brown to reddish brown, moist, (loose), trace of silt, Pebbles, cobbles		12	PID (58'): 12ppm PID (75'): 68ppm PID (81'): 28ppm
	69.0						
70		12.0	69-70'			21	
	75.0						
		12.0	75-76'			68	
80	81.0						
		12.0	81-82'			28	
				SAND (SM) 82-84' - reddish brown, moist, (dense), very fine to coarse grained, some silt. Pebbles, cobbles			PID (90'): 6.0ppm
90				**SILTY SAND (SP)** 84-97' - reddish brown, moist, (loose), medium to fine grained, some gravels, Some black staining/mottling at 96-97' bgs			
	96.0						
		12.0	96-97'			8	LNAPL well screen from 95 to 125
100							

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
344511	EW-12 SHEET 2 OF 2

SOIL BORING LOG

PROJECT : Extraction Well Installation 2011, Siren, WI LOCATION : Siren, WI

ELEVATION : DRILLING CONTRACTOR : Layne Christensen

DRILLING METHOD AND EQUIPMENT : SDC500-28E, Sonic

WATER LEVELS : 102.0 ft below ground surface START : 12/2/2010 END : 12/7/2010 LOGGER : Haas/Lippincott

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (in)	SAMPLE ID (TIME)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLLIC LOG	PID (ppm)	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY SAND (SP) 97-98' - boulder encountered, shatter zone recovered			
				SAND (ML) 98-110' - reddish brown, moist, (loose), coarse to fine grained, little silt and gravels			
110				**SANDY SILT (SP)** 110-115' - reddish brown, moist, very fine grained, some cobbles and gravels			PID (110'): 0.2ppm
				SILTY SAND (SP) 115-120' - reddish brown, (medium dense), medium to fine grained, little gravels and trace cobbles. some poorly sorted coarse sand lenses, mostly well sorted sands with silt.			
120							PID (125'): 2.2ppm
				(SP) 120-130' - Same as 115-120 except reddish brown			
130				**(ML)** 130-132' - Same as 115-120 except reddish brown			Extraction well screen installed from 130 to 150
				SANDY-CLAYEY SILT (ML) 132-144' - reddish brown to brown, fine grained, some gravels and cobbles.			PID (130'): 0.8ppm PID (135'): 1.1ppm
140							
				BOULDERS/SHATTERS ROCK PIECES AND COBBLES (ML) 144-148' - some clay/silts in matrix and coatings			PID (145'): 9.2ppm
150				**GRAVELLY, SANDY, CLAYEY SILT (ML)** 148-150' - reddish brown, (dense), coarse grained, some cobbles and pebbles			PID (154'): 1.3ppm PID (155'): 2.2ppm
				SANDY, CLAYEY, SILT (SP) 150-160' - reddish brown, moist, (dense), some gravel and cobbles, wetter/sandier lense from 156-157 and 158-160'			
160							PID (160'): 1.2ppm
				POLVERIZED BOULDERS AND COBBLES 160-164' - dry, coarse grained, some clays and silts, some cemented till chunks			EOB @ 164' bgs
				Bottom of Boring at 164.0 ft below ground surface			

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
344511	EW-13 SHEET 1 OF 2

SOIL BORING LOG

PROJECT : Extraction Well Installation 2011, Siren, WI LOCATION : Siren, WI

ELEVATION : DRILLING CONTRACTOR : Layne Christensen

DRILLING METHOD AND EQUIPMENT : SDC500-28E, Sonic

WATER LEVELS : 106.0 ft below ground surface START : 11/23/2010 END : LOGGER : Haas

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (in)	SAMPLE ID (TIME)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLLIC LOG	PID (ppm)	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	6.0			**SAND (SM)** 0-3' - Reddish brown, moist, medium coarse to fine, sorted, medium dense			PID (6'): 12ppm
	12.0	12.0	6-7'	**ORGANICS (SM)** 3-8' - Brown, wet, fill, wood fragments, loose		12	
10	12.0			**SAND (SP)** 8-12' - Brown, moist, slightly silty, little clay, medium stiff to medium dense			
		12.0	12-13'			24	PID (13'): 24ppm
20				**SAND (SM)** 12-22' - Brown, reddish brown, moist, medium coarse to coarse			
	25.0			**SAND (SM)** 22-28' - Brown, moist, dense, with trace clay			PID (25'): 18ppm
		12.0	25-26'			18	
30				**SILTY SAND (SM)** 28-40' - Brown, moist, medium dense, coarse, little clay,			PID (37'): 1ppm
	37.0						
		12.0	37-38'			1	
40	43.0			**SAND (SP)** 40-58' - Red, reddish brown, moist, very coarse, loose			PID (44'): 3ppm PID (55'): 81ppm
		12.0	43-44'			3	
50	54.0						
		12.0	54-55'			81	
60				**SAND (SP)** 58-72' - Brown, reddish brown, moist, medium sorted, loose			PID (65'): 1ppm
	65.0						
		12.0	65-66'			1	
70							
	78.0			**SAND (SW)** 72-88' - Red, brown, black, moist, loose, very coarse			PID (79'): 34ppm PID (85'): 1ppm
80		12.0	78-79'			34	
	86.0						
		12.0	86-87'			1	
90				**SAND (SP)** 88-100' - wet, poorly sorted, loose with small to large cobbles			PID (97'): 3ppm
	97.0						LNAPL well screen from 95 to 125
		12.0	97-98'			3	
100							

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
344511	EW-13 SHEET 2 OF 2

SOIL BORING LOG

PROJECT : Extraction Well Installation 2011, Siren, WI LOCATION : Siren, WI

ELEVATION : DRILLING CONTRACTOR : Layne Christensen

DRILLING METHOD AND EQUIPMENT : SDC500-28E, Sonic

WATER LEVELS : 106.0 ft below ground surface START : 11/23/2010 END : LOGGER : Haas

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (in)	SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLLIC LOG	PID (ppm)	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
110	101.0	12.0	101-102'	**SAND (SP)** 100-125' - Reddish brown, wet, loose, stiff, very coarse, with cobbles, lenses of clayey silt with some sand		9	PID (110'): 9ppm Observed water table at 106' bgs.
120	117.0	12.0	117-118'			3	
130	126.0	12.0	126-127'	**SAND (SP)** 125-143' - Reddish brown, wet, loose, very coarse		4	PID (120'): 3ppm
140	135.0	12.0	135-136'			3	Extraction well screen from 135 to 155
150				**SILT (SM)** 143-155' - Brown, moist, dense, some cobbles			PID (143'): 8ppm
160				**SAND (SM)** 155-170' - Reddish brown, wet, loose, silt and cobbles			PID (169'): 10ppm EOB @ 170' bgs
170				Bottom of Boring at 170.0 ft below ground surface			

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
344511	EW-14 SHEET 1 OF 2

SOIL BORING LOG

PROJECT : Extraction Well Installation 2011, Siren, WI LOCATION : Siren, WI

ELEVATION : DRILLING CONTRACTOR : Layne Christensen

DRILLING METHOD AND EQUIPMENT : SDC500-28E, Sonic

WATER LEVELS : 105.0 ft below ground surface START : 11/19/2010 END : 11/22/2010 LOGGER : Haas/Niebauer

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (in)	SAMPLE ID (TIME)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLLIC LOG	PID (ppm)	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	4.0			**DARK TOPSOIL** 0-2' - (loose)			PID: 7.5
	6.0	12.0	4-5'	**SILT (ML)** 2-15' - Dark brown, moist, (loose), With little sand (Fill), 7.5YR 3/3, odor, wood chips, stained organic soil		7.5	
		12.0	6-7'				
10	12.0						
		12.0	12-13'			5.4-0	
				SAND (SP) 15-20' - Brown, moist to dry, w/ silt, no organics, 7.5YR 4/4, odor			PID: 5.5 PID 4.5
20				**SANDY SILT (ML)** 20-25' - moist			PID: 0.0
				SAND (SP) 25-30' - Dark brown, moist, trace clay, 7.5YR, 2.5/3			PID: 3.5 PID: 8.8 PID: 10.6
	29.0						
30	30.0	12.0	29-30'			2.6-10.6	Some water injected
		12.0	30-31'	**SAND (SP)** 30-32' - Dark brown, moist			PID: 6.0
	36.0			**SILT W/ GRAVEL (ML)** 32-39' - Pinkish gray, dry, (loose)			
		48.0	36-40'				
40				**GRAVEL W/ SAND (GW)** 39-41' - Pinkish gray, dry, (loose)			PID: 42.2 Injected Water
	45.0			**SAND (SP)** 41-46' - Brown w/ black specks, moist, (dense), coarse grained			
		12.0	45-46'				
50				**SILT W/ GRAVEL (ML)** 46-50' - Pinkish gray, dry, (loose), coarse grained			
				SAND W/ SILT (SP)			

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
344511	EW-14	SHEET 2 OF 2

SOIL BORING LOG

PROJECT : Extraction Well Installation 2011, Siren, WI LOCATION : Siren, WI

ELEVATION : DRILLING CONTRACTOR : Layne Christensen

DRILLING METHOD AND EQUIPMENT : SDC500-28E, Sonic

WATER LEVELS : 105.0 ft below ground surface START : 11/19/2010 END : 11/22/2010 LOGGER : Haas/Niebauer

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (in)	SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLLIC LOG	PID (ppm)	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
103.0							
	12.0		103-104'	**SAND AND COBBLES (GW)** 105-120' - Brown, moist, (medium dense), coarse grained			Water Table observed at 113'
110							
120				**SAND (SP)** 120-135' - Brown, wet, (medium dense), medium to fine grained			PID: 5 PID: 3
130							Extraction well screen from 133 to 153
				SAND (SP) 135-150' - Brown to dark brown, wet, (stiff), (dense), fine grained			PID: 4 PID: 3 PID: 2 PID: 3
140							
150				**SILTY SAND W/ COBBLES (GW)** 150-160' - Brown to dark brown, wet, (soft to stiff), (loose to dense), coarse to very fine grained			PID: 3 PID: 4 PID: 6
160				**SAND (SP)** 160-175' - Dark brown, wet, (stiff), (dense), coarse to fine grained			PID: 5 PID: 1 PID: 15 PID: 3
170							EOB: 175'
				Bottom of Boring at 175.0 ft below ground surface			

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
344511	MW-27 SHEET 1 OF 2

SOIL BORING LOG

PROJECT : Extraction Well Installation 2011, Siren, WI LOCATION : Siren, WI

ELEVATION : DRILLING CONTRACTOR : Layne Christensen

DRILLING METHOD AND EQUIPMENT : SDC500-28E, Sonic

WATER LEVELS : 122.0 ft below ground surface START : 12/15/2010 END : 12/16/2010 LOGGER : Scherin/Hass

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (in)	SAMPLE ID (TIME)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLLIC LOG	PID (ppm)	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				WOOD CHIPS 0-15' - Brown, wet, (loose), Fill			PID (5'): 1ppm
	5.0	12.0	5-6'			1	
10							
	18.0			**SAND (SP)** 15-35' - Reddish Brown, moist to wet, (loose)			PID (18'): 2ppm PID (29'): 29ppm
20		12.0	18-19'			2	
	29.0						
30		12.0	29-30'			29	
				SAND W/ COBBLES (GW) 35-45' - Brown, moist to wet, (loose)			PID (39'): 38ppm
	39.0						
40		12.0	39-40'			38	
				SAND W/ COBBLES (GW) 45-70' - Brown, moist to wet, (loose), coarse grained			PID (49'): 16ppm PID (55'): 17ppm
	49.0						
50		12.0	49-50'			18	
	56.0						
		12.0	56-57'			17	
60							
	67.0						
		12.0	67-68'			3	
70							
				SAND W/ COBBLES (GW) 70-82' - Brown, wet, (loose), coarse grained			
	78.0						
80		12.0	78-79'			714	
				SAND W/ COBBLES (GW) 82-95' - Brown, wet, (very loose), coarse grained			
90							
	97.0			**SANDY SILT W/ COBBLES (SP-SM)** 95-125' - Brown, moist, (very dense)			PID (96'): 5ppm PID (108'): 3ppm PID (115'): 2ppm
100		12.0	97-98'			5	

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
344511	MW-27 SHEET 2 OF 2

SOIL BORING LOG

PROJECT : Extraction Well Installation 2011, Siren, WI LOCATION : Siren, WI

ELEVATION : DRILLING CONTRACTOR : Layne Christensen

DRILLING METHOD AND EQUIPMENT : SDC500-28E, Sonic

WATER LEVELS : 122.0 ft below ground surface START : 12/15/2010 END : 12/16/2010 LOGGER : Scherin/Hass

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (in)	SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLLIC LOG	PID (ppm)	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
108.0							
110	108.0	12.0	108-109'			3	
	116.0						
	116.0	12.0	116-117'			2	
120							
				SILTY SAND W/ COBBLES (SP-SM) 125-135' - Brown, moist to wet, (very dense)			TD: 135'
130							
				Bottom of Boring at 135.0 ft below ground surface			

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
344511	MW-28 SHEET 1 OF 2

SOIL BORING LOG

PROJECT : Extraction Well Installation 2011, Siren, WI LOCATION : Siren, WI

ELEVATION : DRILLING CONTRACTOR : Layne Christensen

DRILLING METHOD AND EQUIPMENT : SDC500-28E, Sonic

WATER LEVELS : 97.0 ft below ground surface START : 12/8/2010 END : LOGGER : Cailin Lippincott

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (in)	SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLLIC LOG	PID (ppm)	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	0.0	72.0		**SILTY SAND (SP)** 0-6' - dark reddish brown to brown, moist, (loose), well sorted, Some silts, trace gravels. Some grey to black sand concretions or clumps, easily breakable with some silts.		0.4	PID: 0.4ppm PID: 0.2ppm
10	10.0	120.0		**SAND (SP)** 6-14' - No recovery - fell out cone barrel, sand, loose.			
				(SP) 14-16' - Same as 0-6		0.2	PID: 0.3ppm PID: 0.6ppm
20	20.0	120.0		**SILTY SAND (SP)** 16-20' - tan, dry, (loose), medium to coarse grained, trace gravels, increase in moisture at 20'			PID: 0.3ppm
30	30.0	120.0		**(SP)** 20-30' - Same as 16-20 except moist, (loose), Lense from 23-24 and 27-28' which is med sand and moist		0.5	
40	40.0	120.0		**SILTY SAND (SP)** 30-38' - reddish brown, moist, (loose), medium to fine grained, some coarse silty sand, some gravel, becoming siltier		0.3	PID: 0.6ppm
				PULVERIZED ROCK/BOULER AND ROCK FRAGMENTS (SP) 38-40'			PID: 2.4ppm PID: 1ppm
50	50.0	120.0		**SILTY SAND (SP)** 40-45' - moist, medium grained, some gravels, becoming siltier @ 45'		0.3	PID: 8.4ppm
60	60.0	120.0		**SILTY SAND (SP)** 45-50' - reddish brown to brown, medium to fine grained, some gravel. Pulverized boulder and rock fragments present. Unshattered material is loose and moist		0.8	PID: 0.4ppm
70	70.0	120.0		**MEDIUM GRAINED SILTY SAND (SP)** 50-54' - brown to reddish brown, moist, (loose), some gravels			PID: 1ppm
				SILTY SAND AND GRAVEL (SP) 54-60' - (loose), poorly sorted, Pulverized material, silty sand and gravel, many pebbles and cobbles, Small lense of wetter coarse sand material from 57-58'		0.3	PID: 0.1ppm
80	80.0	120.0		**SILTY SAND (SM)** 60-65' - reddish brown to brown, medium to coarse grained, some gravels and pebbles/cobbles			PID: 0.1ppm
				PULVERIZED MATERIAL (SP) 65-70' - dry, (loose), some gravels and cobbles. 4" thick seam of only gravels and no pulverized material at 67'.		0.6	PID: 0.2ppm PID: 0.3ppm PID: 0.2ppm
90	90.0	120.0		**SAND (SP)** 70-75' - reddish brown to brown, moist, (loose), medium to coarse grained, Trace pebbles and cobbles, some gravels.		2.4	PID: 0.2ppm PID: 0.8ppm
				PULVERIZED MATERIAL 76-79' - dry, (loose), lots of pebbles and gravel in last 12"			PID: 1.1ppm
100	100.0			**SAA, MED TO COARSE SAND (SP)** 79-80' - Same as 70-76		1	PID: 1.4ppm

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
344511	MW-28 SHEET 2 OF 2

SOIL BORING LOG

PROJECT : Extraction Well Installation 2011, Siren, WI LOCATION : Siren, WI

ELEVATION : DRILLING CONTRACTOR : Layne Christensen

DRILLING METHOD AND EQUIPMENT : SDC500-28E, Sonic

WATER LEVELS : 97.0 ft below ground surface START : 12/8/2010 END : LOGGER : Cailin Lippincott

DEPTH BELOW EXISTING GRADE (ft)	INTERVAL (ft)	RECOVERY (in)	SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLLIC LOG	PID (ppm)	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	100.0	240.0		**SILTY SAND (SP)** 80-85' - reddish brown to tan, moist, (loose), medium to fine grained, well sorted, some gravel			PID: 1ppm
				PULVERIZED ROCK 85-87'			
110				**SILTY SAND (SP)** 87-90' - reddish tan to tan, dry, (loose), medium to fine grained, loose and dry, little cobbles and gravels. Bottom 6" is moist and siltier and slightly denser.		8.4	PID: 1ppm
				SILTY SAND (SP) 90-97' - brown, wet, (loose), coarse grained, poorly sorted, some pebbles and gravel			
120	120.0						PID: 1ppm EOB @ 140' bgs To set well from 115-135' bgs
		120.0		**GRAVELLY SILT (GM)** 97-100' - reddish brown to brown, wet, (dense). More fractured from drilling. Some dense clumps. Some cobbles and pebbles.			
130				**SILTY GRAVEL (SP)** 100-110' - brown, wet, (loose), poorly sorted, mostly gravels and pebbles with some silty sand and cobbles		0.4	
				SILTY SAND (SP) 110-118' - reddish brown, moist to wet, (medium dense to loose), fine grained, Trace gravels.			
140				**(GM)** 118-120' - Same as 100-110 except silty gravel with sand and pebbles			
				Bottom of Boring at 140.0 ft below ground surface			

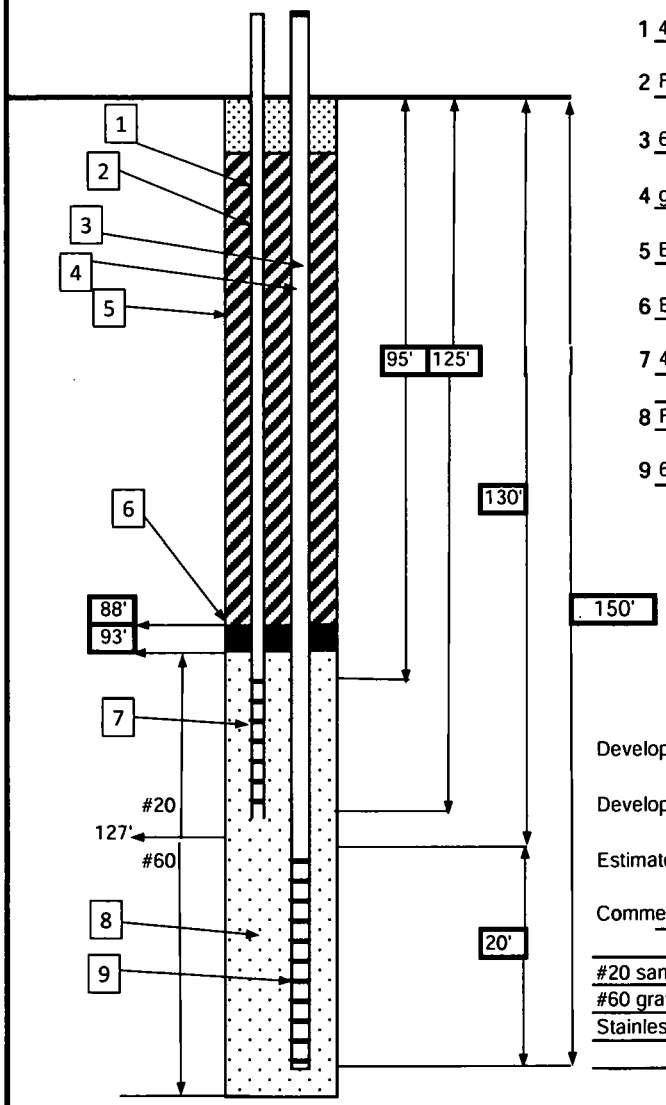
Appendix B

Well Construction Diagrams

CH2MHILL	PROJECT NUMBER 344511	WELL NUMBER EW-12 SHEET 1

Extraction Well Next Completion Diagram

PROJECT : Extraction Well Installation
LOCATION : Pentawood Products Superfund Site
DRILLING CONTRACTOR Layne Christensen
3682 Daniels 70, Siren WI
DRILLING METHOD AND EQUIPMENT USED :
Sonic Drill, SDC500-28E
WATER LEVELS : ~102 ft bgs START: 12/2/2010 END: 12/7/2010 LOGGER : Craig Haas



1 4-inch steel riser (flush threaded, sch. 40 steel)
2 Free product recovery well
3 6-inch steel riser (flush threaded, sch. 40 steel)
4 groundwater extraction well
5 Bentonite slurry tremie pumped
6 Bentonite seal
7 4-inch stainless steel, wire wrapped screen (#15 slot)
8 Filter pack
9 6-inch stainless steel, wire wrapped screen (#65 slot)

Development method surge, bail and pump
Development time
Estimated Purge volume
Comments

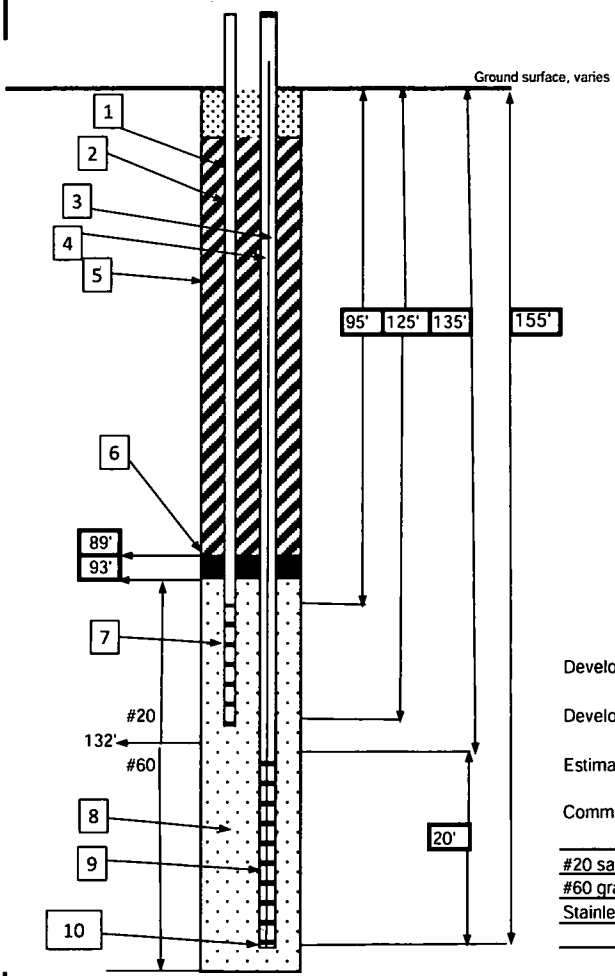
#20 sand (Red Flint)
#60 gravel (Red Flint)
Stainless steel screens = Type 304

CH2MHILL

PROJECT NUMBER	WELL NUMBER		
344511	EW-13	SHEET 1	OF 1

Extraction Well Next Completion Diagram

PROJECT : Extraction Well Installation LOCATION Pentawood Products Superfund Site
DRILLING CONTRACTOR Layne Christensen 3682 Daniels 70, Siren WI
DRILLING METHOD AND EQUIPMEI Sonic Drill, SDC500-28E
WATER LEVELS : ~106 ft bgs START DATE 11/23/2010 END DATE: 12/2/2010 LOGGER : Craig Haas



1 4-inch steel riser (flush threaded, sch. 40 steel)
2 Free product recovery well
3 6-inch steel riser (flush threaded, sch. 40 steel)
4 groundwater extraction well
5 Bentonite slurry tremie pumped
6 Bentonite seal
7 4-inch stainless steel, wire wrapped screen (15 slot)
8 Filter pack
9 6-inch stainless steel, wire wrapped screen (65 slot)
10 Recovery pump (RP-13)

Development method surge and purge
Development time
Estimated Purge volume
Comments

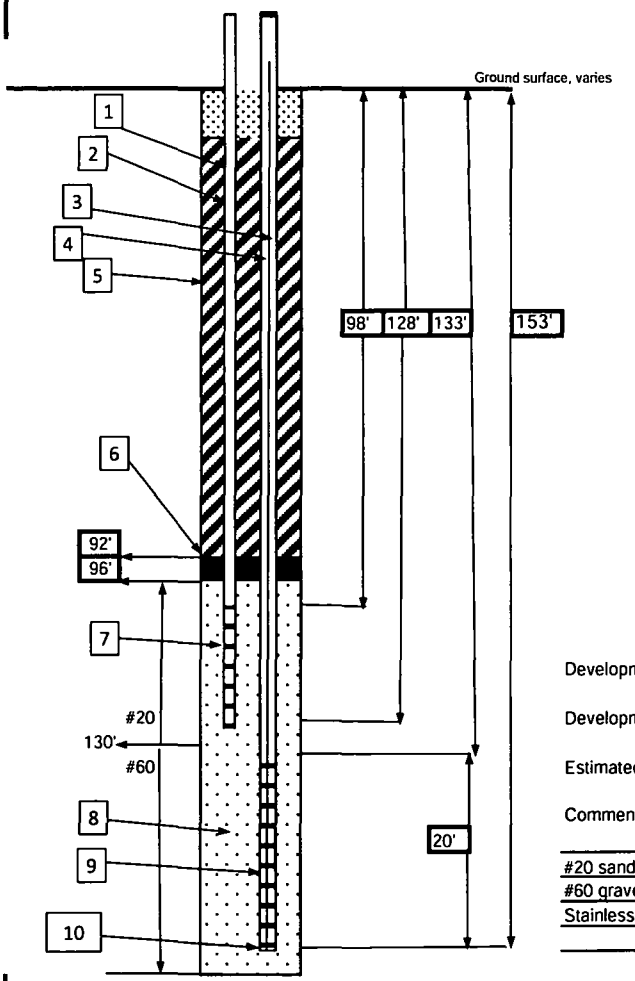
#20 sand (Red Flint)
#60 gravel (Red Flint)
Stainless steel screens = Type 304

CH2MHILL

PROJECT NUMBER	WELL NUMBER		
344511	EW-14	SHEET 1	OF 1

Extraction Well Next Completion Diagram

PROJECT: Extraction Well Installation
LOCATION: Pentawood Products Superfund Site
DRILLING CONTRACTOR: Layne Christensen
3682 Daniels 70, Siren WI
DRILLING METHOD AND EQUIPMENT: Sonic Drill, SDC500-28E
WATER LEVELS: ~113 ft bgs START DATE: 11/9/2010 END DATE: 11/22/2010 LOGGER: Michael Niebauer

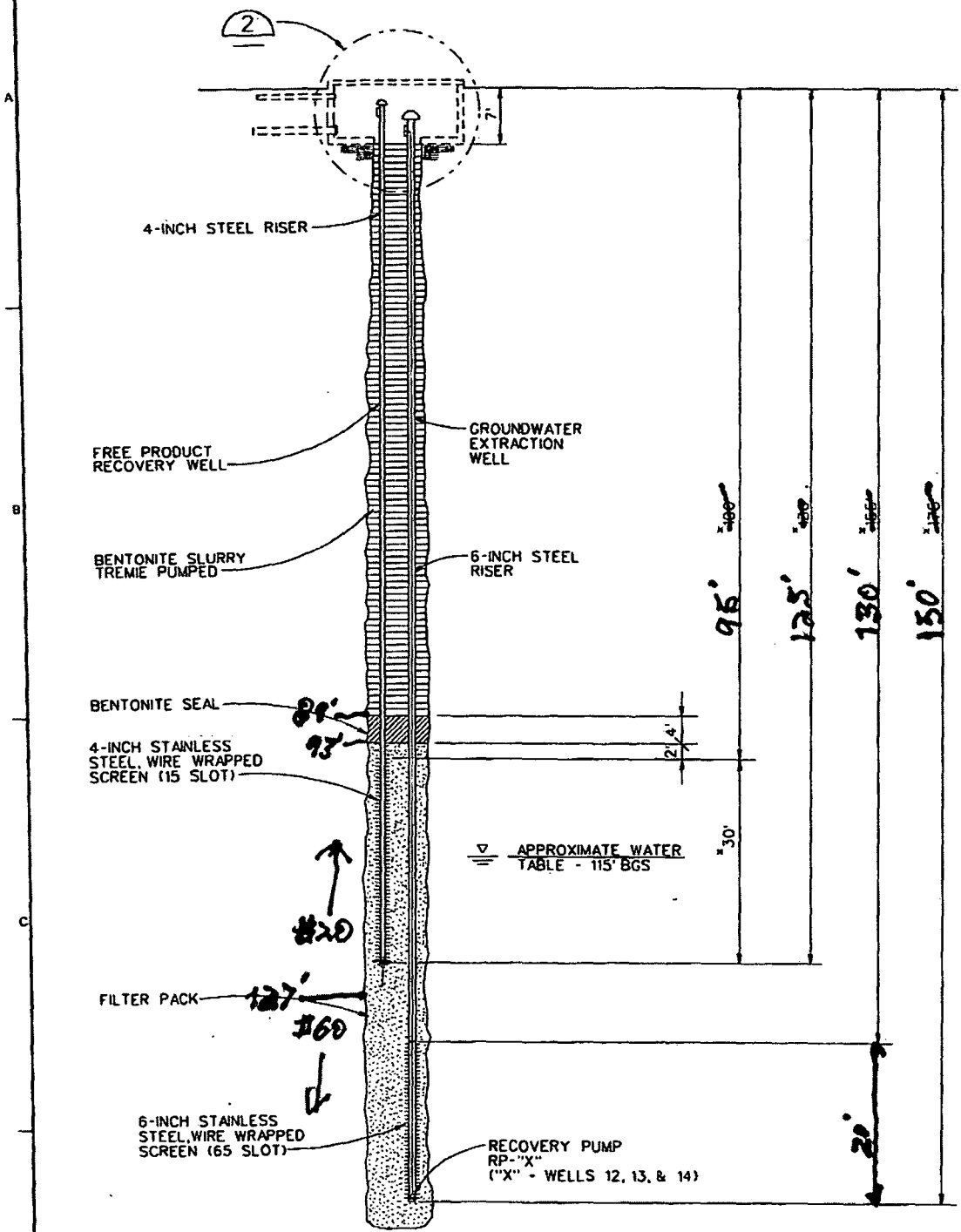


1 4-inch steel riser (flush threaded, sch. 40 steel)
2 Free product recovery well
3 6-inch steel riser (flush threaded, sch. 40 steel)
4 groundwater extraction well
5 Bentonite slurry tremie pumped
6 Bentonite seal
7 4-inch stainless steel, wire wrapped screen (15 slot)
8 Filter pack
9 6-inch stainless steel, wire wrapped screen (65 slot)
10 Recovery pump (RP-14)

Development method	surge and purge
Development time	9 hours (free product) 2.5 hours (groundwater)
Estimated Purge volume	650-700 gal (free product) 1600 gal (groundwater)
Comments	

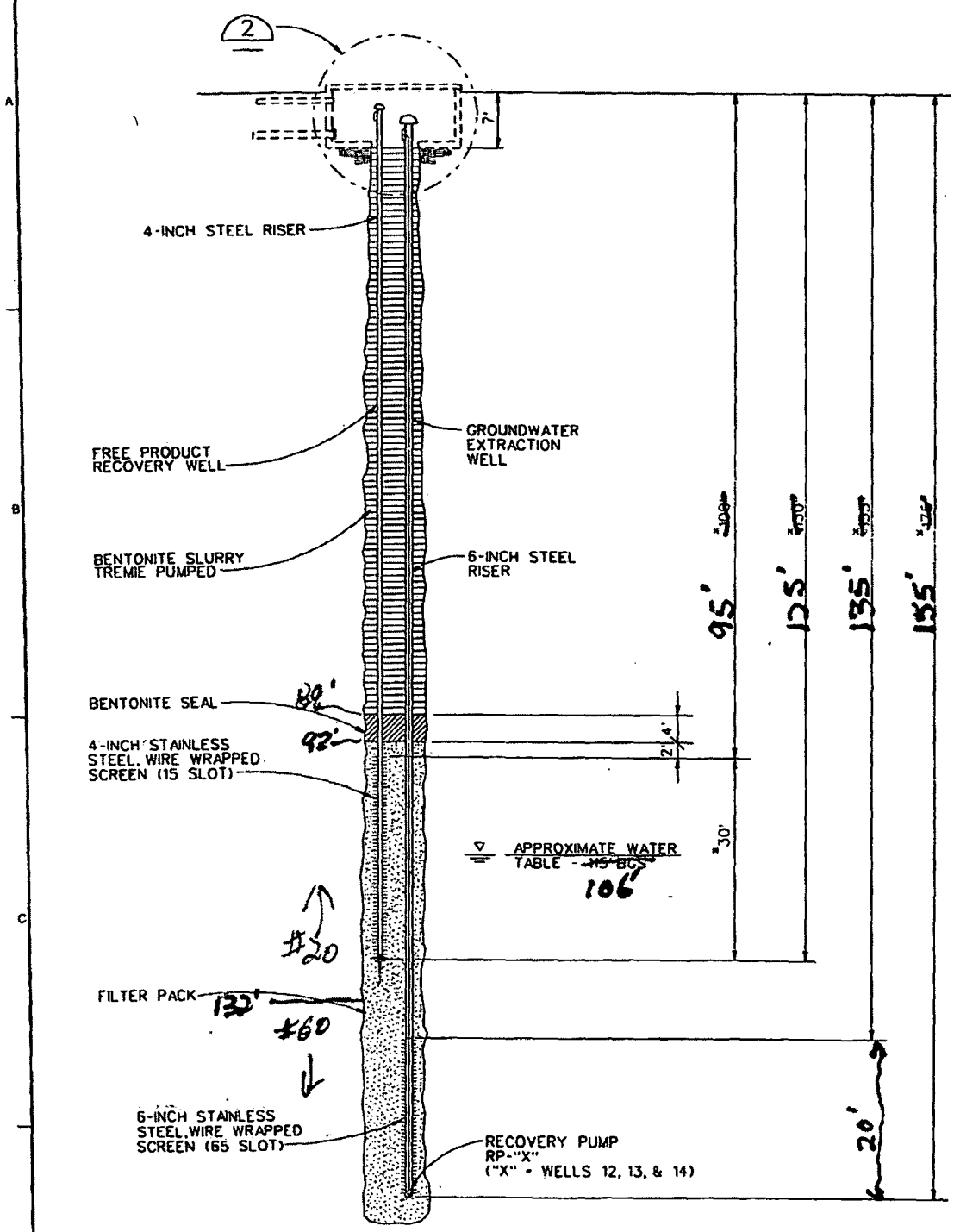
#20 sand (Red Flint) - 102 50 lb-bags
#60 gravel (Red Flint) - 31 100 lb-bags
Stainless steel screens = Type 304

EW-12



EXTRACTION WELL NEST DETAIL (1)
NTS
C-1

EW-13 M. Niebauer



6-INCH I
CONTAIN

1 1/2-INC

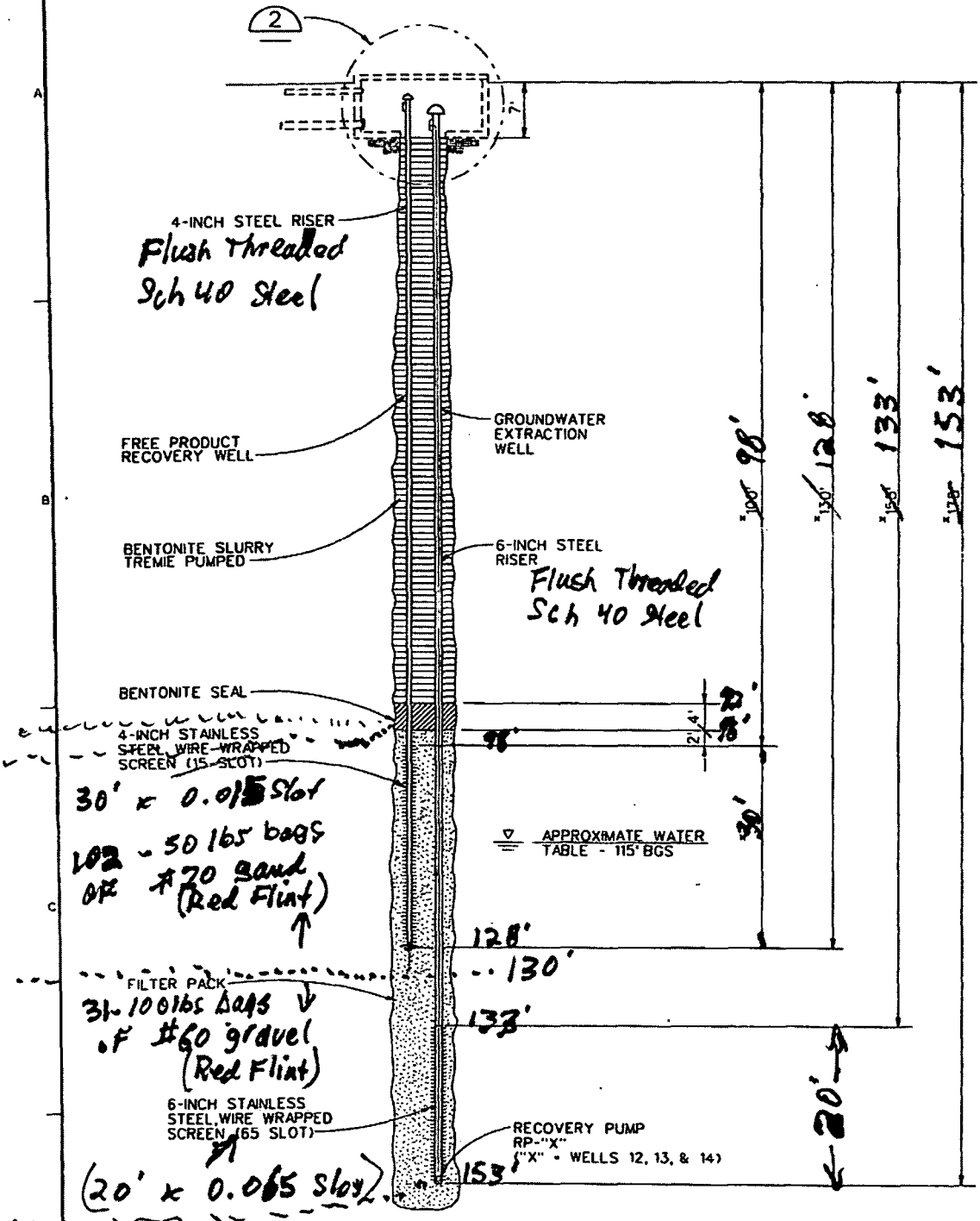
EXTRACTION WELL NEST DETAIL

NTS

1
C-1

EW-14

01-04-2011
C. Haas



EXTRACTION WELL NEST DETAIL (1)
NTS

DATE: 1-12-11
1-13-11

LAYNE-NORTHWEST COMPANY
TEST OF WELL

WELL NO.: 4 inch well
WELL DEPTH: 128.6
OWNER: Restaurant
LOCATION: SiteU

DIA. ORIFICE:
STATIC LEVEL: 114.2 FT.
LENGTH OF AIRLINE: FT.
DRILLED BY: WATER INDUSTRIES

CENTER OF GAUGE TO GROUND LEVEL:
PUMP SET TO DISCHARGE NOZZLE:
TO TAIL PIPE: 121.6
TESTED BY: Layne

READING NUMBER	TIME	G.P.M.	INCHES ON ORIFICE	ALT GA IN FEET	PUMPING LEVEL FT.	DRAWDOWN IN FEET	SPECIFIC YIELD	HEAD PRESSURE PSI	RATE OF RECOVERY OR AMPS	WATER APPEARANCE: CLEAR, CLOUDY, MURKY, MUDDY, SANDY, TEMP, ODOR	
								0		Clear Lt Brown	
8:30 1		5		114.2				75		Brown Cloudy	
8:35 2		1		119.6						START TO SURGE OUT BACK	
8:40 3		2½		114.4				85		Did not see hardly any sand	
8:45 4		1		117.7				80		Cloudy	
8:50 5		2½		117.4				80		" " very little	WATER TOTAL 1000
9:00 6		2½		117.5						" " Screen on water	
7											
8											
9											
AFTER SURGE 10		2½		119.3				80		Milky Lt Brown	
11		2½		115.3				80		" " Darker " very little	
2:15 12		2½		119				80		Cloudy	
2:20 13		2½						80		" "	
2:40 14		1		119.2				80		Slightly Cloudy	100 gal to 150 -
2:50 15		2½		118.2				80		" "	
SHUT DOWN 2:57 16											
17											
4:10 18											
4:35 19											
20											
TURN ON 2:55 7:55 21		2½		119.6						Milky Vc sand	
8:00 22		2		118.5						Lt Brown	
8:20 23		2½		118.2						Cloudy	
8:30 24		2		117.2						Clearing	
8:45 25		2		116.8						Clear	
SHUT DOWN 9:00 26		2		116.8						Clear	WATER TOTAL 300
27										Little Screen on water	
28											
29											TOTAL OUT OF WELL 650 -
30											

DATE: 1-13-14
1-14-14

LAYNE-NORTHWEST COMPANY
TEST OF WELL

WELL NO.: 6 INCH
WELL DEPTH: 153
OWNER: PENTAWOOD
LOCATION: SIREN

DIA. ORIFICE:
STATIC LEVEL: 114.6 FT.
WATER INDICATOR
LENGTH OF AIRLINE: FT.
DRILLED BY:

CENTER OF GAUGE TO GROUND LEVEL:
PUMP SET TO DISCHARGE NOZZLE: 146.6
TO TAIL PIPE:
TESTED BY: LAYNE

READING NUMBER	TIME	G.P.M.	INCHES ON ORIFICE	~~ALTBA~~ IN FEET	PUMPING LEVEL FT.	DRAWDOWN IN FEET	SPECIFIC YIELD	HEAD PRESSURE PSI	RATE OF RECOVERY OR AMPS	WATER APPEARANCE: CLEAR, CLOUDY, MURKY, MUDDY, SANDY, TEMP, ODOR
				114.6				0		
TIME 1	12:40	4		115.1				85		CLOUDY NO SAND
2	12:50	4		115.1				85		CLEARING " "
3	12:55	6		115.3				80		CLEAR
4	1:00	6		115.3				80		" "
5	1:10	12		115.8				70		
6	1:20	12		115.7				70		
7	1:30	16		116.6				60		
8	1:40	16		116.7				60		
9	1:50	16		115.8				60		
10	2:00	20		116.2				40		
11	2:05	20		116.2				40		LITTLE
WIDE OPEN 12	2:10	30		116.8				0		CLOUDY
13	2:15	30		116.7				0		CLEAR
14	2:20	30		117.2				0		
SURGE 1:00 15										
16										
17										
FRI W/D-153 18				114.6						
19	7:55	30		115.9				40		RUSTY MUDDY
20	7:55	20		115.9				40		CLEAR
WIDE OPEN 21	8:00	30		116.4				0		
22	8:15	30		116.4				0		
23	8:30	30		116.4				0		
24	8:45	30		116.4				0		
SHUT DOWN 25	9:00	30		116.4				0		
26										
27										
28										
29										
30										

WATER 159 GALS
100-
100-
100
100
100
100
100
ABOUT 1100 TOT 500 A.
100
100
100
111

111111

Appendix C

WDNR Well Submittals

State of Wisconsin
Department of Natural Resources

Route to: Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION

Form 4400-113A Rev. 7-98

Facility/Project Name: Pentawood Products	Local Grid Location of Well: _____ ft. ☐N. ☐S. _____ ft. ☐E. ☐W.	Well Name: Pentawood MW#28
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☒) or Well Location ☒ Lat. 45 ° 47 ' 13 " Long. 92 ° 25 ' 8 " or	Wis. Unique Well No.: VX855 / DNR Well ID No.:
Facility ID	St. Plane _____ ft. N, _____ ft. E. S/C/N	Date Well Installed: 12 / 10 / 2010 (m m d d y y y y)
Type of Well: Well Code 12 / pz	Section Location of Waste/Source: _____ 1/4 of _____ 1/4 of Sec. _____, T. _____ N, R. _____ ☐E ☐W	Well Installed By: Name (first, last) and Firm: Scott Schwerin; Layne Christensen Company
Distance from Waste/Source _____ ft. / Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	Gov. Lot Number:

A. Protective pipe, top elevation 3 ft. MSL

B. Well casing, top elevation 2.5 ft. MSL

C. Land surface elevation _____ ft. MSL

D. Surface seal, bottom _____ ft. MSL or 3 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis performed? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ 50 / Hollow Stem Auger ☐ 41 / Other ☐ _____

15. Drilling fluid used: Water ☐ 02 / Air ☐ 01 / Drilling Mud ☐ 03 / None ☐ 99

16. Drilling additives used? ☐ Yes ☐ No

Describe _____

17. Source of water (attach analysis, if required): _____

E. Bentonite seal, top _____ ft. MSL or 107.5 ft.

F. Fine sand, top _____ ft. MSL or 111 ft.

G. Filter pack, top _____ ft. MSL or 113 ft.

H. Screen joint, top _____ ft. MSL or 115 ft.

I. Well bottom _____ ft. MSL or 135 ft.

J. Filter pack, bottom _____ ft. MSL or 140 ft.

K. Borehole, bottom _____ ft. MSL or 140 ft.

L. Borehole, diameter 6.62 in.

M. O.D. well casing 2.4 in.

N. I.D. well casing 2 in.

1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:
a. Inside diameter: 6 in.
b. Length: 5 ft.
c. Material: Steel ☒ 04 / Other ☐ _____
d. Additional protection? ☐ Yes ☐ No
If yes, describe: _____

3. Surface seal: Bentonite ☐ 30 / Concrete ☒ 01 / Other ☐ _____

4. Material between well casing and protective pipe: Bentonite ☐ 30 / Other ☐ _____

5. Annular space seal: a. Granular/Chipped Bentonite ☐ 33
b. _____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐ 35
c. _____ Lbs/gal mud weight . . . . . Bentonite slurry ☐ 31
d. 20 % Bentonite . . . . . Bentonite-cement grout ☒ 50
e. 6 Ft³ volume added for any of the above
f. How installed: Tremie ☐ 01 / Tremie pumped ☒ 02 / Gravity ☐ 08

6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐1/4 in. ☒3/8 in. ☐1/2 in. Bentonite chips ☒ 32
c. _____ Other ☐ _____

7. Fine sand material: Manufacturer, product name & mesh size
a. Red Flint Well Slot #10
b. Volume added 0.5 ft³

8. Filter pack material: Manufacturer, product name & mesh size
a. Red Flint Well Slot #15
b. Volume added 5 ft³

9. Well casing: Flush threaded PVC schedule 40 ☐ 23 / Flush threaded PVC schedule 80 ☒ 24 / Other ☐ _____

10. Screen material: Sch 80 PVC
a. Screen type: Factory cut ☒ 11 / Continuous slot ☐ 01 / Other ☐ _____
b. Manufacturer Monoflex
c. Slot size: 0.01 in.
d. Slotted length: 20 ft.

11. Backfill material (below filter pack): None ☒ 14 / Other ☐ _____

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
	Layne Christensen Company

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 7-98

Route to: Watershed/Wastewater [X] Waste Management ☐
Remediation/Redevelopment ☐ Other ☐ _____

Facility/Project Name	County Name	Well Name
Pentawood Products	BURNETT	Pentawood MW#28

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well ID Number
	7	VX855	

1. Can this well be purged dry? [X] Yes ☐ No

2. Well development method

surged with bailer and bailed	☐ 41
surged with bailer and pumped	☐ 61
surged with block and bailed	☐ 42
surged with block and pumped	☐ 62
surged with block, bailed and pumped	☐ 70
compressed air	☐ 20
bailed only	☐ 10
pumped only	[X] 51
pumped slowly	☐ 50
Other _____	☐

3. Time spent developing well 30 min.

4. Depth of well (from top of well casisng) 137 ft.

5. Inside diameter of well 2 in.

6. Volume of water in filter pack and well casing ____ gal.

7. Volume of water removed from well 100 gal.

8. Volume of water added (if any) ____ gal.

9. Source of water added _____

10. Analysis performed on water added? ☐ Yes ☐ No
(If yes, attach results)

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 110 ft.	110 ft.
Date	b. 12 / 10 / 2010 (m m d d y y y y)	12 / 10 / 2010
Time	c. ____ : ____ ☐ a.m. ☐ p.m.	____ : ____ ☐ a.m. ☐ p.m.
12. Sediment in well bottom	____ inches	____ inches
13. Water clarity	Clear ☐ 10 Turbid [X] 15 (Describe)	Clear [X] 20 Turbid ☐ 25 (Describe)

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids	____ mg/l	____ mg/l
15. COD	____ mg/l	____ mg/l

16. Well developed by: Name (first, last) and Firm
First Name: Scott Last Name: Schwerin
Firm: Layne Christensen Company

17. Additional comments on development:

Name and Address of Facility Contact/Owner/Responsible Party
First Name: Keli Last Name: McKenna
Facility/Firm: CH2M Hill
Street: 135 South 84th Street
City/State/Zip: Milwaukee WI 53214-

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: _____
Print Name: Keith Meyers
Firm: Layne Christensen Company

NOTE: See instructions for more information including a list of county codes and well type codes.

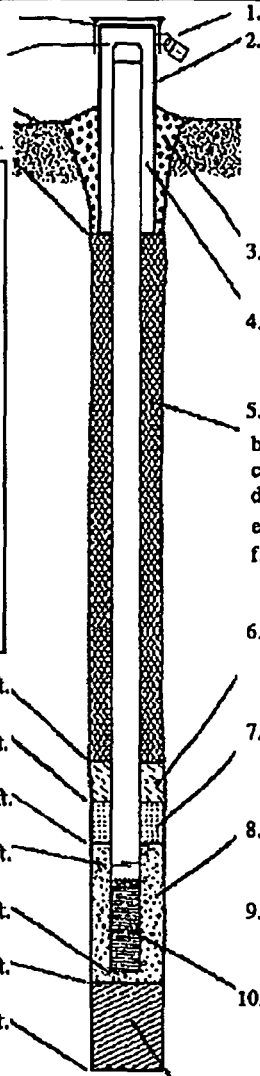
State of Wisconsin
Department of Natural Resources

Route to: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION

Form 4400-113A Rev. 7-98

Facility/Project Name: Pentawood Products	Local Grid Location of Well: _____ ft. ☐N. ☐S. _____ ft. ☐E. ☐W.	Well Name: Pentawood MW#27
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☒) or Well Location ☒ Lat. 45 ° 47 ' 13 " Long. 92 ° 25 ' 8 " or	Wis. Unique Well No.: VX856 / DNR Well ID No.:
Facility ID	St. Plane _____ ft. N, _____ ft. E. S/C/N	Date Well Installed: 12 / 20 / 2010 (m m d d y y y y)
Type of Well: Well Code 12 / pz	Section Location of Waste/Source: _____ 1/4 of _____ 1/4 of Sec. ____, T. ____ N, R. ____ ☐E ☐W	Well Installed By: Name (first, last) and Firm: Scott Schwerin; Layne Christensen Company
Distance from Waste/Source _____ ft. / Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	Gov. Lot Number:



A. Protective pipe, top elevation 3 ft. MSL

B. Well casing, top elevation 2.5 ft. MSL

C. Land surface elevation _____ ft. MSL

D. Surface seal, bottom _____ ft. MSL or 3 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis performed? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ 50 / Hollow Stem Auger ☐ 41 / Other ☐ _____

15. Drilling fluid used: Water ☐ 02 / Air ☐ 01 / Drilling Mud ☐ 03 / None ☐ 99

16. Drilling additives used? ☐ Yes ☐ No
Describe _____

17. Source of water (attach analysis, if required):
_____

E. Bentonite seal, top _____ ft. MSL or 108 ft.

F. Fine sand, top _____ ft. MSL or 111 ft.

G. Filter pack, top _____ ft. MSL or 113 ft.

H. Screen joint, top _____ ft. MSL or 115 ft.

I. Well bottom _____ ft. MSL or 135 ft.

J. Filter pack, bottom _____ ft. MSL or 136 ft.

K. Borehole, bottom _____ ft. MSL or 136 ft.

L. Borehole, diameter 6.62 in.

M. O.D. well casing 2.4 in.

N. I.D. well casing 2 in.

1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:
a. Inside diameter: 6 in.
b. Length: 5 ft.
c. Material: _____ Steel ☒ 04 / Other ☐ _____
d. Additional protection? ☐ Yes ☐ No
If yes, describe: _____

3. Surface seal: _____ Bentonite ☐ 30 / Concrete ☒ 01 / Other ☐ _____

4. Material between well casing and protective pipe: _____ Bentonite ☐ 30 / Other ☐ _____

5. Annular space seal: a. Granular/Chipped Bentonite ☐ 33
b. _____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐ 35
c. _____ Lbs/gal mud weight . . . . . Bentonite slurry ☐ 31
d. 20 % Bentonite . . . . . Bentonite-cement grout ☒ 50
e. 6 Ft³ volume added for any of the above
f. How installed: Tremie ☐ 01 / Tremie pumped ☒ 02 / Gravity ☐ 08

6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐1/4 in. ☒3/8 in. ☐1/2 in. Bentonite chips ☒ 32
c. _____ Other ☐ _____

7. Fine sand material: Manufacturer, product name & mesh size
a. Red Flint Well Slot #10
b. Volume added 0.5 ft³

8. Filter pack material: Manufacturer, product name & mesh size
a. Red Flint Well Slot #15
b. Volume added 5 ft³

9. Well casing: Flush threaded PVC schedule 40 ☐ 23 / Flush threaded PVC schedule 80 ☒ 24 / Other ☐ _____

10. Screen material: Sch 80 PVC
a. Screen type: Factory cut ☒ 11 / Continuous slot ☐ 01 / Other ☐ _____
b. Manufacturer Monoflex
c. Slot size: 0.01 in.
d. Slotted length: 20 ft.

11. Backfill material (below filter pack): _____ None ☒ 14 / Other ☐ _____

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
	Layne Christensen Company

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 7-98

Route to: Watershed/Wastewater [X] Waste Management ☐
Remediation/Redevelopment ☐ Other ☐ _____

Facility/Project Name	County Name	Well Name
Pentawood Products	BURNETT	Pentawood MW#27

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well ID Number
	7	VX856	

1. Can this well be purged dry? [X] Yes ☐ No

2. Well development method

surged with bailer and bailed	☐	41
surged with bailer and pumped	☐	61
surged with block and bailed	☐	42
surged with block and pumped	☐	62
surged with block, bailed and pumped	☐	70
compressed air	☐	20
bailed only	☐	10
pumped only	[X]	51
pumped slowly	☐	50
Other _____	☐	

3. Time spent developing well 30 min.

4. Depth of well (from top of well casisng) 137 ft.

5. Inside diameter of well 2 in.

6. Volume of water in filter pack and well casing ____ gal.

7. Volume of water removed from well 100 gal.

8. Volume of water added (if any) ____ gal.

9. Source of water added _____

10. Analysis perfomed on water added? ☐ Yes ☐ No
(If yes, attach results)

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 112 ft.	112 ft.
Date	b. 12 / 20 / 2010 (m m d d y y y y)	12 / 20 / 2010
Time	c. ____ : ____ ☐ a.m. ☐ p.m.	____ : ____ ☐ a.m. ☐ p.m.
12. Sediment in well bottom	____ inches	____ inches
13. Water clarity	Clear ☐ 10 Turbid [X] 15 (Describe)	Clear [X] 20 Turbid ☐ 25 (Describe)

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids	____ mg/l	____ mg/l
15. COD	____ mg/l	____ mg/l

16. Well developed by: Name (first, last) and Firm
First Name: Scott Last Name: Schwerin
Firm: Layne Christensen Company

17. Additional comments on development:

Name and Address of Facility Contact/Owner/Responsible Party
First Name: Kell Last Name: McKenna
Facility/Firm: CH2M Hill
Street: 135 South 84th Street
City/State/Zip: Milwaukee WI 53214-

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: _____
Print Name: Keith Meyers
Firm: Layne Christensen Company

NOTE: See instructions for more information including a list of county codes and well type codes.

State of Wisconsin
Department of Natural Resources

Route to: Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION

Form 4400-113A Rev. 7-98

3-7-11

Facility/Project Name: Pentawood Products	Local Grid Location of Well: _____ ft. ☐N. ☐S. _____ ft. ☐E. ☐W.	Well Name: Penta EW12 6"
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☒) or Well Location ☒ Lat. 45 ° 47 ' 13 " Long. 92 ° 25 ' 8 " or	Wis. Unique Well No.: VX857__ / DNR Well ID No.: ___
Facility ID: _____	St. Plane _____ ft. N, _____ ft. E. S/C/N	Date Well Installed: 02 / 02 / 2011 (m m d d y y y y)
Type of Well: Well Code 26 / ew	Section Location of Waste/Source: _____ 1/4 of _____ 1/4 of Sec. _____, T. _____ N, R. _____ ☐E ☐W	Well Installed By: Name (first, last) and Firm: Vince Meindel; Layne Christensen Company
Distance from Waste/Source _____ ft. / Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	Gov. Lot Number: _____

A. Protective pipe, top elevation _____ ft. MSL

B. Well casing, top elevation _____ ft. MSL

C. Land surface elevation _____ ft. MSL

D. Surface seal, bottom _____ ft. MSL or 46 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis performed? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ 50 / Hollow Stem Auger ☐ 41 / Other ☐ _____

15. Drilling fluid used: Water ☐ 02 / Air ☐ 01 / Drilling Mud ☐ 03 / None ☐ 99

16. Drilling additives used? ☐ Yes ☐ No
Describe _____

17. Source of water (attach analysis, if required):
_____

E. Bentonite seal, top _____ ft. MSL or 89 ft.

F. Fine sand, top _____ ft. MSL or 93 ft.

G. Filter pack, top _____ ft. MSL or 126 ft.

H. Screen joint, top _____ ft. MSL or 130 ft.

I. Well bottom _____ ft. MSL or 150 ft.

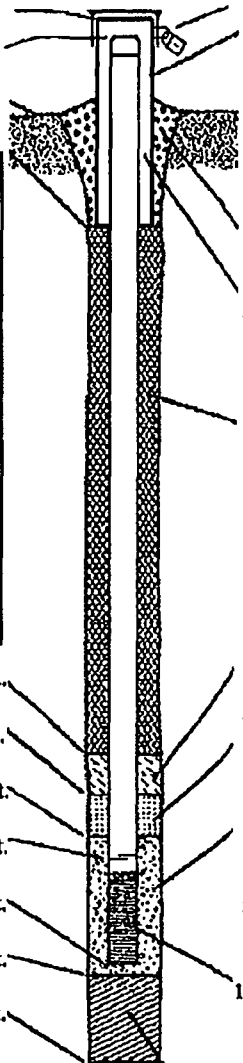
J. Filter pack, bottom _____ ft. MSL or 151.5 ft.

K. Borehole, bottom _____ ft. MSL or 151.5 ft.

L. Borehole, diameter 16 in.

M. O.D. well casing 6.62 in.

N. I.D. well casing 6 in.



1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:
a. Inside diameter: 48 in.
b. Length: 8 ft.
c. Material: Steel ☐ 04 / HDPE - below grade vault _____ / Other ☒ ▒
d. Additional protection? ☐ Yes ☐ No
If yes, describe: _____

3. Surface seal: Bentonite ☒ 30 / Concrete ☐ 01 / Other ☐ ▒
Bentonite Chips

4. Material between well casing and protective pipe: Bentonite ☐ 30 / Other ☐ ▒
_____

5. Annular space seal: a. Granular/Chipped Bentonite ☐ 33
b. _____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐ 35
c. _____ Lbs/gal mud weight . . . . . Bentonite slurry ☐ 31
d. 20 % Bentonite . . . . . Bentonite-cement grout ☐ 50
e. 24 Ft^3 volume added for any of the above
f. How installed: Tremie ☐ 01 / Tremie pumped ☒ 02 / Gravity ☐ 08

6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐1/4 in. ☒3/8 in. ☐1/2 in. Bentonite chips ☒ 32
c. _____ Other ☐ ▒

7. Fine sand material: Manufacturer, product name & mesh size
a. Red Flint Well Slot #20 ▒
b. Volume added 40 ft^3

8. Filter pack material: Manufacturer, product name & mesh size
a. Red Flint Well Slot #60 ▒
b. Volume added 34 ft^3

9. Well casing: Flush threaded PVC schedule 40 ☐ 23 / Flush threaded PVC schedule 80 ☐ 24 / Other ☒ ▒
6" FJ CS Pipe

10. Screen material: FJ SS Screen 304 ▒
a. Screen type: Factory cut ☐ 11 / Continuous slot ☒ 01 / Other ☐ ▒
_____
b. Manufacturer Johnson Screen
c. Slot size: 0.065 in.
d. Slotted length: 20 ft.

11. Backfill material (below filter pack): None ☐ 14 / Other ☒ ▒
Red Flint Well Slot #60

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
	Layne Christensen Company

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 7-98

Route to: Watershed/Wastewater [X] Waste Management [ ]
Remediation/Redevelopment [ ] Other [ ] _____

Facility/Project Name	County Name	Well Name
Pentawood Products	BURNETT	Penta EW12 6"

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well ID Number
	7	VX857	

1. Can this well be purged dry? [ ] Yes [X] No

2. Well development method

surged with bailer and bailed	[ ]	41
surged with bailer and pumped	[X]	61
surged with block and bailed	[ ]	42
surged with block and pumped	[ ]	62
surged with block, bailed and pumped	[ ]	70
compressed air	[ ]	20
bailed only	[ ]	10
pumped only	[ ]	51
pumped slowly	[ ]	50
Other _____	[ ]	[redacted]

3. Time spent developing well 300 min.

4. Depth of well (from top of well casing) 148 ft.

5. Inside diameter of well 6 in.

6. Volume of water in filter pack and well casing _____ gal.

7. Volume of water removed from well 999 gal.

8. Volume of water added (if any) _____ gal.

9. Source of water added _____

10. Analysis performed on water added? (If yes, attach results) [ ] Yes [ ] No

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 108 ft.	108 ft.
Date	b. 02 / 09 / 2011 (m m d d y y y y)	02 / 09 / 2011 (m m d d y y y y)
Time	c. _____ [ ] a.m. [ ] p.m.	_____ [ ] a.m. [ ] p.m.
12. Sediment in well bottom	_____ inches	_____ inches
13. Water clarity	Clear [ ] 10 Turbid [X] 15 (Describe)	Clear [X] 20 Turbid [ ] 25 (Describe)

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids	_____ mg/l	_____ mg/l
15. COD	_____ mg/l	_____ mg/l

16. Well developed by: Name (first, last) and Firm
First Name: Dan Last Name: Passamant
Firm: Layne Christensen Company

17. Additional comments on development:

Name and Address of Facility Contact/Owner/Responsible Party
First Name: Kell Last Name: McKenna
Facility/Firm: CH2M Hill
Street: 135 South 84th Street
City/State/Zip: Milwaukee WI 53214-

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: _____
Print Name: Keith Meyers
Firm: Layne Christensen Company

NOTE: See instructions for more information including a list of county codes and well type codes.

State of Wisconsin
Department of Natural Resources

Route to: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION

Form 4400-113A Rev. 7-98

Facility/Project Name: Pentawood Products	Local Grid Location of Well: _____ ft. ☐N. ☐S. _____ ft. ☐E. ☐W.	Well Name: Penta EW12 4"
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☒) or Well Location ☒ Lat. 45 ° 47 ' 13 " Long. 92 ° 25 ' 8 " or	Wis. Unique Well No.: VX858 / DNR Well ID No.:
Facility ID	St. Plane _____ ft. N, _____ ft. E. S/C/N	Date Well Installed: 02 / 02 / 2011 (m m d d y y y y)
Type of Well: Well Code 64 / le	Section Location of Waste/Source: _____ 1/4 of _____ 1/4 of Sec. _____, T. _____ N, R. _____ ☐E ☐W	Well Installed By: Name (first, last) and Firm: Vince Meindel, Layne Christensen Company
Distance from Waste/Source _____ ft. / Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	Gov. Lot Number:

A. Protective pipe, top elevation _____ ft. MSL

B. Well casing, top elevation _____ ft. MSL

C. Land surface elevation _____ ft. MSL

D. Surface seal, bottom _____ ft. MSL or 46 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis performed? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ 50 / Hollow Stem Auger ☐ 41 / Other ☐ _____

15. Drilling fluid used: Water ☐ 02 / Air ☐ 01 / Drilling Mud ☐ 03 / None ☐ 99

16. Drilling additives used? ☐ Yes ☐ No
Describe _____

17. Source of water (attach analysis, if required):
_____

E. Bentonite seal, top _____ ft. MSL or 89 ft.

F. Fine sand, top _____ ft. MSL or _____ ft.

G. Filter pack, top _____ ft. MSL or 93 ft.

H. Screen joint, top _____ ft. MSL or 95 ft.

I. Well bottom _____ ft. MSL or 125 ft.

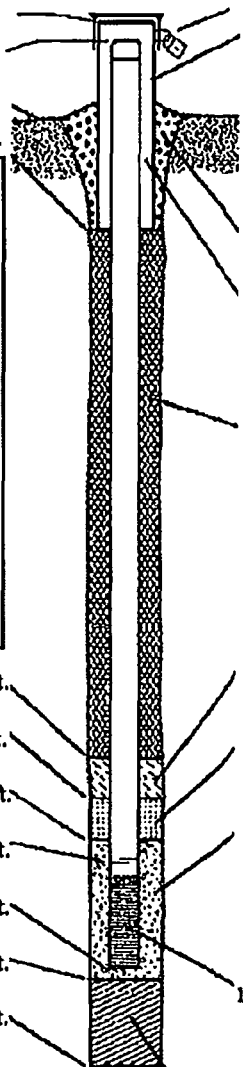
J. Filter pack, bottom _____ ft. MSL or 126 ft.

K. Borehole, bottom _____ ft. MSL or 126 ft.

L. Borehole, diameter 16 in.

M. O.D. well casing 4.5 in.

N. I.D. well casing 4 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 48 in.
b. Length: 8 ft.
c. Material: Steel ☐ 04 / Other ☒ HDPE - below grade vault
d. Additional protection? ☐ Yes ☐ No
If yes, describe: _____
3. Surface seal: Bentonite ☒ 30 / Concrete ☐ 01 / Other ☐ Bentonite Chips
4. Material between well casing and protective pipe: Bentonite ☐ 30 / Other ☐ _____
5. Annular space seal: a. Granular/Chipped Bentonite ☐ 33
b. _____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐ 35
c. _____ Lbs/gal mud weight . . . . . Bentonite slurry ☐ 31
d. 20 % Bentonite . . . . . Bentonite-cement grout ☐ 50
e. 24 Ft^3 volume added for any of the above
f. How installed: Tremie ☐ 01 / Tremie pumped ☒ 02 / Gravity ☐ 08
6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐1/4 in. ☒3/8 in. ☐1/2 in. Bentonite chips ☒ 32
c. _____ Other ☐
7. Fine sand material: Manufacturer, product name & mesh size
a. _____
b. Volume added _____ ft^3
8. Filter pack material: Manufacturer, product name & mesh size
a. Red Flint Well Slot #20
b. Volume added 40 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☐ 23 / Flush threaded PVC schedule 80 ☐ 24 / Other ☒ 4" FJ CS Pipe
10. Screen material: 304 SS FJ
a. Screen type: Factory cut ☐ 11 / Continuous slot ☒ 01 / Other ☐ _____
b. Manufacturer Johnson Screen
c. Slot size: 0.015 in.
d. Slotted length: 30 ft.
11. Backfill material (below filter pack): None ☒ 14 / Other ☐ _____

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
	Layne Christensen Company

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 7-98

Route to: Watershed/Wastewater [X] Waste Management ☐
Remediation/Redevelopment ☐ Other ☐ _____

Facility/Project Name	County Name	Well Name
Pentawood Products	BURNETT	Penta EW12 4"
Facility License, Permit or Monitoring Number	**County Code**	**Wis. Unique Well Number** / **DNR Well ID Number**
	7	VX858 /

1. Can this well be purged dry? [X] Yes ☐ No

2. Well development method

surged with bailer and bailed	☐ 41
surged with bailer and pumped	[X] 61
surged with block and bailed	☐ 42
surged with block and pumped	☐ 62
surged with block, bailed and pumped	☐ 70
compressed air	☐ 20
bailed only	☐ 10
pumped only	☐ 51
pumped slowly	☐ 50
Other _____	☐

3. Time spent developing well 300 min.

4. Depth of well (from top of well casisng) 123 ft.

5. Inside diameter of well 4 in.

6. Volume of water in filter pack and well casing _____ gal.

7. Volume of water removed from well 300 gal.

8. Volume of water added (if any) _____ gal.

9. Source of water added _____

10. Analysis performed on water added? ☐ Yes ☐ No
(If yes, attach results)

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 108 ft.	108 ft.
Date	b. 02 / 10 / 2011 (m m d d y y y y)	02 / 10 / 2011 (m m d d y y y y)
Time	c. ☐ a.m. ☐ p.m.	☐ a.m. ☐ p.m.
12. Sediment in well bottom	inches	inches
13. Water clarity	Clear ☐ 10 Turbid ☐ 15 (Describe)	Clear ☐ 20 Turbid ☐ 25 (Describe)

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids	mg/l	mg/l
15. COD	mg/l	mg/l

16. Well developed by: Name (first, last) and Firm
First Name: Dan Last Name: Passamani
Firm: Layne Christensen Company

17. Additional comments on development:

Name and Address of Facility Contact/Owner/Responsible Party
First Name: Kell Last Name: McKenna
Facility/Firm: CH2M Hill
Street: 135 South 84th Street
City/State/Zip: Milwaukee WI 53214-

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: _____
Print Name: Keith Meyers
Firm: Layne Christensen Company

NOTE: See instructions for more information including a list of county codes and well type codes.

State of Wisconsin
Department of Natural Resources

Route to: Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION

Form 4400-113A Rev. 7-98

Facility/Project Name: Pentawood Products	Local Grid Location of Well: _____ ft. ☐ N. ☐ S. _____ ft. ☐ E. ☐ W.	Well Name: Penta EW13 6"
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☒) or Well Location ☒ Lat. 45 ° 47 ' 13 " Long. 92 ° 25 ' 8 " or	Wis. Unique Well No.: VX859 / DNR Well ID No.:
Facility ID	St. Plane _____ ft. N, _____ ft. E. S/C/N	Date Well Installed: 01 / 19 / 2011 (m m d d y y y y)
Type of Well: Well Code 26 / ew	Section Location of Waste/Source: _____ 1/4 of _____ 1/4 of Sec. _____, T. _____ N, R. _____ ☐ E ☐ W	Well Installed By: Name (first, last) and Firm: Vince Meindel; Layne Christensen Company
Distance from Waste/Source _____ ft.	Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known
		Gov. Lot Number:

A. Protective pipe, top elevation _____ ft. MSL

B. Well casing, top elevation _____ ft. MSL

C. Land surface elevation _____ ft. MSL

D. Surface seal, bottom _____ ft. MSL or 15 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis performed? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ 50 / Hollow Stem Auger ☐ 41 / Other ☐ _____

15. Drilling fluid used: Water ☐ 02 / Air ☐ 01 / Drilling Mud ☐ 03 / None ☐ 99

16. Drilling additives used? ☐ Yes ☐ No

Describe _____

17. Source of water (attach analysis, if required):

_____

E. Bentonite seal, top _____ ft. MSL or 89 ft.

F. Fine sand, top _____ ft. MSL or 93 ft.

G. Filter pack, top _____ ft. MSL or 128 ft.

H. Screen joint, top _____ ft. MSL or 135 ft.

I. Well bottom _____ ft. MSL or 155 ft.

J. Filter pack, bottom _____ ft. MSL or 157 ft.

K. Borehole, bottom _____ ft. MSL or 157 ft.

L. Borehole, diameter 16 in.

M. O.D. well casing 6.62 in.

N. I.D. well casing 6 in.

1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:
a. Inside diameter: 48 in.
b. Length: 8 ft.
c. Material: Steel ☐ 04 / HDPE - below grade vault _____ / Other ☒ _____
d. Additional protection? ☐ Yes ☒ No
If yes, describe: _____

3. Surface seal: Bentonite ☒ 30 / Concrete ☐ 01 / Bentonite Chips _____ / Other ☐ _____

4. Material between well casing and protective pipe: Bentonite ☐ 30 / _____ / Other ☐ _____

5. Annular space seal: a. Granular/Chipped Bentonite ☐ 33
b. _____ Lbs/gal mud weight ... Bentonite-sand slurry ☐ 35
c. _____ Lbs/gal mud weight ..... Bentonite slurry ☐ 31
d. 20 % Bentonite ..... Bentonite-cement grout ☒ 50
e. 30 Ft³ volume added for any of the above
f. How installed: Tremie ☐ 01 / Tremie pumped ☒ 02 / Gravity ☐ 08

6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite chips ☒ 32
c. _____ Other ☐ _____

7. Fine sand material: Manufacturer, product name & mesh size
a. Red Flint Well Slot #20
b. Volume added 45 ft³

8. Filter pack material: Manufacturer, product name & mesh size
a. Red Flint Well Slot #60
b. Volume added 37 ft³

9. Well casing: Flush threaded PVC schedule 40 ☐ 23 / Flush threaded PVC schedule 80 ☐ 24 / 6" FJ CS Pipe / Other ☒ _____

10. Screen material: 304 SS FJ
a. Screen type: Factory cut ☐ 11 / Continuous slot ☒ 01 / Other ☐ _____
b. Manufacturer Johnson Screen
c. Slot size: 0.065 in.
d. Slotted length: 20 ft.

11. Backfill material (below filter pack): None ☐ 14 / Red Flint Well Slot #60 / Other ☒ _____

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
	Layne Christensen Company

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 7-98

Route to: Watershed/Wastewater [X] Waste Management [ ]
Remediation/Redevelopment [ ] Other [ ] _____

Facility/Project Name	County Name	Well Name
Pentawood Products	BURNETT	Penta EW13 6"

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well ID Number
	7	VX859	

1. Can this well be purged dry? [ ] Yes [X] No

2. Well development method

surged with bailer and bailed	[ ]	41
surged with bailer and pumped	[X]	61
surged with block and bailed	[ ]	42
surged with block and pumped	[ ]	62
surged with block, bailed and pumped	[ ]	70
compressed air	[ ]	20
bailed only	[ ]	10
pumped only	[ ]	51
pumped slowly	[ ]	50
Other _____	[ ]	

3. Time spent developing well 300 min.

4. Depth of well (from top of well casisng) 153 ft.

5. Inside diameter of well 6 in.

6. Volume of water in filter pack and well casing ____ gal.

7. Volume of water removed from well 999 gal.

8. Volume of water added (if any) ____ gal.

9. Source of water added _____

10. Analysis performed on water added? [ ] Yes [ ] No
(If yes, attach results)

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 109 ft.	109 ft.
Date	b. 02 / 08 / 2011 (m m d d y y y y)	02 / 08 / 2011
Time	c. ____ : ____ [ ] a.m. [ ] p.m.	____ : ____ [ ] a.m. [ ] p.m.
12. Sediment in well bottom	____ inches	____ inches
13. Water clarity	Clear [ ] 10 Turbid [X] 15 (Describe)	Clear [X] 20 Turbid [ ] 25 (Describe)

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids	____ mg/l	____ mg/l
15. COD	____ mg/l	____ mg/l

16. Well developed by: Name (first, last) and Firm
First Name: Dan Last Name: Passamani
Firm: Layne Christensen Company

17. Additional comments on development:

Name and Address of Facility Contact/Owner/Responsible Party
First Name: Kell Last Name: McKenna
Facility/Firm: CH2M Hill
Street: 135 South 84th Street
City/State/Zip: Milwaukee WI 53214-

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: _____
Print Name: Keith Meyers
Firm: Layne Christensen Company

NOTE: See instructions for more information including a list of county codes and well type codes.

State of Wisconsin
Department of Natural Resources

Route to: Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION

Form 4400-113A Rev. 7-98

Facility/Project Name: Pentawood Products	Local Grid Location of Well: _____ ft. ☐N. ☐S. _____ ft. ☐E. ☐W.	Well Name: Penta EW13 4"
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☒) or Well Location ☒ Lat. 45 ° 47 ' 13 " Long. 92 ° 25 ' 8 " or	Wis. Unique Well No.: VX860__ / DNR Well ID No.: ____
Facility ID: _____	St. Plane _____ ft. N, _____ ft. E. S/C/N	Date Well Installed: 01 / 19 / 2011 (m m d d y y y y)
Type of Well: Well Code 64 / le	Section Location of Waste/Source: ____ 1/4 of ____ 1/4 of Sec. ____, T. ____ N, R. ____ ☐E ☐W	Well Installed By: Name (first, last) and Firm: Vince Meindel; Layne Christensen Company
Distance from Waste/Source: _____ ft. / Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	Gov. Lot Number: _____

A. Protective pipe, top elevation _____ ft. MSL

B. Well casing, top elevation _____ ft. MSL

C. Land surface elevation _____ ft. MSL

D. Surface seal, bottom _____ ft. MSL or 15 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis performed? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ 50 / Hollow Stem Auger ☐ 41 / Other ☐ _____

15. Drilling fluid used: Water ☐ 02 / Air ☐ 01 / Drilling Mud ☐ 03 / None ☐ 99

16. Drilling additives used? ☐ Yes ☐ No

Describe _____

17. Source of water (attach analysis, if required):

_____

E. Bentonite seal, top _____ ft. MSL or 89 ft.

F. Fine sand, top _____ ft. MSL or _____ ft.

G. Filter pack, top _____ ft. MSL or 93 ft.

H. Screen joint, top _____ ft. MSL or 95 ft.

I. Well bottom _____ ft. MSL or 125 ft.

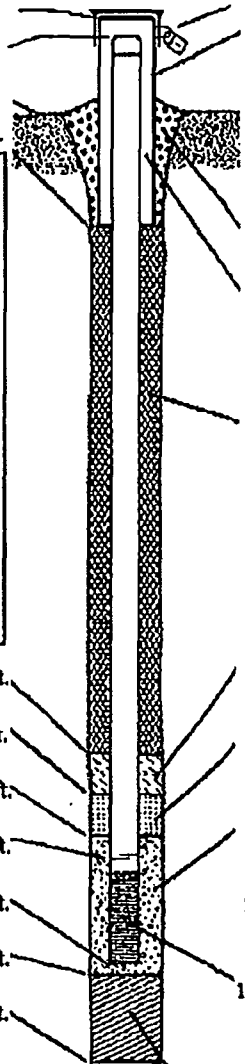
J. Filter pack, bottom _____ ft. MSL or 128 ft.

K. Borehole, bottom _____ ft. MSL or 128 ft.

L. Borehole, diameter 16 in.

M. O.D. well casing 4.5 in.

N. I.D. well casing 4 in.



1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:
a. Inside diameter: 48 in.
b. Length: 8 ft.
c. Material: Steel ☒ 04 / below grade vault _____ / Other ☐ ____
d. Additional protection? ☐ Yes ☐ No
If yes, describe: _____

3. Surface seal: Bentonite ☒ 30 / Concrete ☐ 01 / Bentonite Chips / Other ☐ ____

4. Material between well casing and protective pipe:
Bentonite ☐ 30 / _____ / Other ☐ ____

5. Annular space seal: a. Granular/Chipped Bentonite ☐ 33
b. _____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐ 35
c. _____ Lbs/gal mud weight . . . . . Bentonite slurry ☐ 31
d. 20 % Bentonite . . . . . Bentonite-cement grout ☒ 50
e. 30 Ft^3 volume added for any of the above
f. How installed: Tremie ☐ 01 / Tremie pumped ☒ 02 / Gravity ☐ 08

6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐1/4 in. ☒3/8 in. ☐1/2 in. Bentonite chips ☒ 32
c. _____ Other ☐ ____

7. Fine sand material: Manufacturer, product name & mesh size
a. _____
b. Volume added _____ ft^3

8. Filter pack material: Manufacturer, product name & mesh size
a. Red Flint Well Slot #20
b. Volume added 45 ft^3

9. Well casing: Flush threaded PVC schedule 40 ☐ 23 / Flush threaded PVC schedule 80 ☐ 24 / 4" FS CS Pipe / Other ☒ ____

10. Screen material: 304 SS FJ
a. Screen type: Factory cut ☐ 11 / Continuous slot ☒ 01 / _____ / Other ☐ ____
b. Manufacturer Johnson Screen
c. Slot size: 0.015 in.
d. Slotted length: 30 ft.

11. Backfill material (below filter pack): None ☒ 14 / _____ / Other ☐ ____

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
	Layne Christensen Company

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 7-98

Route to: Watershed/Wastewater [X] Waste Management [ ]
Remediation/Redevelopment [ ] Other [ ] _____

Facility/Project Name	County Name	Well Name
Pentawood Products	BURNETT	Penta EW13 4"

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well ID Number
	7	VX860	

1. Can this well be purged dry? [X] Yes [ ] No

2. Well development method

surged with bailer and bailed	[ ]	41
surged with bailer and pumped	[X]	61
surged with block and bailed	[ ]	42
surged with block and pumped	[ ]	62
surged with block, bailed and pumped	[ ]	70
compressed air	[ ]	20
bailed only	[ ]	10
pumped only	[ ]	51
pumped slowly	[ ]	50
Other _____	[ ]	

3. Time spent developing well 300 min.

4. Depth of well (from top of well casisng) 123 ft.

5. Inside diameter of well 4 in.

6. Volume of water in filter pack and well casing _____ gal.

7. Volume of water removed from well 300 gal.

8. Volume of water added (if any) _____ gal.

9. Source of water added _____

10. Analysis performed on water added? (If yes, attach results) [ ] Yes [ ] No

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 109 ft.	109 ft.
Date	b. 02 / 08 / 2011 (m m d d y y y y)	02 / 08 / 2011 (m m d d y y y y)
Time	c. : [ ] a.m. [ ] p.m.	: [ ] a.m. [ ] p.m.
12. Sediment in well bottom	inches	inches
13. Water clarity	Clear [ ] 10 Turbid [X] 15 (Describe)	Clear [X] 20 Turbid [ ] 25 (Describe)

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids	mg/l	mg/l
15. COD	mg/l	mg/l

16. Well developed by: Name (first, last) and Firm
First Name: Dan Last Name: Passamani
Firm: Layne Christensen Company

17. Additional comments on development:

Name and Address of Facility Contact/Owner/Responsible Party
First Name: Keli Last Name: McKenna
Facility/Firm: CH2M Hill
Street: 135 South 84th Street
City/State/Zip: Milwaukee WI 53214-

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: _____
Print Name: Keith Meyers
Firm: Layne Christensen Company

NOTE: See instructions for more information including a list of county codes and well type codes.

State of Wisconsin
Department of Natural Resources

Route to: Watershed/Wastewater ☐ Waste Management ☐ Remediation/Redevelopment ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION

Form 4400-113A Rev. 7-98

Facility/Project Name: Pentawood Products	Local Grid Location of Well: _____ ft. ☐N. ☐S. _____ ft. ☐E. ☐W.	Well Name: Penta EW14 6"
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☒) or Well Location ☒ Lat. 45 ° 47 ' 13 " Long. 92 ° 25 ' 8 " or	Wis. Unique Well No.: VX861__ / DNR Well ID No.: ____
Facility ID: _____	St. Plane _____ ft. N, _____ ft. E. S/C/N	Date Well Installed: 12 / 30 / 2010 (m m d d y y y y)
Type of Well: Well Code 26 / ew	Section Location of Waste/Source: ____ 1/4 of ____ 1/4 of Sec. ____, T. ____ N, R. ____ ☐E ☐W	Well Installed By: Name (first, last) and Firm: Vince Meindel; Layne Christensen Company
Distance from Waste/Source _____ ft.	Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known
		Gov. Lot Number: _____

A. Protective pipe, top elevation _____ ft. MSL

B. Well casing, top elevation _____ ft. MSL

C. Land surface elevation _____ ft. MSL

D. Surface seal, bottom _____ ft. MSL or 36 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis performed? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ 50 / Hollow Stem Auger ☐ 41 / Other ☐ _____

15. Drilling fluid used: Water ☐ 02 / Air ☐ 01 / Drilling Mud ☐ 03 / None ☐ 99

16. Drilling additives used? ☐ Yes ☐ No

Describe _____

17. Source of water (attach analysis, if required):

_____

E. Bentonite seal, top _____ ft. MSL or 92 ft.

F. Fine sand, top _____ ft. MSL or 96 ft.

G. Filter pack, top _____ ft. MSL or 132 ft.

H. Screen joint, top _____ ft. MSL or 133 ft.

I. Well bottom _____ ft. MSL or 153 ft.

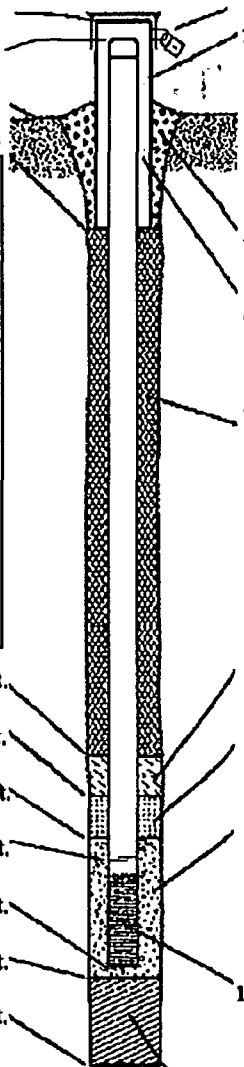
J. Filter pack, bottom _____ ft. MSL or 154.5 ft.

K. Borehole, bottom _____ ft. MSL or 154.5 ft.

L. Borehole, diameter 16 in.

M. O.D. well casing 6.62 in.

N. I.D. well casing 6 in.



1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:
a. Inside diameter: 48 in.
b. Length: 8 ft.
c. Material: Steel ☐ 04 / HDPE - below grade vault _____ / Other ☒ [illegible]
d. Additional protection? ☐ Yes ☐ No
If yes, describe: _____

3. Surface seal: Bentonite ☒ 30 / Concrete ☐ 01 / Other ☐ [illegible]
Bentonite Chips

4. Material between well casing and protective pipe: Bentonite ☐ 30 / Other ☐ [illegible]
_____

5. Annular space seal: a. Granular/Chipped Bentonite ☐ 33
b. _____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐ 35
c. _____ Lbs/gal mud weight . . . . . Bentonite slurry ☐ 31
d. 20 % Bentonite . . . . . Bentonite-cement grout ☒ 50
e. 24 Ft³ volume added for any of the above
f. How installed: Tremie ☐ 01 / Tremie pumped ☒ 02 / Gravity ☐ 08

6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐1/4 in. ☒3/8 in. ☐1/2 in. Bentonite chips ☒ 32
c. _____ Other ☐ [illegible]

7. Fine sand material: Manufacturer, product name & mesh size
a. Red Flint Well Slot #20 [illegible]
b. Volume added 51 ft³

8. Filter pack material: Manufacturer, product name & mesh size
a. Red Flint Well Slot #60 [illegible]
b. Volume added 31 ft³

9. Well casing: Flush threaded PVC schedule 40 ☐ 23 / Flush threaded PVC schedule 80 ☐ 24
6" FJ CS Pipe / Other ☒ [illegible]

10. Screen material: 304 SS FJ [illegible]
a. Screen type: Factory cut ☐ 11 / Continuous slot ☒ 01 / Other ☐ [illegible]
_____
b. Manufacturer Johnson Screen
c. Slot size: 0.065 in.
d. Slotted length: 20 ft.

11. Backfill material (below filter pack): None ☐ 14 / Other ☒ [illegible]
Red Flint Well Slot #60

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
	Layne Christensen Company

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 7-98

Route to: Watershed/Wastewater [X] Waste Management ☐
Remediation/Redevelopment ☐ Other ☐ _____

Facility/Project Name	County Name	Well Name
Pentawood Products	BURNETT	Penta EW14 6"
Facility License, Permit or Monitoring Number	**County Code**	**Wis. Unique Well Number** / **DNR Well ID Number**
	7	VX861 /

1. Can this well be purged dry? ☐ Yes [X] No

2. Well development method

surged with bailer and bailed	☐	41
surged with bailer and pumped	[X]	61
surged with block and bailed	☐	42
surged with block and pumped	☐	62
surged with block, bailed and pumped	☐	70
compressed air	☐	20
bailed only	☐	10
pumped only	☐	51
pumped slowly	☐	50
Other _____	☐	[redacted]

3. Time spent developing well 300 min.

4. Depth of well (from top of well casisng) 151 ft.

5. Inside diameter of well 6 in.

6. Volume of water in filter pack and well casing ____ gal.

7. Volume of water removed from well 999 gal.

8. Volume of water added (if any) ____ gal.

9. Source of water added _____

10. Analysis performed on water added? (If yes, attach results) ☐ Yes ☐ No

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 112 ft.	112 ft.
Date	b. 01 / 13 / 2011 (m m d d y y y y)	01 / 13 / 2011
Time	c. ____ : ____ ☐ a.m. ☐ p.m.	____ : ____ ☐ a.m. ☐ p.m.
12. Sediment in well bottom	____ inches	____ inches
13. Water clarity	Clear ☐ 10 Turbid [X] 15 (Describe)	Clear [X] 20 Turbid ☐ 25 (Describe)

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids	____ mg/l	____ mg/l
15. COD	____ mg/l	____ mg/l

16. Well developed by: Name (first, last) and Firm
First Name: Dan Last Name: Passamani
Firm: Layne Christensen Company

17. Additional comments on development:

Name and Address of Facility Contact/Owner/Responsible Party
First Name: Kell Last Name: McKenna
Facility/Firm: CH2M Hill
Street: 135 South 84th Street
City/State/Zip: Milwaukee WI 53214-

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: _____
Print Name: Keith Meyers
Firm: Layne Christensen Company

NOTE: See instructions for more information including a list of county codes and well type codes.

State of Wisconsin
Department of Natural Resources

Route to: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION

Form 4400-113A Rev. 7-98

Facility/Project Name: Pentawood Products	Local Grid Location of Well: _____ ft. ☐N. ☐S. _____ ft. ☐E. ☐W.	Well Name: Penta EW14 4"
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☒) or Well Location ☒ Lat. 45 ° 47 ' 13 " Long. 92 ° 25 ' 8 " or	Wis. Unique Well No.: VX862 / DNR Well ID No.:
Facility ID	St. Plane _____ ft. N, _____ ft. E. S/C/N	Date Well Installed: 12 / 30 / 2010 (m m d d y y y y)
Type of Well: Well Code 64 / le	Section Location of Waste/Source: _____ 1/4 of _____ 1/4 of Sec. ____, T. ____ N, R. ____ ☐E ☐W	Well Installed By: Name (first, last) and Firm: Vince Meindel; Layne Christensen Company
Distance from Waste/Source _____ ft. / Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known / Gov. Lot Number:	

A. Protective pipe, top elevation _____ ft. MSL

B. Well casing, top elevation _____ ft. MSL

C. Land surface elevation _____ ft. MSL

D. Surface seal, bottom _____ ft. MSL or 36 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis performed? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ 50 / Hollow Stem Auger ☐ 41 / Other ☐ _____

15. Drilling fluid used: Water ☐ 02 / Air ☐ 01 / Drilling Mud ☐ 03 / None ☐ 99

16. Drilling additives used? ☐ Yes ☐ No

Describe _____

17. Source of water (attach analysis, if required): _____

E. Bentonite seal, top _____ ft. MSL or 92 ft.

F. Fine sand, top _____ ft. MSL or _____ ft.

G. Filter pack, top _____ ft. MSL or 96 ft.

H. Screen joint, top _____ ft. MSL or 98 ft.

I. Well bottom _____ ft. MSL or 128 ft.

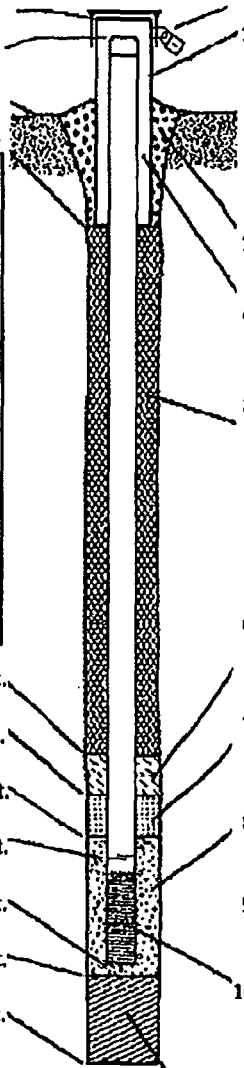
J. Filter pack, bottom _____ ft. MSL or 132 ft.

K. Borehole, bottom _____ ft. MSL or 132 ft.

L. Borehole, diameter 16 in.

M. O.D. well casing 4.5 in.

N. I.D. well casing 4 in.



1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:
a. Inside diameter: 48 in.
b. Length: 8 ft.
c. Material: Steel ☐ 04 / HDPE - below grade vault _____ / Other ☒ ▒
d. Additional protection? ☐ Yes ☐ No
If yes, describe: _____

3. Surface seal: Bentonite ☒ 30 / Concrete ☐ 01 / Bentonite Chips / Other ☐ ▒

4. Material between well casing and protective pipe: Bentonite ☐ 30 / _____ / Other ☐ ▒

5. Annular space seal: a. Granular/Chipped Bentonite ☐ 33
b. _____ Lbs/gal mud weight ... Bentonite-sand slurry ☐ 35
c. _____ Lbs/gal mud weight ..... Bentonite slurry ☐ 31
d. 20 % Bentonite ..... Bentonite-cement grout ☒ 50
e. 24 Ft^3 volume added for any of the above
f. How installed: Tremie ☐ 01 / Tremie pumped ☒ 02 / Gravity ☐ 08

6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐1/4 in. ☒3/8 in. ☐1/2 in. Bentonite chips ☒ 32
c. _____ Other ☐ ▒

7. Fine sand material: Manufacturer, product name & mesh size
a. _____ ▒
b. Volume added _____ ft^3

8. Filter pack material: Manufacturer, product name & mesh size
a. Red Flint Well Slot #20 ▒
b. Volume added 31 ft^3

9. Well casing: Flush threaded PVC schedule 40 ☐ 23 / Flush threaded PVC schedule 80 ☐ 24 / 4" FJ CS Pipe / Other ☒ ▒

10. Screen material: 304 SS FJ ▒
a. Screen type: Factory cut ☐ 11 / Continuous slot ☒ 01 / _____ / Other ☐ ▒
b. Manufacturer Johnson Screen
c. Slot size: 0.015 in.
d. Slotted length: 30 ft.

11. Backfill material (below filter pack): None ☒ 14 / _____ / Other ☐ ▒

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
	Layne Christensen Company

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 7-98

Route to: Watershed/Wastewater [X] Waste Management [ ]
Remediation/Redevelopment [ ] Other [ ] _____

Facility/Project Name	County Name	Well Name
Pentawood Products	BURNETT	Penta EW14 4"

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well ID Number
	7	VX862	

1. Can this well be purged dry? [X] Yes [ ] No

2. Well development method

surged with bailer and bailed	[ ] 41
surged with bailer and pumped	[X] 61
surged with block and bailed	[ ] 42
surged with block and pumped	[ ] 62
surged with block, bailed and pumped	[ ] 70
compressed air	[ ] 20
bailed only	[ ] 10
pumped only	[ ] 51
pumped slowly	[ ] 50
Other _____	[ ] 80

3. Time spent developing well 300 min.

4. Depth of well (from top of well casing) 126 ft.

5. Inside diameter of well 4 in.

6. Volume of water in filter pack and well casing _____ gal.

7. Volume of water removed from well 300 gal.

8. Volume of water added (if any) _____ gal.

9. Source of water added _____

10. Analysis performed on water added? [ ] Yes [ ] No
(If yes, attach results)

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 112 ft.	112 ft.
Date	b. 01 / 13 / 2011 (m m d d y y y y)	01 / 13 / 2011
Time	c. : [ ] a.m. [ ] p.m.	: [ ] a.m. [ ] p.m.
12. Sediment in well bottom	inches	inches
13. Water clarity	Clear [ ] 10 Turbid [X] 15 (Describe)	Clear [X] 20 Turbid [ ] 25 (Describe)
Fill in if drilling fluids were used and well is at solid waste facility:		
14. Total suspended solids	mg/l	mg/l
15. COD	mg/l	mg/l

16. Well developed by: Name (first, last) and Firm
First Name: Dan Last Name: Passamani
Firm: Layne Christensen Company

17. Additional comments on development:

Name and Address of Facility Contact/Owner/Responsible Party
First Name: Keli Last Name: McKenna
Facility/Firm: CH2M Hill
Street: 135 South 84th Street
City/State/Zip: Milwaukee WI 53214-

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: _____
Print Name: Keith Meyers
Firm: Layne Christensen Company

NOTE: See instructions for more information including a list of county codes and well type codes.

Appendix D

Pump installation Records

PUMP INSTALLATION

1 Job Name: Pentawood Products
Address: 3682 Daniels 70
City, State: Siren WI

2 Date: 2 (Month) 17 (Day) 2011 (Year) Job Completed

3 Pump No. EW-13 (4") Oil or Water Lube
(New) or Repair
Pump Trouble: _____

4 PUMP SIZE

	Diameter	Lengths
Discharge	1/2" (Above) Below	
Column	Black Poly Screw Flange	
Tubing	Air supply Line: 1/4" Exhaust: 3/8"	
Shaft	Stainless Carbon	

Water is at 107.09 FT / Product just sheen at this time
Column setting to bowl Around 107 ft. Depending on Product.

BOWL AP2C-42372 QED Auto Pump (Airdrive)
Diameter 1 9/16" Shaft Diameter N/A
Type Airdrive Stages N/A
~~Cast Iron or Bronze~~ S.S.
Suction S.S. Diameter _____ Ft. Long Strn.
~~Special Paint or Coating on:~~ Zinc Sleeves in:
~~Column~~ Total Length of pump
~~Tubing~~ with fittings included: 32"

5 PUMP REPAIR

Condition of Pump When Pulled	New Parts Installed
~~Column~~ Note: There is 3/8", & 1/4" poly from pump to Top of casing.	Column 3/8", 1/4" poly
~~Tubing~~ 3/8" Exhaust line is under well cap	~~Tubing~~ Winch, cable, air supply, fittings, etc. as per work order
~~Shafting~~ Note:- All poly line measurements are: 1/2", 3/8", 1/4" ID	~~Shafting~~ 110 FT Airline For Bubbler
~~Bowl~~ Line ace taped with 2" Layne Tape	Bowl New well cap, fittings, etc.
~~Suction~~	~~Suction~~ S.S. safety cable & S.S. cable for winch line connected to pump.
~~Machine Work~~	1. Drain Ports Open Yes (No)
	2. Chlorinate Well Yes (No)
	3. Pump Runs good
	4. Align Pump Head with Dial Indicator Yes (No)
	5. Grouted Head-Base Plate Yes (No)

6 Motor or Gear Drive
Make Airdrive Skimmer Pumps
Speed _____
Or Gear Drive Ratio _____
Frame Size _____
Running Amps N/A
Running Volts N/A
Serial No. (Unable To read)
Motor CD _____
Gear Drive CD _____
HP _____
Volts _____
Standard Combination
Non-Reverse -- Yes (No)

7 WELL Readings are From Top of casing
Number EW-13 4" Year Drilled 2011
Location 4FT Vault
Diameter 4" Depth 125.9 FT
Measured from top of 4 " diameter casing which is
4FT Vault feet above ground
Tape to Water 107.09
Air Line Length 108 FT A.L. Material PVC
~~Static Gage~~ Depending on Product ~~Static Level~~ Airline For Bubbler
Pumping Gage _____ Pumping Level _____
Discharge Pressure _____ feet when pumping into System

8 Installer Dan & Bob
Rig Used None
Foreman Hours to: Rig Up _____
To Pull _____ Inspect _____
Repair _____ To Set _____

Layne Northwest
a div. of Layne Christensen Company

PUMP INSTALLATION

1 Job Name: Pentawood Products
Address: 3682 Daniels Rd
City, State: Siren WI

2 Date: 2 (Month) 17 (Day) 2011 (Year) Job Completed

3 Pump No. EW-12 (4") Oil or Water Lube
New or Repair
Pump Trouble:

4 PUMP SIZE

	Diameter	Lengths
Discharge	3/4" Above / Below	
Column	Black Poly Screw / Flange	
Tubing	Air supply line: 3/8" Exhaust: 1/2"	
Shaft	Stainless / Carbon	

Water is at 100.91 FT / Product at 100.90 T.O.C.
Column setting to bowl: Around 100 FT ft. Depending on Product

BOWL AP4 + QED AvTo Pump (Airdrive)
Diameter 3 5/8" Shaft Diameter N/A
Type Airdrive Stages N/A
~~Cast Iron or Bronze~~ S.S.
Suction S.S. Diameter ____ Ft. Long Strn.
~~Special Paint or Coating on:~~ Zinc Sleeves in:
~~Column~~ Total Length of pump with
~~Tubing~~ fittings included: 43"

5 PUMP REPAIR

Condition of Pump When Pulled	New Parts Installed
~~Column~~ Note: There is 3/4", 1/2", 3/8" poly From pump To Top of casing.	Column 3/4", 1/2", 3/8" poly
~~Tubing~~ 1/2" Exhaust line is under well cap.	~~Tubing~~ Winch, cable, fittings, air supply, etc., as per work order
~~Shafting~~ Note: All poly line measurments are 3/4" ID, 1/2" ID, 3/8" ID	~~Shafting~~ 105 FT PVC airline For Bubbler use
~~Bowl~~ Lines are taped with 2" Layne tape	Bowl New well cap, fittings, etc
~~Suction~~	~~Suction~~ S.S. safety cable & S.S. Cable for winch line connected To pump
~~Machine Work~~	1. Drain Ports Open Yes (No)
	2. Chlorinate Well Yes (No)
	3. Pump Runs good
	4. Align Pump Head with Dial Indicator Yes (No)
	5. Grouted Head-Base Plate Yes (No)

6 ~~Motor or Gear Drive~~ Motor CD ____
Gear Drive CD ____
Make Airdrive HP ____
~~Skimmer Pump~~ Speed ____ Volts ____
Or Gear Drive Ratio ____ Standard Combination
Frame Size ____ Non-Reverse -- Yes (No)
Running Amps N/A
Running Volts N/A
Serial No. 4-3001

7 WELL Readings Top of casing
Number EW-12 4" Year Drilled 2011
Location 4' Vault
Diameter 4" Depth 125.7FT
Measured from top of 4 " diameter casing which is
4FT Vault feet above ground
Tape to Water 100.91 FT
Air Line Length Around 101 A L Material PVC
~~Static Gage~~ Depending on Product ~~Static Level~~ Airline For Bubbler
Pumping Gage ____ Pumping Level ____
Discharge Pressure ____ feet when pumping into System

8 Installer Dan & Bob
Rig Used None
Foreman Hours to: Rig Up ____
To Pull ____ Inspect ____
Repair ____ To Set ____

Layne
Layne Northwest
a div of Layne Christensen Company

Sep-01

PUMP INSTALLATION

1 Job Name: Pentawood Products
Address: 3682 Daniels 70
City, State: Siren WI

2 Date: 2 (Month) 17 (Day) 2011 (Year) Job Completed

3 Pump No. Ew-14 (4") Oil or Water Lube
(New) or Repair
Pump Trouble

6 ~~Motor or Gear Drive~~ Motor CD
Gear Drive CD
Make Airdrive shimmer pump HP
Speed Volts
Or Gear Drive Ratio Standard Combination
Frame Size Non-Reverse -- Yes (No)
Running Amps N/A
Running Volts N/A
Serial No. 4-3000

4 PUMP SIZE

	Diameter	Lengths
Discharge	3/4" ~~Above~~ Below	
Column	Black Poly ~~Screw~~ Flange	
~~Tubing~~	Air supply line: 3/8" Exhaust line: 1/2"	
Shaft	~~Stainless~~ Carbon	

Water is at 113.19FT / Product at 113.18FT T.O.C.
Column setting to bowl Around 113 ft. Depending on Product

BOWL AP4 + QE0 Auto Pump (Airdrive)
Diameter 3 5/8" Shaft Diameter N/A
Type Airdrive Stages N/A
~~Cast Iron or Bronze~~: S.S.
Suction S.S. Diameter Ft. Long Strn.
~~Special Paint or Coating on:~~ Zinc Sleeves in:
~~Column~~ Total Length of Pump with
~~Tubing~~ fittings included: 43"

7 WELL Readings Top of casing
Number Ew-14 (4") Year Drilled 2011
Location 4" Vault
Diameter 4" Depth 127.4FT
Measured from top of 4" diameter casing which is
4FT Vault feet above ground
Tape to Water 113.18FT
Air Line Length 1/4 ~~AL~~ A L. Material ~~AL~~ PVC
~~Static Gage~~ Airline Length arrived 114FT ~~Static Level~~ Airline For Bubbler
Pumping Gage Pumping Level
Discharge Pressure feet when pumping into System

8 Installer Dan & Bob
Rig Used None
Foreman Hours to: Rig Up
To Pull Inspect
Repair To Set

PUMP REPAIR

~~Condition of Pump When Pulled~~
~~Column~~ Note: There is 3/4", 1/2", 3/8" poly from pump To Top of casing.
~~Tubing~~ 1/2" Exhaust line is under well cap.
~~Shafting~~ Note: All poly line measurments are: 3/4" ID, 1/2" ID, 3/8" ID
~~Bowl~~ Lines are taped together with 2" Layne tape
~~Suction~~
~~Machine Work~~

New Parts Installed

Column 3/4", 1/2", 3/8" poly
~~Tubing~~ Winch, cable, fittings, air supply, etc, as per work order.
~~Shafting~~ 115FT Airline For Bubbler
Bowl New pump
well cap, fittings, etc.
~~Suction~~ S.S. safety cable & S.S. cable for winch line connected to pump

1. Drain Ports Open Yes (No)
2. Chlorinate Well Yes (No)
3. Pump Runs good
4. Align Pump Head with Dial Indicator Yes (No)
5. Grouted Head-Base Plate Yes (No)

PUMP INSTALLATION

1 Job Name: Pentawood Products
Address: 3682 Daniels 70
City, State: Siren WI

2 Date: 2 (Month) 15 (Day) 2011 (Year) Job Completed

3 Pump No. EW-12 (6") Oil or Water Lube
New or Repair
Pump Trouble

4 PUMP SIZE

	Diameter		Lengths
Discharge	1¼"	Above / Below	1¼" Pitless Adaptor
Column	1¼"	Screw / Flange	5 EA: 21'1" 1 EA: 14 FT
Tubing			
Shaft		Stainless / Carbon	

Mod # B10010018-P11103 H 366 FT of Head
Column setting to bowl 119.5 ft. From Bottom of Pitless

BOWL Grundfos GPM: Q 16 US
Diameter 3 5/8" Shaft Diameter N/A
Type 16820-18 Stages 18
~~Cast Iron or Bronze~~ S.S. Pump & motor
Suction S.S. on Pump Diameter 3 5/8" Ft. Long Strn.
Special Paint or Coating on: Zinc Sleeves in:
~~Column~~ Tubing Total Length of motor & pump: 33½"

6 Motor or Gear Drive Motor CD
Mod # 23432523 18 Gear Drive CD
#12 Chemical resistant wire
Make Franklin HP 2
Speed 3450 Volts 460
~~Or Gear Drive Ratio~~ 3PH Standard Combination
Frame Size Non-Reverse -- Yes (No)
Running Amps 4.1 Max 3.4 Run
Running Volts 460 S.F. 1.25
Serial No. 10M14-02-010180

7 WELL (6") Readings top of casing
Number EW-12 Year Drilled 2011
Location 3682 Daniels 70
Diameter 6" Depth 147.8' T.O.C.
Measured from top of 6 " diameter casing which is in 4 FT vault feet above ground 5.6 FT T.O.C. To Pitless
Tape to Water 102.5 FT T.O.C.
Air Line Length N/A A.L. Material N/A
Static Gage Static Level
Pumping Gage Pumping Level
Discharge Pressure feet when pumping into System

8 Installer Dan & Bob
Rig Used T-35
Foreman Hours to: Rig Up
To Pull Inspect
Repair To Set

5 PUMP REPAIR

Condition of Pump When Pulled	New Parts Installed
Column	5 EA: 21'1" 1 EA: 14 FT
Tubing	
Shafting	~~Shafting~~ wire is Taped with 2" Layn Tape
Bowl	New Bowl & Motor and #12 Chemical resistant wire
Suction	~~Suction~~ 1¼" Pitless and 6" well cap as per work order
Machine Work	

1. Drain Ports Open Yes (No)
2. Chlorinate Well Yes ~~No~~
3. Pump Runs good
4. Align Pump Head with Dial Indicator Yes (No)
5. Grouted Head-Base Plate Yes (No)

PUMP INSTALLATION

1 Job Name: Pentawood Products
Address: 3682 Daniels Rd
City, State: Siren WI

2 Date: 2 (Month) 15 (Day) 2011 (Year) Job Completed

3 Pump No. EW13 (6") Oil or Water Lube
(New) or Repair
Pump Trouble

4 PUMP SIZE

	Diameter	Lengths
Discharge	1¼" (Above) Below	~~6 EA: 21' 1"~~ 1¼" P.Tless Adaptor
Column	1¼" (Screw) Flange	6 EA: 21' 1"
Tubing		
Shaft	Stainless Carbon	

Mod# B10010018-P11103 H366 FT
Column setting to bowl 126.6 ft. GPM: @ 16 US
From Bottom of P.Tless
BOWL GrundFos
Diameter ~~4~~ 3⅝" Shaft Diameter N/A
Type 16820-18 Stages 18
~~Cast Iron or Bronze~~ S.S. Pump & Motor
Suction S.S. on Pump Diameter 3⅝" Ft. Long Strn.
Special Paint or Coating on: Zinc Sleeves in:
~~Column~~ Total Length of Motor & Pump: 33½"
Tubing

5 PUMP REPAIR

Condition of Pump When Pulled	
Column	
Tubing	
Shafting	
Bowl	
Suction	
Machine Work	

New Parts Installed	
Column	6 EA: 21' 1" X 1¼"
Tubing	
~~Shafting~~	wire is Taped with 2" Layne Tape
Bowl	New Bowl & Motor and #12 Chemical resistant wire
~~Suction~~	1¼" P.Tless and 6" well Caps as per work order

1. Drain Ports Open Yes (No)
2. Chlorinate Well Yes (No)
3. Pump Runs good
4. Align Pump Head with Dial Indicator Yes (No)
5. Grouted Head-Base Plate Yes (No)

6 Motor or Gear Drive Motor CD
Mod# 234325231B Gear Drive CD
3PH
Make Franklin HP 2
Speed 3450 Volts 460
#12 wire (chemical resistant) Standard
Or Gear Drive Ratio Combination
Frame Size Non-Reverse -- Yes (No)
Running Amps 4.1 MAX 3.4 Run
Running Volts 460 S.F. 1.25
Serial No. 10M14-02-01013C

7 WELL (6")
Number EW-13 Year Drilled 2011
Location 3682 Daniels Rd
Diameter 6" Depth 153.4 FT. o.c.
Measured from top of 6 " diameter casing which is in
4FT 4 IN feet above ground 5'4" T.o.c. To P.Tless
Tape to Water 108.3 FT T.o.c.
Air Line Length N/A A L Material N/A
Static Gage Static Level 108.3 FT
Pumping Gage Pumping Level
Discharge Pressure feet when pumping into System

8 Installer Dan & Bob
Rig Used T-35
Foreman Hours to: Rig Up
To Pull Inspect
Repair To Set

Layne
Layne Northwest
a div of Layne Christensen Company

Sep-01

PUMP INSTALLATION

1 Job Name: Pentawood Products
Address: 3682 Daniels 70
City, State: Siren WI

2 Date: 2 (Month) 15 (Day) 2011 (Year) Job Completed

3 Pump No. EW-14 (6") Oil or Water Lube
(New) or Repair
Pump Trouble:

4 PUMP SIZE

	Diameter		Lengths
Discharge	1¼"	(Above) Below	1¼" Pitless Adaptor
Column	1¼"	(Screw) Flange	5EA: 21FT 1" 1EA: 17FT
Tubing			
Shaft		Stainless Carbon	

Mod# B1001018-P11103 H 366FT of Head
Column setting to bowl 122.5 ft. From Bottom of Pitless

BOWL Grundfos GPM: Q 16US
Diameter 3⅝" Shaft Diameter N/A
Type 16820-18 Stages 18
~~Cast Iron or Bronze~~ S.S. Pump & motor
~~Suction~~ S.S. on pump Diameter 3⅝" Ft. Long Strn.
Special Paint or Coating on: Zinc Sleeves in:
Column
Tubing Total length of motor & pump: 33½"

5 PUMP REPAIR

Condition of Pump When Pulled	
Column	
Tubing	
Shafting	
Bowl	
Suction	
Machine Work	

6 Motor or Gear Drive Motor CD
Mod# 23432523 18
#12 Chemical resistant wire Gear Drive CD
Make Franklin HP 2
Speed 3450 Volts 460
~~Or Gear Drive Ratio~~ 3PH Standard Combination
Frame Size Non-Reverse -- Yes (No)
Running Amps 4.1 MAX 3.4 Run
Running Volts 460 S.F. 1.25
Serial No. 10L14-05-0100 4C

7 WELL
Number EW-14 (6") Year Drilled 2011
Location 3682 Daniels 70
Diameter 6" Depth 150.7 FT T.O.C
Measured from top of 6" diameter casing which is in
4FT Vault feet above ground 5 FT Top of casing To Pitless
Tape to Water 113 FT
Air Line Length N/A A.L. Material N/A
Static Gage Static Level
Pumping Gage Pumping Level
Discharge Pressure feet when pumping into System

8 Installer Dan & Bob
Rig Used T-35
Foreman Hours to: Rig Up
To Pull Inspect
Repair To Set

New Parts Installed	
Column	5EA: 1¼" X 21' 1" 1EA: 1¼" X 17 FT
Tubing	
~~Shafting~~	wire is taped with 2" Layne Tape
Bowl	New Bowl & motor and #12 Chemical resistant wire
~~Suction~~	1¼" Pitless Adaptor and 6" well cap as per work order

1. Drain Ports Open Yes (No)
2. Chlorinate Well Yes (No)
3. Pump Runs good
4. Align Pump Head with Dial Indicator Yes (No)
5. Grouted Head-Base Plate Yes (No)

Appendix E

Photographic Log

APPENDIX E

Photograph Log

Conveyance pipe excavation

Conveyance Pipe excavation – looking west toward the CAMU

Conveyance pipe excavation will piping installed – looking west toward the CAMU

Conveyance Piping Installation looking east toward the Treatment Plant

Barbary Rig drilling at EW-13 – looking southwest

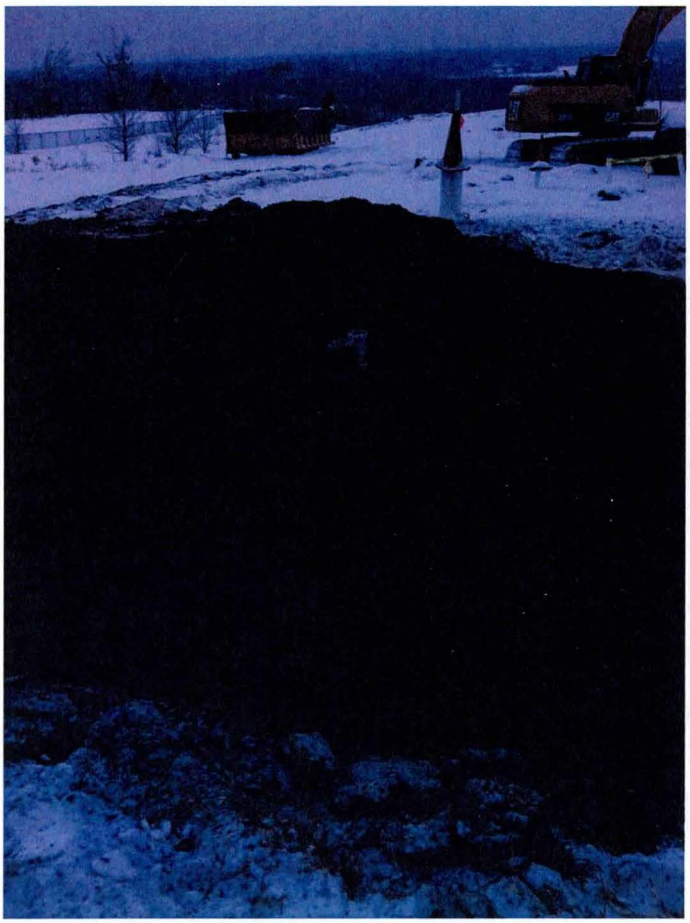
Barbary Rig Drilling at EW-13 – looking southwest

HDPE heating coupler

Coupling the HDPE piping at the conveyance piping penetration point

Excavation for the vault around EW-12 – looking east

Conveyance piping excavation – soil layering



Excavation of vault for EW-12 – looking north