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FIRST FIVE-YEAR REVIEW REPORT FOR ASHLAND/NORTHERN STATES POWER LAKEFRONT SUPERFUND SITE ASHLAND COUNTY, WISCONSIN

Prepared by

U.S. Environmental Protection Agency
Region 5
Chicago, Illinois

8/12/2019

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Table of Contents

Figures and Tables

Appendices

LIST OF ABBREVIATIONS & ACRONYMS

AOC	Administrative Order on Consent
ARARs	Applicable or Relevant and Appropriate Requirements
BERA	Baseline Ecological Risk Assessment
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
C.F.R.	Code of Federal Regulations
COCs	Contaminants of Concern
CR	Cancer Risk
CTE	Central Tendency Evaluation
DNAPL	Dense Non-aqueous Phase Liquid
EC	Environmental Covenant
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FS	Feasibility Study
FYR	Five-Year Review
IC	Institutional Control
HHRA	Human Health Risk Assessment
LNAPL	Light Non-aqueous Phase Liquid
MCL	Maximum Contaminant Level
MGP	Manufactured Gas Plant
NAPL	Non-aqueous Phase Liquid
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NSPW	Northern States Power Company of Wisconsin
O&M	Operation and Maintenance
PAHs	Polynuclear Aromatic Hydrocarbons
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RD/RA	Remedial Design/Remedial Action
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
Site	Ashland/Northern States Power Lakefront Superfund Site
SWAC	Surface-Weighted Average Concentration
SVOCs	Semi-Volatile Organic Compounds
UU/UE	Unlimited Use/Unrestricted Exposure
VOCs	Volatile Organic Compounds
WDNR	Wisconsin Department of Natural Resources
WNPDES	Wisconsin National Pollutant Discharge Elimination System

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine whether the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The United States Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP)(40 C.F.R. Section 300.430(f)(4)(ii)), and EPA policy.

This is the first FYR for the Ashland/Northern States Power Lakefront Superfund Site (Site). The triggering action for this statutory review was the start of the remedial action (RA). The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of one operable unit (OU) and will be addressed in this FYR. However, the Site remedy was separated into two phases: 1) Phase 1: upland remedy (onshore) and 2) Phase 2: sediment remedy (offshore).

Scott Hansen, Remedial Project Manager with EPA led the Ashland/NSP Lakefront Superfund Site FYR. John Sager, Project Manager with the Wisconsin Department of Natural Resources (WDNR) assisted in the review. On June 18, 2018, EPA notified WDNR of the initiation of the FYR.

Site Background

The Site is located in Ashland, Ashland County, Wisconsin (see maps in Appendix C, Attachment 1). The Site consists of 25 acres of upland (onshore) and 16 acres offshore (sediment located along the shore of Lake Superior). The Site contains: (i) property owned by Northern States Power Company, a Wisconsin corporation, doing business as Xcel Energy, a subsidiary of Xcel Energy Inc. (NSPW). This property included the former Manufactured Gas Plant (MGP) facility; (ii) a portion of Kreher Park, a City-owned property fronting on the bay that included the former municipal waste water treatment plant (WWTP); (iii) an inlet of Chequamegon Bay containing contaminated sediment directly offshore from the former WWTP; (iv) a railroad right-of-way owned by the Wisconsin Central Ltd., and formerly owned by the Soo Line Railroad; and (v) Our Lady of the Lake Church/School, as well as private residences. The Site is bounded by US Highway 2 (Lake Shore Drive) to the south, Ellis Avenue and its extension to the City marina to the west, Prentice Avenue and its extension to a boat launch to the east, and a line between the north termini of the marina and the boat launch to the north. More information regarding Site Background can be found in Appendix A – Existing Site Information.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Ashland/Northern States Power Lakefront		
EPA ID: WISFN0507952		
Region: 5	**State:** WI	**City/County:** Ashland/Ashland
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the site achieved construction completion?** No	
REVIEW STATUS		
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:**		
Author name (Federal or State Project Manager): Scott Hansen		
Author affiliation: EPA		
Review period: 6/18/2018 – 4/30/2019		
Date of site inspection: 11/27/2018		
Type of review: Statutory		
Review number: 1		
Triggering action date: 5/23/2014		
Due date *(five years after triggering action date)*: 5/23/2019		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In 1989, during exploratory work to expand the WWTP, contaminated soil and groundwater were encountered by the City of Ashland. The City notified WDNR, subsequently closed the WWTP, and built a new WWTP facility a few miles away. In

1994, WDNR initiated an investigation and evaluation of the area to characterize the extent of contamination on the property.

The primary contaminants at the Site are derived from manufactured gas plant wastes in the form of coal tars, including volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbon (PAH) compounds. Additionally, some free-phase hydrocarbons product (free product) derived from the coal tars is present as non-aqueous phase liquid (NAPL), and has impacted soils, groundwater, and sediments. The NAPL referenced in this document includes both light non-aqueous phase liquid (LNAPL) and dense non-aqueous phase liquid (DNAPL).

DNAPL was encountered in the upper reaches of the Filled Ravine near the former MGP facility on the NSPW property to the former lake shore, in isolated areas of Kreher Park including the former "seep" area, in the nearshore sediments, and in the upper elevations of the Copper Falls Formation, which behaves as a confined aquifer under the former MGP in the Upper Bluff portion of the Site. DNAPLs encountered in the Filled Ravine (near the former MGP facility) and at isolated areas at Kreher Park were encountered at the base of these fill units overlying the Miller Creek Formation. The Miller Creek Formation is the confining unit for the underlying Copper Falls aquifer. LNAPLs were also observed across much of Kreher Park as oily sheen in the underlying wood waste layer encountered during a test pit investigation at the Park.

DNAPL was also encountered in sediments in portions of the affected inlet, although the DNAPL is less defined than at on-shore locations due to the dynamic conditions in the affected sediments. The most highly contaminated sediments (including areas of DNAPL) are subsurface and nearest the shoreline; however, releases of contamination to the surface water have been documented, specifically during high energy events. It is important to note that nearly all of the significant wood waste/wood debris is located within the most highly contaminated areas of the inlet nearest the shoreline.

DNAPLs in the deep aquifer correspond to high levels of VOCs in groundwater (>50,000 μg/L), which is surrounded by a dissolved phase contaminant plume that extends north from the NAPL area in the direction of groundwater flow.

Contaminants of Concern

The source of the contaminants of concern (COCs) at the Site was determined to be the historical releases from the former MGP operations from the 1880s to 1947, with potential contributions from historic lumber operations and solid waste disposal. Other activities such as the construction, expansion and operation of the former WWTP may also have redistributed contamination at the Site.

The COCs at the Site are typical by-products of MGP processes. The groundwater, soil, and sediment at the Site are contaminated predominantly with VOCs and semivolatile organic compounds (SVOCs). The predominant subgroup of SVOCs are PAHs. The most commonly occurring VOC is benzene, and the most commonly occurring PAH is naphthalene. Metals (e.g., lead and arsenic) have been detected at varying concentrations and are associated with natural conditions, fill, and former MGP process wastes. The VOCs and PAHs were derived from the former MGP operations located on the Upper Bluff portion of the Site.

The ongoing sources of the COCs are primarily the free-product zones of NAPL that have been identified since investigations began at the Site in 1994, and further refined during the remedial investigation (RI) sampling performed in 2005. These free-product zones consist of both DNAPL and LNAPL and are consistent with MGP wastes. These MGP wastes are located in the aquifers, subsurface soils and sediments.

All data from historic investigations and the 2005 RI were compiled into one database. A large dataset of organic compounds was analyzed during the earlier investigations at the Site, with a smaller dataset available for metals and inorganics. The 2005 RI Work Plan required sampling of a smaller set of VOCs, PAHs and metals/inorganic analytes common to all media (a slightly expanded list of PAHs was analyzed for sediments for purposes of ecological evaluation). During preparation of the RI, EPA approved an amended list of compounds which included the analytes listed in the 2005 RI Work Plan and additional compounds previously analyzed that exceeded regulatory limits. These additional compounds were limited to those which were historically measured at least once in excess of 10 times an applicable regulatory standard. The amended final COC parameter list that was approved by EPA is included in Appendix C, Attachment 2.

Risk Characterization

As part of the RI, NSPW prepared a Human Health Risk Assessment (HHRA) and a Baseline Ecological Risk Assessment (BERA) for the Site to evaluate potential risks to human health and the environment if no action is taken. The HHRA and BERA characterized current and future threats or risks to human health and the environment posed by contaminants at the Site. The risk assessments provided the basis for taking action and identified the contaminants and exposure pathways that needed to be addressed by the RA. The HHRA and BERA determined that the COCs for the Site are PAHs and VOCs in soils, sediment and groundwater and that cleanup to levels within EPA's risk range will be protective of human health and the environment at the Site for current and future use.

Human Health Risks

The results of the HHRA for the Site indicated that seven exposure pathways result in estimated risks that exceeded EPA's target risk range (CR of 10^{-4} to 10^{-6} and an HI ≤ 1) and eight exposure pathways result in estimated risks that were either equivalent to or exceeded the WDNR's threshold (CR $\leq 1\times10^{-5}$ and HI ≤ 1).

Cancer risks to a subsistence fisher (finfish) were equivalent to the upper-end of the EPA target risk range, but greater than the WDNR threshold of a CR of 1×10^{-5}. Non-carcinogenic risk was within acceptable limits for both EPA and WDNR.

Risks to recreational children (surface soil) were equivalent to the WDNR risk threshold. However, risks to adolescent and adult receptors exposed to surface soil were below the EPA acceptable risk range and below the WDNR risk threshold.

Risks to waders and swimmers (sediments), industrial workers (surface soil), and maintenance workers (surface soil) were all within EPA's target risk range of 10^{-4} to 10^{-6} for lifetime cancer risk and a target HI of less than or equal to 1 for non-cancer risk but were greater than the WDNR threshold of 1×10^{-5} for lifetime cancer risk.

These risk estimates were based upon the reasonable maximum exposure (RME) scenarios for potential cancer risks and non-cancer risks. The conclusions were based on assumed exposures to soil in the Filled Ravine area (for residential receptors), to soil in the Filled Ravine, Upper Bluff and Kreher Park areas (for construction worker receptors), and to indoor air samples collected at the NSPW Service Center. Carcinogenic risks based on central tendency evaluation (CTE) scenarios indicated that only the residential receptor exposure to soil (all soil depths to 10 feet below ground surface (bgs)) was estimated to be at a CR of 1×10^{-4}, which was at the upper-end of the EPA target risk range and greater than the WDNR threshold. Non-carcinogenic risks for the residential receptor (for soil depths 0-1 foot and 0-3 feet bgs) and risks associated with the construction scenario were within acceptable levels. However, residential receptor exposure to subsurface soil is not expected given the current and potential future land use of the Site. Residential risks associated with exposures to surface soil (0-1 feet bgs) were within the target risk ranges.

Although the results of the HHRA indicated risks to the construction workers under the RME conditions exceeded EPA's target risk levels, the assumptions used to estimate risks to this population were conservative and assumed the worst case. Given both the current and future land use of the Site, it is unlikely that construction workers would be exposed to soil in the Filled Ravine and Upper Bluff. The most likely scenario for the future construction worker is exposure to soil within 0 to 4 feet bgs at Kreher Park (a typical depth for the installation of underground utility corridors), as most activities associated with the implementation of the future land use would be associated with regrading, landscaping, and road or parking lot construction.

At the request of the Wisconsin Department of Health Services (WDHS), risks were also estimated for construction workers exposed to "oily materials" in groundwater via dermal contact and for swimmers and waders who may be exposed to oil slicks in surface water via ingestion and dermal contact. Because no media-specific concentrations were available for either scenario, risks were estimated using analytical data collected from the product stream from the active NAPL recovery system for the Copper Falls aquifer or chemical-specific solubility values detected in the DNAPL sample. Risks to construction workers exposed to "oily material" in groundwater and adult swimmers and waders exposed to "oil slicks" in surface water were greater than both the EPA upper risk range (CR $1{\times}10^{-4}$ and HI of 1) and WDNR threshold (CR $1{\times}10^{-5}$ and HI of 1).

Ecological Risks

The results of the ecological risk characterization indicated that there were unacceptable risks to the benthic macroinvertebrate community from exposure to contaminated sediment at the Site. Two lines of evidence, bulk sediment chemistry and sediment toxicity testing, indicated an unacceptable risk to the benthic community. Effects observed from field surveys of the existing benthic community indicated effects that were less dramatic than those demonstrated in the laboratory toxicity studies, but interpretation of the field survey data was very difficult due to a high degree of variability and lack of comparability between reference and site stations.

However, the fact that hydrocarbons were sporadically released from the Site sediment during some high energy meteorological events or when disturbed by other activities indicates the potential for impact to the benthic community that may not have been fully measured by the benthic community studies conducted to support the RI. Since the impact from releases was not fully measured during the RI and there was no evidence that showed impairment of populations and communities of these receptors inhabiting the waters of Chequamegon Bay, the full impact from these releases remained a source of uncertainty. However, the presence of this continuing source of site-related contaminants in sediments presented an unacceptable risk that could impair the healthy functioning of the aquatic community in the Chequamegon Bay area of the Site.

In addition, if normal lake front activities (i.e., wading, boating etc.) were not presently prohibited, the disturbance of sediments and contaminant release of subsurface COCs would increase.

Response Actions

The cleanup of the Site was led by the State (WDNR) for several years before EPA became the lead agency. The discovery of contaminants in 1989 at Kreher Park led WDNR to initiate several investigations that culminated in the identification of the former MGP as a source of contamination and the naming of NSPW as a responsible party. WDNR also sent the City of Ashland and Wisconsin Central Ltd., responsible party notifications for solid waste disposed on a portion of Kreher Park.

In 1994, WDNR initiated an investigation and evaluation to characterize the extent of contamination around the former WWTP, determining that contaminants had migrated from the former MGP to Kreher Park. Upon notification by WDNR of these findings, NSPW also began a series of investigations of its property. These investigations identified subsurface contamination resulting from the historic MGP operations. The WDNR investigations of Kreher Park included several mobilizations to investigate subsurface conditions at the park and affected sediments and concluded with the completion of a RI Report and FS in 1998.

In 1998, EPA was petitioned to evaluate the Site for inclusion on the National Priorities List (NPL) and cleanup under CERCLA, also known as Superfund. The Site was nominated for inclusion on the NPL in 2000 and was formally added to the NPL in 2002. During the NPL nomination process, in 2000, NSPW installed an interim action free product recovery system on its property, initially as a pilot test, to remove free product from the Copper Falls Aquifer; the system became fully operational in January 2001. The pumped water was treated at the NSPW property and discharged to the City of Ashland's sanitary sewer, and the free product/NAPL that was separated from the water was sent off-site for treatment and disposal. More than 11,000 gallons of free product/water emulsification was removed, and approximately 2.4 million gallons of contaminated groundwater was treated between January 2001 and June 2010.

In addition, NSPW performed a second interim action during May 2002 to cap the seep area. Capping the seep was necessary to address the threat of direct contact with coal tars/free product seeping to the surface. Activities included the excavation and removal of contaminated soil in the seep area, the placement of a low permeability cap over the seep area, and the installation of a groundwater extraction well at the base of the Filled Ravine.

After the Site was added to the NPL, EPA and NSPW entered into an Administrative Order on Consent (AOC) dated November 14, 2003. Under the AOC, NSPW conducted an RI/FS to determine the nature and extent of contamination and any threat to the public health or the environment at the Site, to determine and evaluate alternatives for RA, and to collect data sufficient for developing and evaluating remedial alternatives. The RI investigation activities were completed in November 2005. The RI was approved by EPA in October 2007. EPA approved the final FS on December 4, 2008.

On September 30, 2010, EPA signed a Record of Decision (ROD). The remedy specified in the ROD serves as the final action for soil, groundwater, and sediment contamination at the Site. The Site consisted of soils, sediments, and groundwater contaminated by PAHs and VOCs.

The remedy selected in the ROD included the following response actions:

- removal and treatment or off-site disposal of contaminated soil, groundwater and sediment, including all NAPL;
- engineered surface and vertical barriers to contain contaminated groundwater;
- groundwater extraction as hydraulic control and restoration and possible in-situ treatment of groundwater;
- long-term groundwater and sediment monitoring; and,
- Institutional Controls (ICs) such as land use controls, to limit future use to prevent exposure to hazardous substances that will remain at the Site after the remedy is complete.

The Site was divided into four main areas of concern: 1) sediments in Chequamegon Bay; 2) soil and shallow groundwater under Kreher Park; 3) soil and shallow groundwater under the Upper Bluff/Filled Ravine; and 4) deep groundwater in the Copper Falls Aquifer.

The remedy for sediments in Chequamegon Bay consisted of dry excavation of all near-shore sediment and wood debris and dredging of the remaining contaminated sediment and wood debris that exceeded the Remedial Action Level (RAL) of 2,295 micrograms (ug) total PAH (tPAH)/gram (g) organic carbon (OC) [which is equivalent to 9.5 parts per million (ppm) of tPAH dry weight (dwt) at 0.415% OC]. The remedy required thermal treatment of sediments or stabilization of sediments to transport off-site for disposal at a NR 500 licensed landfill. If thermal treatment was determined to be more difficult and not cost effective, then off-site disposal of sediment at a NR 500 licensed landfill was the alternate remedy. Although EPA had serious concerns with the effectiveness of dredging the near shore area of sediments, due to significant wood waste/wood debris and the presence of NAPL in the near shore sediments, the excavation/dredging remedy allowed for a pre-design pilot test to determine if dredging could achieve the performance standards in the near-shore area. The 2010 ROD included a pre-design pilot test to determine whether dredging, rather than dry excavation within the near-shore area, would attain the established performance standards. If the pilot test was successful, EPA, in consultation with WDNR, would recommend that an alternate sediment remedy (dredging) be implemented.

Based on EPA and WDNR's review, the pilot test, completed in 2016, met the performance standards set forth in the ROD. Therefore, EPA signed an Explanation of Significant Difference (ESD) selecting the alternate sediment remedy of dredging on December 15, 2016.

The remedy for soil in Kreher Park and the Upper Bluff/Filled Ravine consisted of limited soil removal with ex-situ thermal treatment. If thermal treatment was determined during pre-design studies to be more difficult to implement and not cost effective, then off-site disposal of soil was the alternate disposal option. The remedy also included in-situ treatment of soil using chemical oxidation to address any residual contamination after the soil removal. The remedy for shallow groundwater in Kreher Park and the Upper Bluff/Filled Ravine consisted of groundwater containment using engineered surface and vertical barriers with groundwater extraction as hydraulic control. Shallow groundwater extracted from the contained areas was treated onsite and discharged to the lake or publicly owned treatment works (POTW). The remedy for shallow groundwater will achieve the dual objectives of containment and restoration.

The remedy for the Copper Falls Aquifer consisted of a groundwater extraction system. The remedy consisted of enhancing the current system by installing additional extraction wells. The groundwater remedies for the Copper Falls Aquifer, Kreher Park and the Upper Bluff/Filled Ravine included engineered surface and vertical barriers to contain contamination and prevent further migration and groundwater extraction, which included an in-situ chemical treatment component to possibly enhance the groundwater treatment. In addition, the remedy includes long-term groundwater monitoring and ICs, such as restrictive covenants, to restrict future site use and to restrict the use of site groundwater for potable purposes until groundwater cleanup standards are achieved.

The specific Remedial Action Objectives (RAOs) developed for the Site are:

RAOs for Soil

- Protect human health by reducing or eliminating exposure (ingestion/direct contact/inhalation) to soil having COCs representing an excess cancer risk greater than 10^{-6} as a point of departure (with cumulative excess cancer risks not exceeding 10^{-5}) and a HI greater than 1 for reasonably anticipated future land use scenarios.
- Ensure future beneficial commercial/industrial use of the Site and recreational use of Kreher Park.
- Protect populations of ecological receptors or individuals of protected species by eliminating exposure (direct contact with or incidental ingestion of soils or prey) to soil with levels of COCs that would pose an unacceptable risk.
- Conduct NAPL removal whenever it is necessary to halt or contain the discharge of a hazardous substance or to minimize the harmful effects of the discharge to the air, land, sediments or water (groundwater and surface water).
- Protect the environment by minimizing/eliminating the migration of contaminants in the soil to groundwater, sediments or to surrounding surface water bodies.

RAOs for Groundwater

- Protect human health by eliminating exposure (direct contact, ingestion, and inhalation) to groundwater with COCs in excess of regulatory or risk-based standards.
- Restore groundwater to its beneficial use by reducing contaminant levels in groundwater to meet maximum contaminant levels (MCLs) and State of Wisconsin Drinking Water Standards.
- Protect the environment by controlling the off-site migration of contaminants in groundwater to surrounding surface water bodies which would result in exceedance of applicable or relevant and appropriate requirements (ARARs) for COCs in surrounding surface waters.
- Conduct NAPL removal whenever it is necessary to halt or contain the discharge of a hazardous substance or to minimize the harmful effects of the discharge to the air, land, sediments or water.
- Protect the environment by minimizing/eliminating the migration of contaminants in the groundwater to soil, sediments or to surrounding surface water bodies.

No COCs were initially identified in the HHRA for groundwater because groundwater is not used as a potable water supply. However, currently there is no restriction on groundwater use in the area of known contamination. Exposure to contaminated groundwater and accompanying NAPLs can potentially occur via the following exposure scenarios:

- Construction worker exposure to shallow groundwater infiltrating trenches during work at Kreher Park.

NAPL encountered in the Kreher Park fill, ravine fill, NSPW property and Copper Falls aquifer are a source for the dissolved phase plumes identified in groundwater in each unit at the Site. RAOs for NAPL within these units are based on Chapter NR 708.13, Wisconsin Administrative Code (WAC), which states the following:

Responsible parties shall conduct free product removal whenever it is necessary to halt or contain the discharge of a hazardous substance or to minimize the harmful effects of the discharge to the air, lands or waters of the state. When required, free product removal shall be conducted, to the maximum extent practicable, in compliance with all of the following requirements:

1) *Free product removal shall be conducted in a manner that minimizes the spread of contamination into previously uncontaminated zones using recovery and disposal techniques appropriate to the hydrologic conditions at the site or facility, and properly reuses or treats discharges of recovery byproducts in compliance with applicable state and federal laws.*
2) *Free product removal systems shall be designed to abate free product migration.*
3) *Any flammable products shall be handled in a safe and competent manner to prevent fires or explosions.*

RAOs for Sediment

- Protect human health by eliminating exposure (direct contact, ingestion, inhalation, fish ingestion) to sediment with COCs in excess of regulatory or risk-based standards;
- Conduct NAPL (source) removal whenever it is necessary to halt or contain the discharge of a hazardous substance or to minimize the harmful effects of the discharge to the air, land or water; and
- Protect populations of ecological receptors or individuals of protected species by eliminating exposure (direct contact with sediment or ingestion of sediment or prey) to sediment with COCs that would pose an unacceptable risk.

For ecological receptors, EPA established a preliminary remedial goal (PRG) of 2,295 µg tPAH/g organic carbon (OC), which is equivalent to 9.5 ppm tPAH dwt at 0.415% OC. This value was based on a best professional evaluation of sediment chemistry, bioassay, and benthic community study data collected at the Site.

Status of Implementation

As mentioned in the Introduction section above, the remedy was separated into two phases: Phase 1 - upland remedy (onshore) and Phase 2 - sediment remedy (offshore).

A Consent Decree (CD) was negotiated for Phase 1 between NSPW, the potentially responsible party (PRP), EPA, WDNR and the Bad River and Red Cliff Tribes. The CD required the PRP to implement the Phase 1 RD/RA at the Site. The CD was entered by the Court on October 18, 2012. The Phase 1 RA construction started in May 2014. Phase 1 RA was completed in June 2016, except for the final cover in Kreher Park.

As mentioned above, the sediment remedy selected in the ROD allowed for performance of a pilot study to demonstrate that wet dredging of the near-shore sediments could meet the required cleanup goal and performance standards for sediments. On May 9, 2014, NSPW entered into an Administrative Order on Consent (AOC) to complete a wet dredge pilot study. Certain site preparation and mobilization activities for the pilot study were completed in August and September 2014, including the installation of floating barges for wave attenuation and an enhanced silt curtain system for controlling turbidity during dredging. However, on September 10, 2014, before dredging could begin, the barges were dislodged, and in some cases, rolled and sank during a storm event. On September 23, 2014, EPA granted NSPW an extension of the deadline to complete the pilot study until 2015, subject to certain modifications to the wave attenuation system. On January 30, 2015, NSPW submitted the final Design Package for the Wet Dredge Pilot Study with an enhanced wave attenuation and containment system utilizing sheet pile and impermeable curtains. EPA granted conditional approval of the final Design Package for Wet Dredge Pilot Study on February 19, 2015.

During its evaluation of potential re-designs to the wave attenuation system, NSPW determined that a breakwater would be more cost effective and beneficial for conducting the pilot study and the final sediment remedy and proposed to install a breakwater to attenuate waves and contain contamination during the pilot study. On February 27, 2015, EPA granted NSPW an extension to complete the pilot study in 2016, to allow time to design and construct a breakwater. However, prior to construction of any permanent breakwater, NSPW needed to enter into an agreement with the City of Ashland regarding long-term ownership and maintenance of the breakwater after the sediment remedy is implemented and obtain a permit from the State of Wisconsin under Chapter 30 of the Wisconsin Statutes for a permanent structure on the lakebed. NSPW and the City negotiated an agreement for the permanent breakwater on May 20, 2015. The permanent breakwater was completed in November 2015.

EPA approved the wet dredge pilot test design in May 2016, and NSPW started the pilot on May 31, 2016. The pilot study was completed in July 2016. NSPW submitted a Pilot Study Data Report on August 10, 2016. Based on EPA and WDNR's review, the pilot test met the performance standards set forth in the ROD. Therefore, as noted above, EPA signed the ESD on December 15, 2016.

A CD was subsequently negotiated for Phase 2 (dredging) between NSPW, EPA, and WDNR. The CD required the PRP to implement the Phase 2 RD/RA at the Site. The CD was entered by the Court on March 1, 2017.

Remedial activities began in May 2014. The work completed during the Phase 1 RA generally consisted of preparation activities; installation of a soil-bentonite cutoff wall and shoreline bulkhead wall (sheet pile); excavation of impacted soil; pre-treatment handling and sorting of the excavated material; Medium Temperature Thermal Desorption (MTTD) treatment of the impacted soil; placement of the treated soil and other suitable material to backfill the excavations; temporary water treatment and discharge to the City of Ashland POTW; construction of a long-term water collection and treatment system; and site restoration to support future beneficial use of the property.

A chronology of Phase 1 work activities completed at the Site included the following:

- Site Preparation;
- Kreher Park Soil-Bentonite Cutoff Wall;
- Kreher Park Shoreline Bulkhead Wall;
- Upper Bluff Remediation;
- Kreher Park Remediation;
- St. Claire Street/Filled Ravine Excavation;
- Kreher Park Backfill/Restoration;
- Upper Bluff Backfill/Restoration;
- Long-term Monitoring Well Network Installation;
- Long-term Water Treatment Building Construction; and
- Long-term Water Treatment System Startup.

The work completed during the Phase 2 RA generally consisted of removal of targeted PAH-impacted materials (debris and sediment) from the Chequamegon Bay. The Phase 2 wet dredge project focused on the approximate 16-acre area of the Bay located south of the 2015-constructed breakwater.

A chronology of Phase 2 work activities completed in 2017 – 2018 at the Site included the following:

2017 work activities

- Mobilization/Air/Water/Noise Monitoring;
- Marine Mobilization (East/West gap closures, barrier systems construction;
- Mechanical dredging, sediment stabilization, transportation and disposal;
- Interim post-mechanical core collection; and
- Demobilization and winterization.

2018 work activities

- Re-mobilization/Air/Water/Noise Monitoring;
- Hydraulic dredging and interim post-hydraulic core collection;
- Hydraulic/Mechanical re-dredging;
- Final confirmation sampling;
- Sediment stabilization, transportation, and disposal;
- Restorative layer placement and sampling;
- Demobilization of Modutanks, sediment processing and water treatment tents;
- Fish habitat structures, removal of gap coffers, geogrid, west peninsula rock extension, and temporary curtains; and
- Demobilization.

Final capping of Kreher Park remains to be performed. Capping of Kreher Park is planned for 2019.

Institutional Controls

The ROD requires ICs to restrict property use, to maintain the integrity of the remedy, to prevent disturbance of the remedy components, to minimize the potential for exposure to contamination and to assure long-term protectiveness for areas which do not allow for UU/UE. ICs are defined as non-engineered instruments, such as administrative and legal controls, that help to minimize potential for exposure to contamination and protect the integrity of the remedy.

A summary of the planned ICs for the Site is listed in Table 1 and are further discussed below. A map which depicts the current conditions of the Site and areas which do not allow for UU/UE will be developed in the IC evaluation activities discussed below.

Table 1: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Site area	Yes	Yes	upland area (approx. 25 acres)	Prohibits land uses inconsistent with the remedy and precludes disturbance of the remedy components.	Planned Environmental Covenants (ECs)

Current compliance

Even though the required ICs have not been implemented, based on Site inspections and interviews, EPA is not aware of Site or media uses which are inconsistent with the stated objectives to be achieved by the ICs. Site access and use is restricted with a security perimeter fence.

IC Follow-up Actions Needed

NSPW has submitted to EPA a draft Institutional Control Implementation and Assurance Plan (ICIAP). The purpose of the ICIAP is to conduct IC evaluation activities to ensure that the implemented ICs are effective, to explore whether additional ICs are needed, and to ensure long-term stewardship (LTS) procedures are in place so that ICs are properly maintained, monitored, and enforced. IC evaluation activities will include, as needed, developing maps depicting current conditions in areas that to not allow for UU/UE, reviewing current zoning and city ordinances, and reviewing recording and title work for properties impacted by the Site. After the Site is complete, EPA and WDNR expect to receive a revised ICIAP for review.

In summary, the ICs follow-up actions that need to be completed include:

1. Finalize and record ECs;
2. Develop a LTS Plan or add LTS procedures to an Operation and Maintenance (O&M) Plan; and

3. Finalize the ICIAP.

Long-Term Stewardship

Long-term protectiveness at the Site requires compliance with use restrictions to assure the remedy continues to function as intended. LTS procedures need to be developed and embodied within a LTS Plan or added to an O&M Plan. It should include procedures to ensure long-term IC stewardship including regular inspections of the engineering controls and access controls at the Site, reviews of the ICs, and semi-annual reports with results of the inspection and review and certification to EPA that ICs remain in-place and are effective.

Systems Operations/Operation & Maintenance

A draft O&M Plan has been developed and will be finalized once the RA is completed. Pursuant to the October 2012 CD, NSPW submits monthly reports on the progress of the RA. Since July 2016, Site activities included in the progress reports include the following.

- Operation of the Long-Term Water Treatment System (LTWTS) equipment;
- Operation of the hydraulic control wells in the Kreher Park area;
- Operation of Copper Falls Formation wells for NAPL recovery. Direct NAPL recovery volumes and measured NAPL layer thickness, for the isolated NAPL recovery wells (CFW-12 – CFW-15) and select wells in Kreher Park.
- The current groundwater monitoring wells are sampled on an as-needed basis.

A Long-Term Groundwater Monitoring Optimization Report and a letter summarizing planned installation of monitoring wells were submitted to EPA and WDNR in October 2018. See the current monitoring well locations in Appendix C, Attachment 5. However, the monitoring well installation program will not be completed until access agreements are finalized and the final cap is constructed on Kreher Park.

III. PROGRESS SINCE THE LAST REVIEW

This is the first FYR for the Site.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

The completed FYR Report and background data will be available in the Site information repository and on EPA's website for public viewing. An advertisement notice regarding the FYR process was placed in the local newspaper for public review on September 5, 2018 (see Appendix C, Attachment 3). No public comments regarding the FYR were received.

Data Review

Since the inception of the post remediation monitoring program, 8 groundwater monitoring events have taken place between December 2015 – April 2018. 98 monitoring wells at the Site were analyzed during each monitoring event for VOCs, Total Metals, Total Alkalinity, Mercury, Dissolved Methane, Total Hardness, and Cyanide.

Results of the 8 monitoring events show a group of constituents for certain analysis that have been detected in groundwater at the Site. Of the 59 VOCs analyzed in each sample, 26 were detected. Of those 26 VOCs detected, 9 are COCs with Site groundwater cleanup standards. Of the 67 SVOCs analyzed in each sample, 39 were detected. Of those 39 SVOCs detected, 9 are COCs with Site groundwater cleanup standards. Of the 18 metals, including Mercury, analyzed in each sample, 17 were detected. All 17 of the Metals detected have a Site groundwater cleanup standard (See Appendix C, Attachment 6).

The LTWTS has pumped and treated approximately 50 million gallons of water since start-up. The water is discharged to the bay which follows the substantive requirements of a Wisconsin National Pollutant Discharge Elimination System (WNPDES) permit. Effluent discharge water is in compliance with the WNPDES permit requirements (see Appendix C, Attachment 7). In addition, the total NAPL recovered from CFW-12 – CFW-15 is approximately 180 to 250 gallons per month. Since start-up, NAPL recovered is approximately 5,000 gallons.

All of the project performance standards of the ROD and Final Designs were met during the Phase 1 and 2 RA work activities. For Phase 1, the soil treated with the MTTD met cleanup standards. For Phase 2, a surface-weighted average concentration (SWAC) of 2.38 ppm tPAH was calculated from post-dredge confirmation sample results compared to the overall ROD goal for the project of 9.5 ppm tPAH. In addition, a SWAC of 0.03 ppm tPAH was calculated from the restorative layer verification sample results. As mentioned above, construction of all Phase 1 activities will not be complete until the cap is constructed in Kreher Park in 2019.

Site Inspection

The Site inspection for this FYR was conducted on November 27, 2018. Scott Hansen, EPA, Jim Burton, EPA's contractor (Weston), John Sager, WDNR and numerous NSPW staff and their consultants, Foth/Envirocon Joint Venture (FE-JV), attended the inspection. The purpose of the inspection was to get a status update of the project and general conditions of the Site.

The participants walked the Site. Site access is available through a locked gate which encloses the Site. The Site Inspection Checklist completed by EPA is included as Appendix C, Attachment 4.

The Site appeared to be in good condition.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

Yes, the remedy is functioning as intended, although there are still portions of the Phase 1 remedial activities that have not yet been implemented. Additionally, ICs are not yet in place and will need to be implemented to ensure protectiveness of the remedy.

Remedial Action Performance: Most of the remedies selected in the 2010 ROD and 2016 ESD have been implemented and the remedial activities that have been completed to date seem to be functional, operational and effective. The Phase 1 RA (upland remedy) construction started in May 2014 and was completed in June 2016, except for the final cover in Kreher Park. Construction of the final cover in Kreher Park is expected to begin in 2019. The Phase 2 RA (sediment remedy) construction started in April 2017 and was completed in November 2018.

Implementation of Institutional Controls and Other Measures: The 2010 ROD required imposition of proprietary controls and other ICs to prevent interference with the remedy assuring the integrity of the RA. Currently, site access and use is restricted with a security perimeter fence. ECs for the Site property which protect the integrity of remedial components need to be completed and recorded._After the Site is complete, EPA and WDNR expect to receive a revised ICIAP for review. LTS procedures will be developed and embodied within a LTS Plan or an O&M Plan.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

Question B Summary:

Yes, the exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection are still valid. All standards outlined in the 2010 ROD are still valid at the Site and no changes in exposure assumptions have been identified.

Toxicity information for benzo(a)pyrene, a COC, has recently changed, however the cleanup levels selected in the ROD are still protective.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that calls into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
None

Issues and Recommendations Identified in the Five-Year Review:

	Issue Category: Institutional Controls

OU(s): OU1/Sitewide				
	Issue: The required ICs are not yet in place.			
	Recommendation: Implement EC.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	12/31/2020

OU(s): OU1/Sitewide	Issue Category: Institutional Controls			
	Issue: Need to ensure LTS of ICs.			
	Recommendation: Develop a LTS Plan or add LTS procedures to an O&M Plan to ensure that effective ICs are maintained, monitored and enforced.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	12/31/2020

OU(s): OU1/Sitewide	Issue Category: Institutional Controls			
	Issue: Finalize ICIAP.			
	Recommendation: Submit revised ICIAP to EPA and WDNR for review and approval.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA/State	3/31/2020

VII. PROTECTIVENESS STATEMENT

OU1 and Sitewide Protectiveness Statement
Protectiveness Determination: Will be Protective
Protectiveness Statement: The remedy at the Ashland/Northern States Power Lakefront Superfund site is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risk in these areas.

VIII. NEXT REVIEW

The next FYR report for the Site is required five years from EPA's signature date of this review.

APPENDIX

APPENDIX A

EXISTING SITE INFORMATION

APPENDIX A – EXISTING SITE INFORMATION

BACKGROUND

Physical Characteristics

The Site is located in Ashland, Ashland County, Wisconsin. The Site consists of property owned by NSPW, Our Lady of the Lake Church/School and private residences, a railroad corridor, a portion of Kreher Park, and sediments in an area of Chequamegon Bay adjacent to Kreher Park. The Site is located in S 33, T 48 N, R 4W in Ashland County, Wisconsin.

The former MGP facility and current NSPW property is located at the south boundary of the Site at 301 Lake Shore Drive East in Ashland, Wisconsin. The facility is approximately 1,000 feet south of the shore of Chequamegon Bay of Lake Superior. The NSPW property is occupied by a small office building and parking lot fronting on Lake Shore Drive, and a larger vehicle maintenance building and parking lot area located south of St. Claire Street between Prentice Avenue and 3rd Avenue East. There was a gravel-covered parking and storage yard area north of St. Claire Street between 3rd Avenue East and Prentice Avenue. A large microwave tower was located on the north end of the storage yard. The office building and vehicle maintenance building are separated by an alley. The area occupied by the buildings and parking lots is relatively flat, at an elevation of approximately 640 feet above mean sea level (MSL). The total area occupies approximately 2.5 acres. Surface water drainage from the NSPW property is to the north. A residence is located east of the office building and west of the blacktop parking area. Our Lady of the Lake Church and School is located immediately west of 3rd Avenue East. Private homes are located immediately east of Prentice Avenue and north of St. Claire Street. To the northwest the Site slopes abruptly to the railroad right-of-way owned by the Wisconsin Central Ltd. (Canadian National Railway (CN)) and which sits on a bluff that marks the former Lake Superior shoreline, and then to Kreher Park, with approximately 10 acres of impacted soil and groundwater, beyond which is Chequamegon Bay, with approximately 16 acres of impacted sediments.

Historic investigations included the visual classification of subsurface soil units from numerous soil borings, monitoring well boreholes and exploration test pits. Supplemental investigations completed for the RI included the installation of additional monitoring wells, the collection of surface and subsurface soil samples from borings and test pits, and a downhole geophysical survey. Geologic units investigated at the Site include the Miller Creek Formation and underlying Copper Falls Formation. Fill soil units were also encountered at the Upper Bluff and at Kreher Park. At the Upper Bluff area, fill soil was encountered in the Filled Ravine that dissects the Miller Creek Formation in the vicinity of the former MGP facility. Kreher Park consists of material used to fill the former lakebed.

The uppermost water-bearing unit at the Upper Bluff area includes the Miller Creek Formation. Groundwater is also encountered in the fill material used to backfill the former ravine that dissects the Miller Creek Formation in the vicinity of the former MGP facility. The uppermost water-bearing unit at Kreher Park consists of fill material used to fill the former lakebed; this fill material overlies the Miller Creek Formation. The fine-grained low permeability Miller Creek

Formation creates an aquitard overlying the Copper Falls aquifer, behaving as a confining unit.

Previous investigations have identified groundwater contamination in the ravine fill, the Kreher Park fill and the underlying Copper Falls aquifer. Contaminants, including free product, migrated to the underlying Copper Falls aquifer in the vicinity of the former MGP facility where the Miller Creek Formation lacks plasticity and where vertical hydraulic gradients indicate downward flow in the Copper Falls aquifer. These migration pathways may have been exacerbated by construction operations during the early life of the MGP. Strong upward gradients have likely limited the vertical migration of contaminants at down gradient locations north of this area. The transition from downward to upward gradients within the Copper Falls aquifer occurs at the alley immediately south of the NSPW service center. Site investigation results indicate that contaminants in the Copper Falls aquifer have migrated laterally along the interface between the Copper Falls aquifer and overlying Miller Creek aquitard.

Land and Resource Use

The Upper Bluff/Filled Ravine portion of the Site is occupied by the NSPW facilities, residential properties, as well as a church and school. Kreher Park had a walking path along the lakefront as well as a gravel parking lot for the marina. The marina is located to the west of the inlet and is separated from the inlet by a break wall and is not part of the Site. The inlet contained the contaminated sediments that are part of the Site. The entry to the inlet was posted to prevent boats from entering and disturbing the contaminated sediments. In addition, signs were posted along the shoreline of the inlet warn the public against wading or swimming. An RV park and swimming beach is located east of the inlet and is also separated by a break wall and is not part of the Site.

Future use of Kreher Park does not include a residential scenario. However, the City of Ashland has proposed a bike path along the railroad corridor that runs east/west through the Site and has a Waterfront Development Plan for the lakefront that includes Kreher Park and would expand the existing marina and make the location of the former WWTP the centerpiece of the Ashland bayfront by creating a visitor's center, and Great Lakes education center and meeting facilities.

The City of Ashland adopted a Comprehensive Plan in October 2004 which sets policy for the direction that the community would like to develop over the next 20 years. For the areas within the Site, the City's Comprehensive Plan calls for the areas north of the bluff to be redeveloped as Planned Waterfront. For areas south of the bluff, this area is to be redeveloped as City Center with the following potential actions: relocate existing industrial uses to other areas of the City; promote water-oriented commercial uses that are respectful of existing and future residential uses; provide a sensitive mix of residential uses, including medium and high-density housing; develop an attractive, pedestrian-oriented character to this area that is strongly oriented to the waterfront; and incorporate pedestrian corridors through this area that link the waterfront and Main Street areas.

Lake Superior is a source of drinking water for many area communities including Ashland; however, the water intake is several thousand feet out into the Chequamegon Bay and is not located in the inlet containing contaminated sediments that are part of the Site. Thus, surface water as a source of drinking water is not an issue at the Site.

Currently, groundwater at the Site is not used, however, future groundwater use is an issue that will be addressed by containment, groundwater extraction and treatment, and institutional controls to restrict future use of the groundwater until it is restored to its beneficial use. The City of Ashland has two artesian wells located in the Kreher Park area. They were taken out of use during implementation of the RI when it was determined that the wells could potentially intercept contamination. Data from the RI show that COCs from the Site were detected, however, the results were below State and/or Federal groundwater quality standards.

In addition, the Lake Superior basin is one of the most pristine and unique ecosystems in North America. Containing the largest surface area of any freshwater lake in the world, Lake Superior has some of the most breathtaking scenery in the Great Lakes and serves as a backdrop to a wide range of recreational and outdoor activities enjoyed by people from all over the world. Sparsely populated even today, Lake Superior has not experienced the same level of development, urbanization, or pollution as the other Great Lakes. Recognizing this unique and invaluable resource, the federal, state, provincial, and U.S. tribal governments, First Nations, environmental groups, industry and the public have taken steps to protect this great legacy for generations to come. This partnership serves as a model the world over for cooperative binational resource management. The Great Lakes Water Quality Agreement (GLWQA) between the United States and Canada commits the two countries (the Parties) to address the water quality issues of the Great Lakes in a coordinated fashion.

History of Contamination

Historically, Chequamegon Bay was a vital transportation route for the shipment of various materials to and from Ashland including iron ore, lumber, pulp and coal. During the late 19th and early 20th centuries, Ashland was one of the busiest ports in the Great Lakes. In recent times the shipping volume through the bay has declined because of the decrease in the mining and lumber industries in the region, while recreational activities have increased. The City of Ashland has a waterfront development plan that includes the impacted portions of Kreher Park and the Chequamegon Bay.

The primary source of contamination at the Site was releases of coal tars from the historic MGP facility. Other historic activities at the Site, such as lumber operations, solid waste disposal and construction of the former WWTP on the lakeshore, contributed to the filling of the lakebed and may have further dispersed contamination from historic activities at the Site.

The former MGP facility is located on the Upper Bluff on NSPW's property. The former MGP building was incorporated into NSPW's main service facility on St. Claire Street. The former MGP operated predominantly as a manufacturer of water gas and carbureted water gas for street and home lighting and other uses between 1885 and 1947. After 1947 the carbureted water gas process was retired in favor of liquid petroleum (propane). During the entire time gas was manufactured, coal tars were produced as a normal co-product. An open ravine ran south/north through the MGP facility, under the current buildings, emptying out by the historic Lake

Superior shoreline near what is now the railroad corridor. The ravine was filled by the early 1900s. A 12-inch clay tile pipe was buried in the Filled Ravine and runs south to north from the former MGP facility to an area north of the railroad right of way in Kreher Park. In addition, drawings for construction of the former WWTP show a 2-inch "Tar to Abandon Tar Dump" pipe running in the approximate location of the historic ravine from the MGP to Kreher Park. The WWTP drawings also mark an area in Kreher Park as the "Coal Tar Dump" located south of the former WWTP and north, or downhill, of the Filled Ravine.

Kreher Park, between Prentice and Ellis Avenues was a historic lakebed and was created over the decades as various fill materials were placed into the bay. The southern boundary of the park defined the original lake shoreline. The eastern portion of the park was filled with sawdust, wood waste and other material from sawmills. The lumbering and sawmill activities occurred during the deforestation of the northern portion of Wisconsin around the turn of the century. The John Schroeder Lumber Company owned the eastern portion of Kreher Park from 1901 until 1939 operating a sawmill until approximately 1931. In 1939, Ashland County acquired the tax deed to the Schroeder Lumber property. In 1942, Ashland County transferred the property to the City of Ashland via quit claim deed. Between the 1880s and 1951 the western portion of Kreher Park was used as an open "dump" for solid waste, primarily demolition debris. In 1986 the City of Ashland acquired a number of parcels on the western portion of the park that includes the former open dump. This area was used for the storage of boats.

In 1951, the City of Ashland constructed a WWTP in Kreher Park on the shoreline of Chequamegon Bay. The City added secondary treatment facilities to the WWTP in 1972 to 1973 and constructed a lift station at Prentice Avenue in 1992. The WWTP operated until 1992 and is now demolished. During the mid-1980s the marina extension of Ellis Avenue was completed to permit establishment of a marina with full service boat slips, fuel and dock facilities and a ship store. Prior to the construction of the marina the area was a rail boat dock used for offloading freight. The dock was used for this purpose beginning with the sawmill operations through the marina construction. The boat landing jetty extension of Prentice Avenue was originally the log boom associated with the Schroeder sawmill that was located in what is now Kreher Park.

Initial Response

In 1989, during exploratory work to expand the WWTP, contaminated soil and groundwater were encountered by the City of Ashland. The City notified the WDNR, subsequently closed the WWTP, and built a new WWTP facility a few miles away to the northeast. In 1994, WDNR initiated an investigation and evaluation to characterize the extent of contamination around the former WWTP, determining that contaminants had migrated from the former MGP to Kreher Park. Upon notification by WDNR of these findings, NSPW also began a series of investigations of its property. These investigations identified subsurface contamination resulting from the historic MGP operations. Contamination exists as dissolved phase tar constituents in groundwater and as "pools" of DNAPL and LNAPL or free product as referred to in this document. Free product has been encountered at the base of the ravine and in the underlying Copper Falls Aquifer. In the Filled Ravine, free product varying from one to two feet in thickness is present from south of the service facility north of the mouth of the former ravine, commonly referred to as the "seep" area. In the upper Copper Falls Aquifer, free product has been encountered from south of the service facility north to the gravel-covered parking and storage yard area located north of St. Claire Street. It has also been measured in piezometers installed on the Our Lady of the Lake church property west of Third Avenue East.

The WDNR investigations of Kreher Park included several mobilizations to investigate subsurface conditions at the park as well as the affected sediments and concluded with the completion of a Remedial Investigation Report and Feasibility Study in 1998. A distinct free product pool varying in thickness up to five feet was identified in the area of Kreher Park just north of the seep area. A 12-inch clay tile pipe was encountered at the base of the backfilled ravine during investigations NSPW completed between September and November 2001. The clay tile pipe was traced up the Filled Ravine to the area of the former MGP as part of these investigations (see Figure 3-7). The buried clay tile pipe likely behaved as a conduit for the migration of free product as well as contaminated groundwater from the MGP to the seep area after the ravine was filled (both dissolved phase and free product were found in the pipe during the excavations). A significant portion of the clay tile was destroyed during the 2001 investigation activities.

This tile pipe may have been part of a sewer system installed in response to a 1902 City ordinance specifying that manufactured gas plant wastes were to be conveyed underground. Although there is no documentation indicating the exact date the tile pipe was installed or by whom, it presumably would have been installed shortly after the 1902 ordinance since the ravine was filled by the early 1900s, and it most likely was installed by the MGP given the tile's apparent connection to the MGP facility and the fact that it was the only manufactured gas plant in Ashland. The 1902 ordinance also indicates that prior to that time manufactured gas plant waste was conveyed via the open ravine.

After the Site was added to the NPL, EPA and NSPW entered into an AOC dated November 14, 2003. Under the AOC, NSPW conducted a Remedial Investigation and Feasibility Study (RI/FS) to determine the nature and extent of contamination and any threat to the public health or the environment at the Site, to determine and evaluate alternatives for remedial action, and to collect data sufficient for developing and evaluating remedial alternatives. NSPW conducted the RI/FS under EPA oversight. EPA approved the final Feasibility Study on December 4, 2008. EPA's Preferred Alternative presented in the Proposed Plan came from the remedial alternatives evaluated in the Feasibility Study.

APPENDIX B

REFERENCE LIST

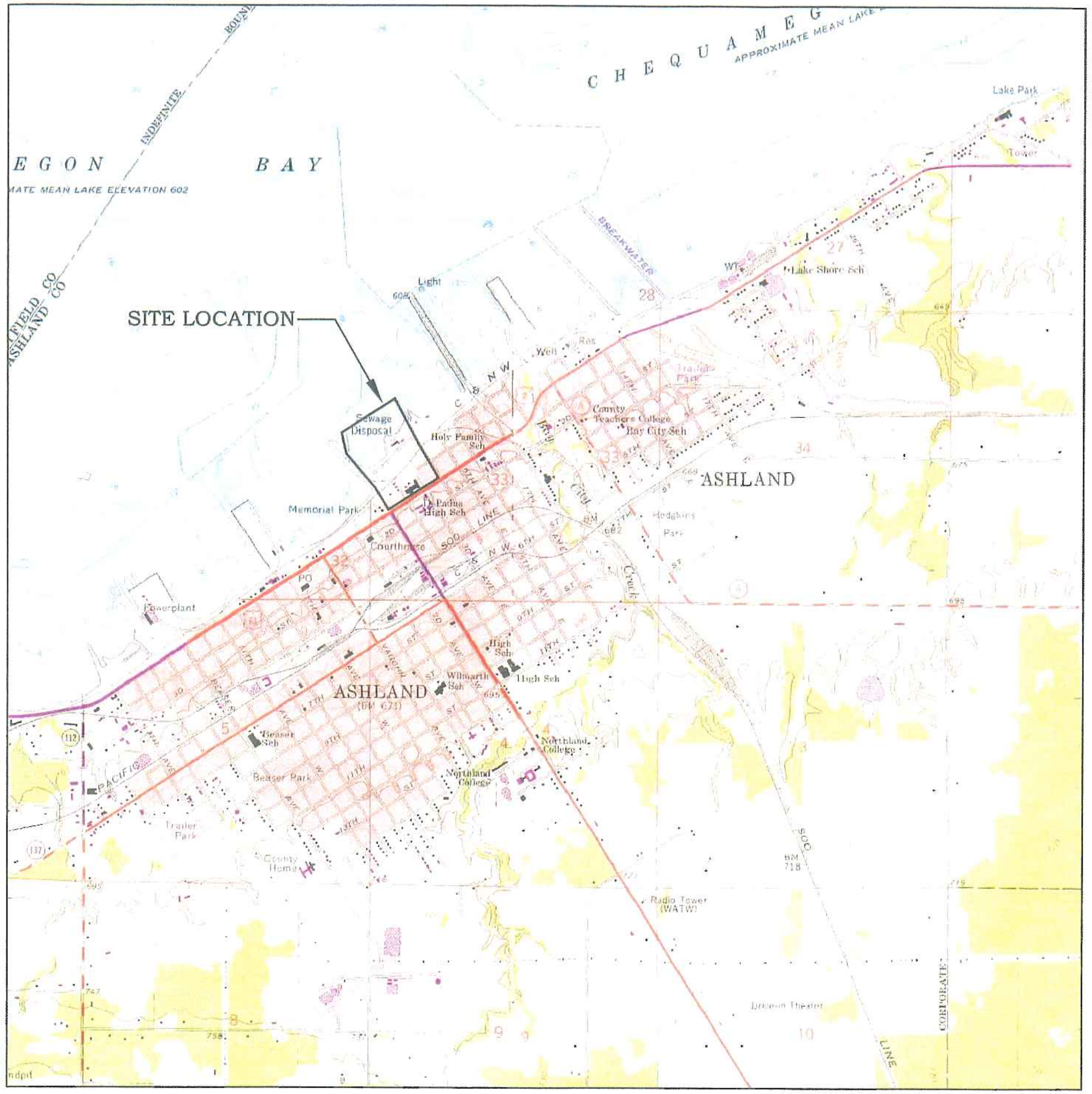
REFERENCE LIST

- RD/RA Consent Decrees, October 2012 and March 2017
- Remedial Investigation, 2007
- Feasibility Study, 2008
- Record of Decision, September 2010
- Explanation of Significant Differences, December 2016
- Site files and status reports
- Phase 1 Site Inspection Report, 2016
- Phase 2 Draft Construction Completion Report, 2018

APPENDIX C

ATTACHMENTS

ATTACHMENT 1



BASE MAP SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE, ASHLAND, WISCONSIN, DATED 1964, PHOTOREVISED 1975.

QUADRANGLE LOCATION

NORTH

0 1320 2640 5280

SCALE IN FEET

PROJECT:	ASHLAND/NSP LAKEFRONT SITE ASHLAND, WISCONSIN
TITLE:	FIGURE 1–1 SITE LOCATION

DRAWN BY: DDZ	SCALE: 1" = 2640'	PROJ. NO. 25688375
CHECKED BY: PJS	DATE: 30.JULY.2007	SHEET: 1–1
APPROVED BY: DPT		

URS

10200 INNOVATION DRIVE, SUITE 500
MILWAUKEE, WISCONSIN 53226
414–831–4100

NOTES

Former MGP features are shown on Figure 1-3.

PROJECT:	ASHLAND/NSP LAKEFRONT SITE ASHLAND, WISCONSIN		
TITLE:	FIGURE 1-2 SITE FEATURES		
DRAWN BY: DDZ	SCALE: 1" = 150'	PROJECT: 25688375	
CHECKED BY: PJS	DATE: 30.JULY.2007	SHEET: 1-2	
APPROVED BY: DPT			

URS

10200 INNOVATION DRIVE, SUITE 500
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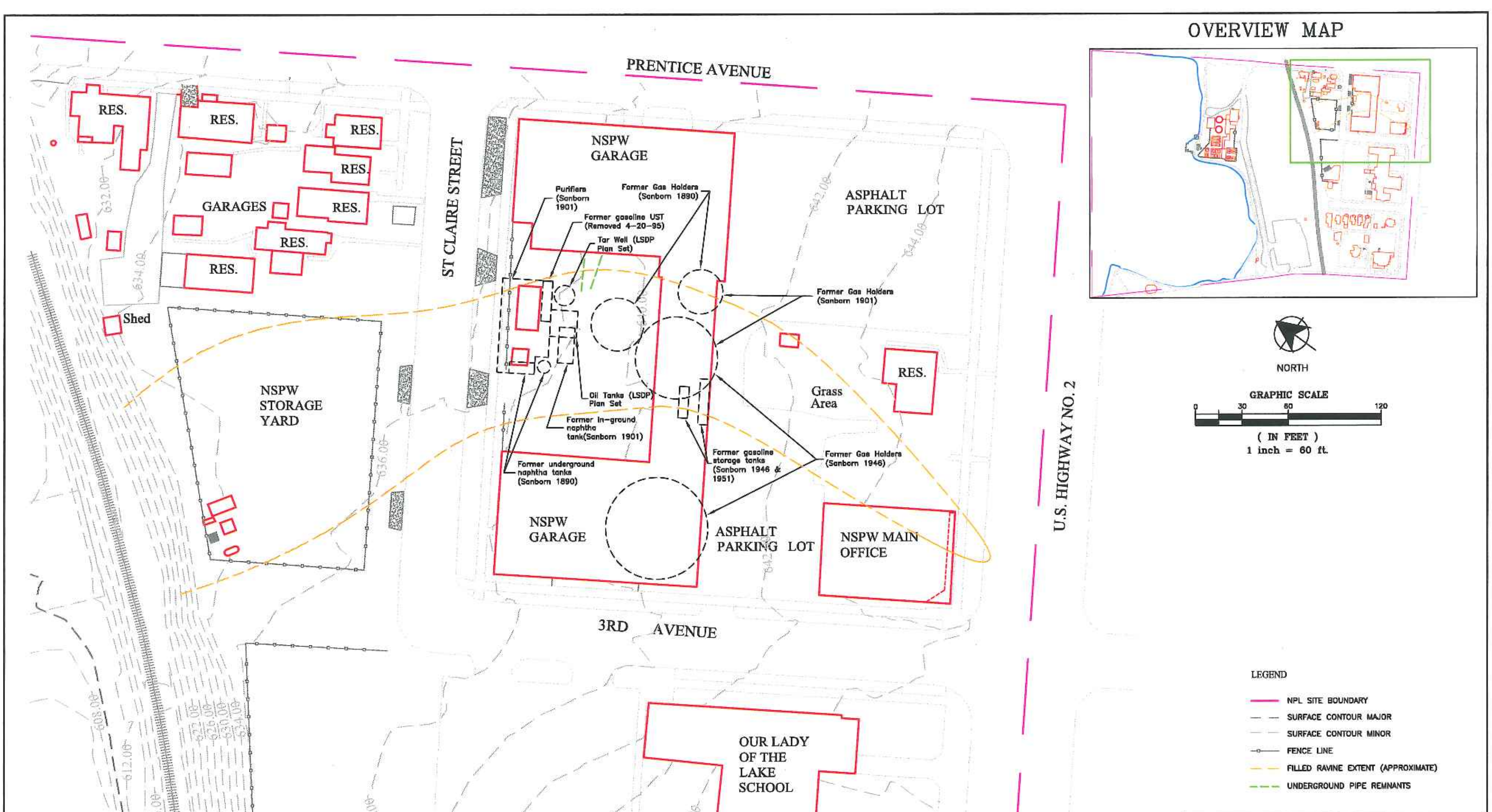
414-831-4100



PROJECT: ASHLAND/NSP LAKEFRONT SITE ASHLAND, WISCONSIN			
TITLE: FIGURE 1-3 FORMER MGP FEATURES			
DRAWN BY: DDZ	SCALE: 1" = 60'	PROJECT: 25688375	
CHECKED BY: PJS	DATE: 30.JULY.2007	SHEET: 1-3	
APPROVED BY: DPT			
URS	10200 INNOVATION DRIVE, SUITE 500 MILWAUKEE, WISCONSIN 53226 414-831-4100		

Legend

- Extent of NAPL and/or sheen
- Extent of contamination

All Sed Results - Total PAH ppm

Total PAH ppm

- 0
- 1 - 5
- 6 - 9.4
- 9.5 - 100
- 101 - 200
- 201 - 1000
- >1000

0 62.5 125 250 375 500 Feet

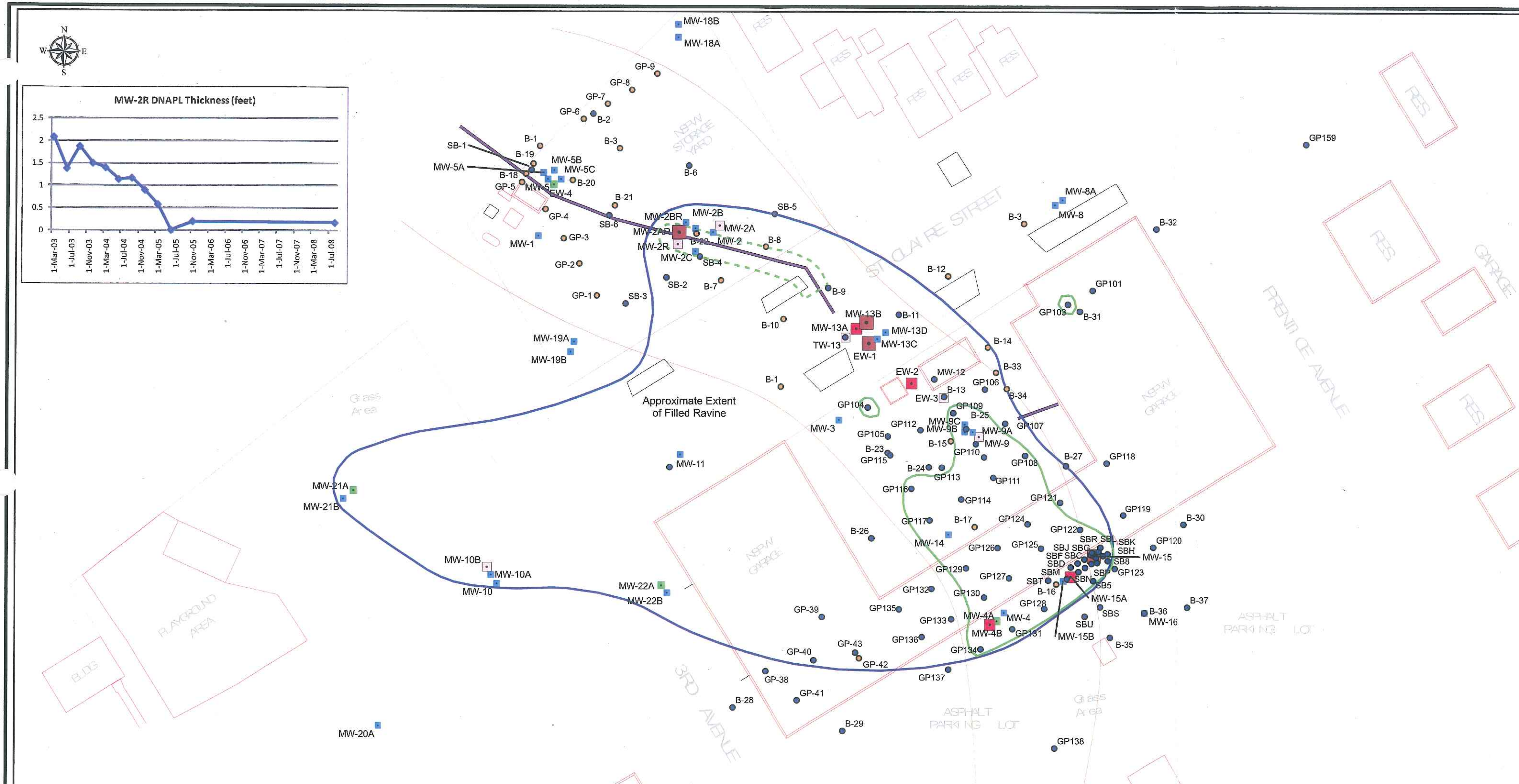
PROJECT:
ASHLAND/NSP LAKEFRONT SITE
ASHLAND, WISCONSIN

TITLE:
Figure 3-3
Area of Impacted Sediment

DRAWN BY: DDZ	SCALE: AS SHOWN	PROJECT: 25688375	
CHECKED BY: MSM	DATE: 24.OCT.2008	SHEET: 3-3	
APPROVED BY: DPT			

URS

6737 W. WASHINGTON ST. SUITE 2265
MILWAUKEE, WISCONSIN 53214
414-831-4100



Legend

Free Product thickness (feet)

Maximum by well

- 0
- 0.1 - 1
- 1.1 - 5
- 5.1 - 10
- 10.1 - 26.3
- Historical Soil Borings
- Soil Sample Locations

2001 Clay Tile Investigation

Free Product Extent

Label

- April 2005 geoprobes
- Copper Falls wells
- Free Product Extent Inferred - Filled Ravine

0 25 50 75 100 Feet

Note:
Free product extent between TW-13 and MW-2R is based on recent data, which indicates the free product plume in this area is significantly declining (dashed line where inferred). See graph of MW-2R historical free product measurements at upper left. Free product is assumed to approximate trace of clay tile which was removed in 2001.
Wells MW-2, MW-2A, and MW-2B were abandoned during the 2001 clay tile investigation.
Historical soil borings indicate locations with no associated laboratory data.

PROJECT: ASHLAND/NSP LAKEFRONT SITE ASHLAND, WISCONSIN			
TITLE: Figure 3-7 Extent of DNAPL in Upper Bluff, Filled Ravine, and Copper Falls			
DRAWN BY: DDZ	SCALE: AS SHOWN	PROJECT: 25688375	
CHECKED BY: MSM	DATE: 24.OCT.2008	SHEET: 3-7	
APPROVED BY: DPT			

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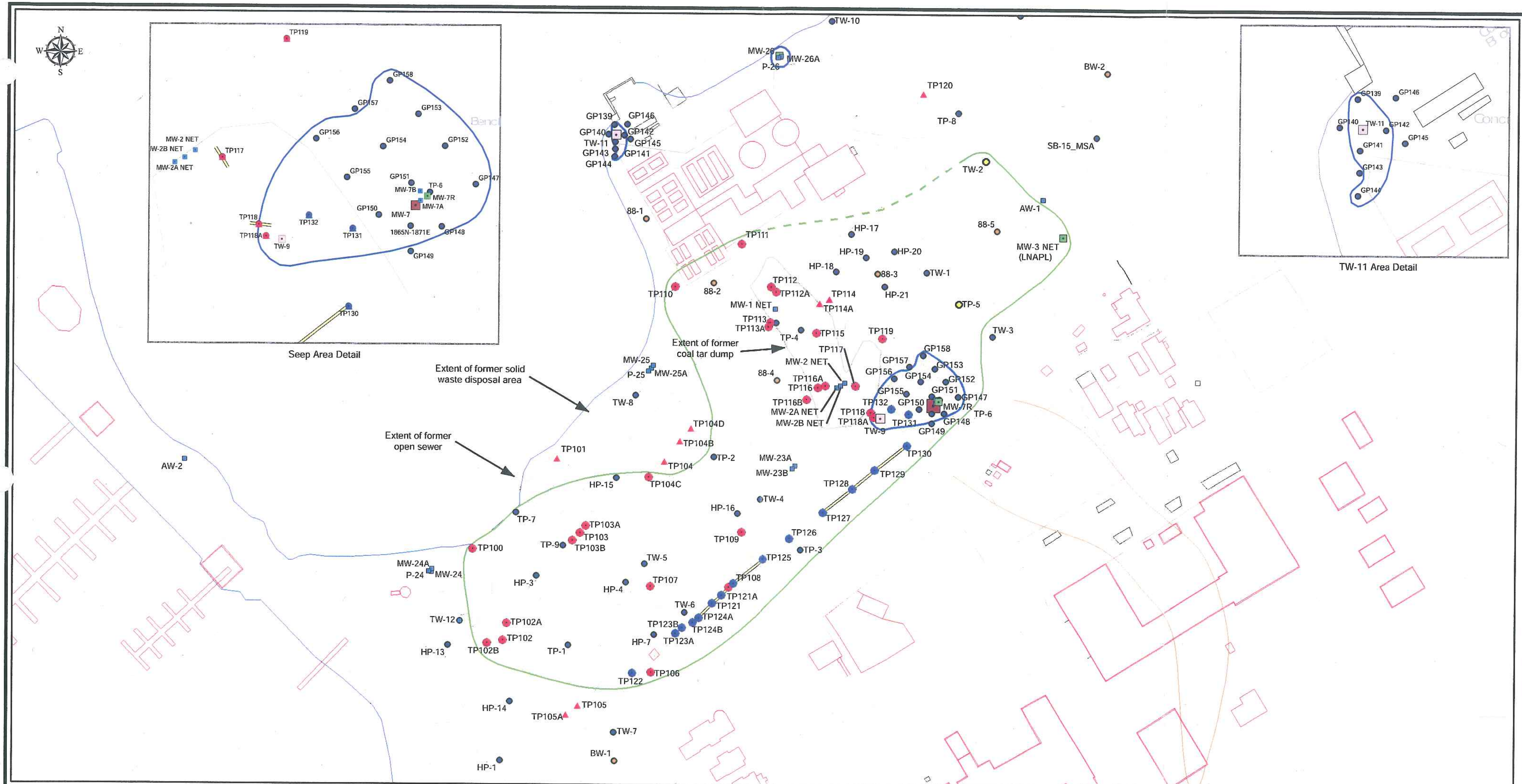


Legend

Free Product thickness (feet)

Maximum by well

- 0
- 0.1 - 1
- 1.1 - 5
- 5.1 - 10
- 10.1 - 26.3

2005 RI clay pipe investigation

DNAPL Extent

LNAPL Extent (dashed where inferred)

Soil Sample Locations

Historical Soil Borings

1994 Locations

Test Pit locations with LNAPL

Event Date

- Nov 2005
- June 2005

Test Pit locations without LNAPL

Event Date

- Nov 2005
- June 2005

0 30 60 120 180 240 Feet

Note:
Defined boundaries shown at seep area and TW-11 indicate probable extent of DNAPL.
DNAPL in well MW-26 (0.25 ft.) was first encountered on August 18, 2008.
Symbols denoting LNAPL where encountered in borings and test pits are shown separately.
Well MW-7 was abandoned during the 2002 seep remediation.
Historical soil borings indicate locations with no associated laboratory data.
1994 locations shown indicated oily sheen in soil cuttings in TW-2 and oil present on wood pieces in TP-5.

PROJECT: ASHLAND/NSP LAKEFRONT SITE
ASHLAND, WISCONSIN

TITLE: Figure 3-8
Extent of DNAPL & LNAPL in Kreher Park

DRAWN BY: DDZ	SCALE: AS SHOWN	PROJECT: 25688375	
CHECKED BY: MSM	DATE: 24.OCT.2008	SHEET: 3-8	
APPROVED BY: DPT			

URS

10200 INNOVATION DRIVE, SUITE 500
MILWAUKEE, WISCONSIN 53226
414-831-4100

ATTACHMENT 2

Table 4-1
Amended List of Final Compounds for Regulatory Exceedances
Sediment, Soil, and Groundwater Samples
Ashland Lakefront Site - Ashland, Wisconsin

VOCs				SVOCs[1]				Inorganics			
	Sed[4]	Soil	GW		Sed.	Soil	GW		Sed.	Soil	GW
Benzene	√	√	√	Acenaphthene (LMW)	√	√		Arsenic	√	√	√
Ethylbenzene		√	√	Acenaphthylene (LMW)	√	√		Antimony	√		√
Styrene			√	Anthracene (LMW)	√	√	√	Barium			√
Toluene	√	√	√	Benzo(a)Anthracene (HMW)	√	√		Beryllium		√	√
1,2,3-Trimethylbenzene			√[2]	Benzo(a)Pyrene (HMW)	√	√	√	Cadmium	√	√	√
1,2,4-Trimethylbenzene		√	√[2]	Benzo(b)Fluoranthene (HMW)	√	√	√	Chromium (+3)	√[5]		√[3]
1,3,5-Trimethylbenzene		√	√[2]	Benzo (k) Fluoranthene (HMW)	√	√		Chromium (+6)	√[5]		√[3]
Total Xylenes	√	√	√	Benzo(g,h,i)Perylene (HMW)	√	√		Cobalt			√
1,2,4-Trichlorobenzene	√	√		Chrysene (HMW)	√	√	√	Copper	√		√
Chloroform			√	Dibenzo(a,h)Anthracene (HMW)	√	√		Cyanide			√
Chloromethane			√	Fluoranthene (HMW)	√	√	√	Iron	√	√	√
Methylene Chloride			√	Fluorene (LMW)	√	√	√	Lead	√	√	√
n-Butyl benzene		√		Indeno(1,2, 3-cd)Pyrene (HMW)	√	√		Manganese	√	√	√
				1-Methyl Naphthalene		√		Mercury	√		√
				2-Methyl Naphthalene (LMW)	√	√		Nickel	√		√
				Naphthalene (LMW)	√	√	√	Selenium			√
				Pentachlorophenol	√		√	Silver	√		√
				Phenanthrene (LMW)	√	√		Thallium			√
				Pyrene (HMW)	√	√	√	Vanadium		√	√
				Dibenzofuran	√	√		Zinc	√		√
				Phenol	√	√	√				
				Pyridine			√				
				Benzo(e)Pyrene (HMW)	√						
				Total PAHs	√						

[1] ~~(HMW) = Heavy molecular weight PAHs; (LMW) = Low molecular weight PAHs.~~

[2] Trimethylbenzene in groundwater will be presented as total TMB per the WI ch. NR 140 standard.

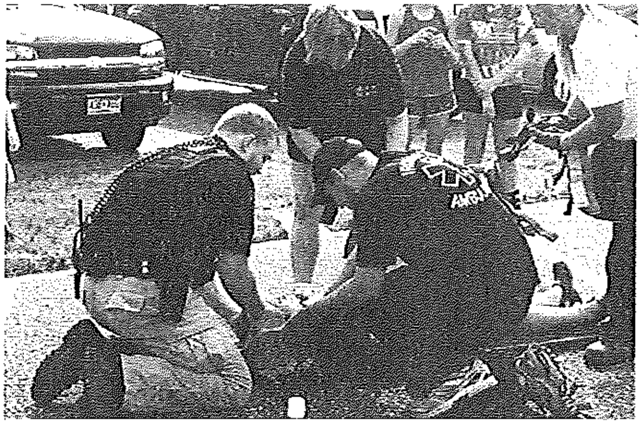
[3] Chromium in groundwater will be presented as total chromium per the WI ch. NR 140 standard.

[4] Compounds listed for sediments from WDNR Consensus-Based Sediment Quality Guidelines, Recommendations for Use & Application, Interim Guidance, December 2003.

[5] Chromium in sediment will be presented as total chromium per the WDNR Consensus-Based Sediment Quality Guidelines December 2003.

ATTACHMENT 3

LIFE SAVING DEMONSTRATION



CONTRIBUTED PHOTO/WENDY YOUNG

Emergency crews demonstrated life-saving techniques Saturday at the Emergency Pig Out fundraiser hosted by White Winter Winery. It was the event's 11th year, and proceeds are used to buy equipment for Iron River emergency services.

A reporter's farewell: Hope to see you around

Editor's Note – A version of this story appeared in Tuesday's e-edition of The Ashland Daily Press

SARA M. CHASE
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Chase

In Ecclesiastes 3:1 it says, "To every thing there is a season, and a time to every purpose under the heaven," and so it is with a mixture of excitement and a bit of sadness that I find myself writing both my first and last column as a reporter for the Ashland Daily Press.

While it has been my utmost pleasure getting to know so many of you from our wonderful community and the surrounding areas over the last three-plus years, I feel called into a new season of my life and have moved into a new job at Heart Graphics. I believe that is where I am called to be at this stage in my life.

As I close out this chapter I would really like to thank my co-worker Rick Olivo for vouching for the journalism training I received during my time in the Navy, as well as my former editor Larry Servinsky and general manager Dave LaPorte for giving me a chance and bringing me onboard, providing me with the opportunity to connect with all of you dear readers on an almost daily basis through the written word.

I would also like to thank the rest of the people I've worked with at the press. The paginators, who work long hours laying out not only the Ashland Daily Press and Bayfield County Journal but many of the other regional papers plus special inserts and more. Then there are the sports guys, advertising, circulation, customer service, billing and bookkeeping people. While the newspaper is not always 100 percent perfect – as we have tight deadlines and quick turnarounds, errors do sometimes get by – I'm looking at you "mandarin organs" – I can promise you this: The many local people who work at the newspaper really do care about this community and work hard to provide the best service that they can.

It has been my pleasure to share your stories and help promote the many wonderful things that happen in our region. I have found this to be a very beautiful, generous and loving community – regardless of what some trolls on the Internet might think. The area we chose to call our home is incredibly rich with beauty if we simply choose to open ourselves up to it. I would encourage anyone who lives here to take advantage of the wonderful recreational opportunities.

When I was in the Navy I lived within a 45-minute drive of Gettysburg, Pa., and while I've always been a bit of a history buff I just kept putting off driving out there for a visit and today I've still never been. I would encourage you not do the same. Go visit the Apostle Islands, hike Houghton Falls or St. Peter's Dome, walk around downtown and look at the murals. People travel from far and wide to see and do these things, please don't miss out on the opportunities this area presents.

As I still have a passion for our community and writing I may still do some writing for the newspaper as a stringer (newspaper correspondent) and I hope to see you around the community. Thank you and God bless!

ATTACHMENT 4

I. SITE INFORMATION	
Site name: Ashland/NSP Lakefront Site	**Date of inspection:** 11/27/2018
Location and Region: Ashland, Wisconsin, Region 5	**EPA ID:** WISFN0507952
Agency, office, or company leading the FYR: EPA	**Weather/temperature:** Sunny/15 degrees

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☒ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☒ Groundwater containment
- ☒ Vertical barrier walls
- ☒ Other: Slurry wall

Attachments:

- ☐ Inspection team roster attached
- ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M Site Manager** **Eric Ealy,** **Project Mgr.,** **11/27/2018**

   Interviewed: ☒ at site ☐ at office ☐ by phone Phone Number: 612-330-2928

   Problems, suggestions: ☐ Report attached

   Click or tap here to enter text.

2. **O&M Staff** Name , Title , Click or tap to enter a date.

   Interviewed: ☐ at site ☐ at office ☐ by phone Phone Number: Click here to enter text.

   Problems, suggestions: ☐ Report attached

   Click or tap here to enter text.

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

   Agency: Wisconsin Department of Natural Resources

   Contact: John Sager, State Project Manager, 11/27/2018, P: 715-392-7822

   Problems, suggestions: ☐ Report attached

   Click or tap here to enter text.

   Agency: Click or tap here to enter text.

   Contact: Name , Title , Click or tap to enter a date., P: Phone Number

   Problems, suggestions: ☐ Report attached

   Click or tap here to enter text.

   Agency: Click or tap here to enter text.

   Contact: Name , Title , Click or tap to enter a date., P: Phone Number

   Problems, suggestions: ☐ Report attached

   Click or tap here to enter text.

   Agency: Click or tap here to enter text.

   Contact: Name , Title , Click or tap to enter a date., P: Phone Number

   Problems, suggestions:

   Click or tap here to enter text.

4. **Other Interviews (optional):** ☐ Report attached

   Click or tap here to enter text.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. O&M Documents

☒ O&M manual ☐ Readily available ☒ Up to date ☐ N/A

☒ As-built drawings ☐ Readily available ☒ Up to date ☐ N/A

☒ Maintenance logs ☐ Readily available ☒ Up to date ☐ N/A

Remarks: Click or tap here to enter text.

2. Site-Specific Health and Safety Plan ☒ Readily available

☒ Contingency Plan/Emergency Response Plan ☒ Readily available

Remarks: Click or tap here to enter text.

3. O&M and OSHA Training Records

☒ Readily available ☐ Up to date ☐ N/A

Remarks: Click or tap here to enter text.

4. Permits and Service Agreements

☐ Air discharge permit ☐ Readily available ☐ Up to date ☐ N/A

☒ Effluent discharge ☒ Readily available ☒ Up to date ☐ N/A

☐ Waste disposal, POTW ☐ Readily available ☐ Up to date ☐ N/A

☐ Other permits: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

5. Gas Generation Records

☐ Readily available ☐ Up to date ☒ N/A

Remarks: Click or tap here to enter text.

6. Settlement Monument Records

☐ Readily available ☐ Up to date ☒ N/A

Remarks: Click or tap here to enter text.

7. Groundwater Monitoring Records

☒ Readily available ☒ Up to date ☐ N/A

Remarks: Click or tap here to enter text.

8. Leachate Extraction Records

☐ Readily available ☐ Up to date ☒ N/A

Remarks: Click or tap here to enter text.

9. Discharge Compliance Records

☐ Air	☐ Readily available	☐ Up to date	☐ N/A
☒ Water (effluent)	☒ Readily available	☒ Up to date	☐ N/A

Remarks: Click or tap here to enter text.

10. Daily Access/Security Logs

☒ Readily available ☒ Up to date ☐ N/A

Remarks: Click or tap here to enter text.

IV. O&M COSTS

1. O&M Organization

☐ State in-house	☐ Contractor for State
☐ PRP in-house	☒ Contractor for PRP
☐ Federal Facility in-house	☐ Contractor for Federal Facility

Remarks: Click or tap here to enter text.

2. O&M Cost Records

☐ Readily available ☐ Up to date ☐ Funding mechanism/agreement in place

Original O&M cost estimate Click or tap here to enter text. ☐ Breakdown attached

Total annual cost by year for review period if available

From	To	Total cost	
Click or tap to enter a date.	Click or tap to enter a date.	Click or tap here to enter text.	☐ Breakdown attached
Click or tap to enter a date.	Click or tap to enter a date.	Click or tap here to enter text.	☐ Breakdown attached
Click or tap to enter a date.	Click or tap to enter a date.	Click or tap here to enter text.	☐ Breakdown attached
Click or tap to enter a date.	Click or tap to enter a date.	Click or tap here to enter text.	☐ Breakdown attached
Click or tap to enter a date.	Click or tap to enter a date.	Click or tap here to enter text.	☐ Breakdown attached

3. Unanticipated or Unusually High O&M Costs During Review Period

Describe costs and reasons:

Click or tap here to enter text.

V. ACCESS AND INSTITUTIONAL CONTROLS			
☒ Applicable		☐ N/A	
1. **Fencing Damaged**	☐ Location shown on site map	☒ Gates secured	☐ N/A
Remarks: Remedial Action is still on-going so gates and fence are in place.			
2. **Other Access Restrictions**	☐ Location shown on site map	☐ Gates secured	
Remarks: Click or tap here to enter text.			
3. **Institutional Controls (ICs)**			
A. **Implementation and Enforcement**			
Site conditions imply ICs not properly implemented	☐ Yes	☐ No	☒ N/A
Site conditions imply ICs not being fully enforced	☐ Yes	☐ No	☒ N/A
Type of monitoring (*e.g.*, self-reporting, drive by)	Click or tap here to enter text.		
Frequency			
Responsible party/agency	PRP		
Contact: Eric Ealy, Project Manager, Click or tap to enter a date., P: 612-330-2928			
Reporting is up-to-date	☐ Yes	☐ No	☒ N/A
Reports are verified by the lead agency	☐ Yes	☐ No	☒ N/A
Specific requirements in deed or decision documents have been met	☐ Yes	☐ No	☒ N/A
Violations have been reported	☐ Yes	☐ No	☒ N/A
Other problems or suggestions:			
ICs are not implemented yet.			
B. **Adequacy**	☐ ICs are adequate	☐ ICs are inadequate	☒ N/A
Remarks: ICs are not implemented yet.			
4. General			
A. **Vandalism/Trespassing**	☐ Location shown on site map	☒ No vandalism evident	
Remarks: Click or tap here to enter text.			
B. **Land use changes on site**	☒ N/A		
Remarks: Click or tap here to enter text.			
C. **Land use changes off site**	☒ N/A		
Remarks: Click or tap here to enter text.			

VI. GENERAL SITE CONDITIONS			
1. **Roads**	☒ Applicable	☐ N/A	
A. **Roads damaged**	☐ Location shown on site map	☒ Roads adequate	☒ N/A
Remarks: Access Roads are on site.			
B. **Other Site Conditions**			
Remarks: Click or tap here to enter text.			

VII. LANDFILL COVERS		
1. **Landfill Surface**	☐ Applicable	☒ N/A
A. **Settlement (Low Spots)**	☐ Location Shown on Site Map	☐ Settlement Not Evident
Areal Extent: Click or tap here to enter text.		Depth: Click or tap here to enter text.
Remarks: Click or tap here to enter text.		
B. **Cracks**	☐ Location Shown on Site Map	☐ Cracking Not Evident
Lengths: Click or tap here to enter text.	Widths: Click or tap here to enter text.	Depths: Click or tap here to enter text.
Remarks: Click or tap here to enter text.		
C. **Erosion**	☐ Location Shown on Site Map	☐ Erosion Not Evident
Areal Extent: Click or tap here to enter text.		Depth: Click or tap here to enter text.
Remarks: Click or tap here to enter text.		
D. **Holes**	☐ Location Shown on Site Map	☐ Holes Not Evident
Areal Extent: Click or tap here to enter text.		Depth: Click or tap here to enter text.
Remarks: Click or tap here to enter text.		
E. **Vegetative Cover**	☐ Grass	☐ Cover Properly Established
☐ Tress/Shrubs (indicate size and locations on a diagram		☐ No Signs of Stress
Remarks: Click or tap here to enter text.		
F. **Alternative Cover (armored rock, concrete, etc.)**		☒ N/A
Remarks: Click or tap here to enter text.		
G. **Bulges**	☐ Location Shown on Site Map	☐ Bulges Not Evident
Areal Extent: Click or tap here to enter text.		Height: Click or tap here to enter text.
Remarks: Click or tap here to enter text.		
H. **Wet Areas/Water Damage**	☐ Wet Areas/Water Damage Not Evident	

☐ Wet Areas ☐ Location Shown on Site Map Areal Extent: Area south of landfill cap was wet due to a lot of rain

☐ Ponding ☐ Location Shown on Site Map Areal Extent: Click or tap here to enter text.

☐ Seeps ☐ Location Shown on Site Map Areal Extent: Seep located near gabion wall

☐ Soft Subgrade ☐ Location Shown on Site Map Areal Extent: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

I. **Slope Instability** ☐ Location Shown on Site Map ☐ Slope Instability Not Evident

☐ Slides Areal Extent: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

2. **Benches** ☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

A. **Flows Bypass Bench** ☐ Location Shown on Site Map ☒ N/A or Okay

Remarks: Click or tap here to enter text.

B. **Bench Breached** ☐ Location Shown on Site Map ☒ N/A or Okay

Remarks: Click or tap here to enter text.

C. **Bench Overtopped** ☐ Location Shown on Site Map ☒ N/A or Okay

Remarks: Click or tap here to enter text.

3. **Letdown Channels** ☐ Applicable ☒ N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

A. **Settlement** ☐ Location Shown on Site Map ☐ Settlement Not Evident

Areal Extent: Click or tap here to enter text. Depth: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

B. **Material Degradation** ☐ Location Shown on Site Map ☐ Degradation Not Evident

Material Type: Click or tap here to enter text. Areal Extent: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

C. **Erosion** ☐ Location Shown on Site Map ☐ Erosion Not Evident

Areal Extent: Click or tap here to enter text. Depth: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

D. Undercutting ☐ Location Shown on Site Map ☐ Undercutting Not Evident

Areal Extent: Click or tap here to enter text. Depth: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

E. Obstructions ☐ Location Shown on Site Map ☐ Undercutting Not Evident

Type: Click or tap here to enter text.

Areal Extent: Click or tap here to enter text. Size: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

F. Excessive Vegetative Growth ☐ Location Shown on Site Map ☐ Excessive Growth Not Evident

Areal Extent: Click or tap here to enter text. ☐ Vegetation in channels does not obstruct flow

Remarks: Click or tap here to enter text.

4. Cover Penetrations ☐ Applicable ☒ N/A

A. Gas Vents ☐ Active ☐ Passive

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled

☐ Good condition ☐ Evidence of leakage at penetration

☐ Needs Maintenance ☒ N/A

Remarks: Click or tap here to enter text.

B. Gas Monitoring Probes

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled

☐ Good condition ☐ Evidence of leakage at penetration

☐ Needs Maintenance ☒ N/A

Remarks: Click or tap here to enter text.

C. Monitoring Wells

☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled

☒ Good condition ☐ Evidence of leakage at penetration

☐ Needs Maintenance ☐ N/A

Remarks: Click or tap here to enter text.

D. Leachate Extraction Wells

☒ Properly secured/locked ☒ Functioning ☐ Routinely sampled

☒ Good condition ☐ Evidence of leakage at penetration

☐ Needs Maintenance ☐ N/A

Remarks: Click or tap here to enter text.

E. **Settlement Monuments** ☐ Located ☐ Routinely Surveyed ☒ N/A

Remarks: Click or tap here to enter text.

5. **Gas Collection and Treatment** ☐ Applicable ☒ N/A

A. **Gas Treatment Facilities**

☐ Flaring ☐ Thermal Destruction ☐ Collection for Reuse

☐ Good condition ☐ Needs Maintenance

Remarks: Click or tap here to enter text.

B. **Gas Collection Wells, Manifolds, and Piping**

☐ Good condition ☐ Needs Maintenance ☒ N/A

Remarks: Click or tap here to enter text.

C. **Gas Monitoring Facilities (e.g. gas monitoring of adjacent homes or buildings)**

☐ Good condition ☐ Needs Maintenance ☒ N/A

Remarks: Click or tap here to enter text.

6. **Cover Drainage Layer** ☐ Applicable ☒ N/A

A. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A

Remarks: Click or tap here to enter text.

B. **Outlet Rock Inspected** ☐ Functioning ☒ N/A

Remarks: Click or tap here to enter text.

7. **Detention/Sediment Ponds** ☐ Applicable ☒ N/A

A. **Siltation** ☐ Siltation Not Evident ☒ N/A

Areal Extent: Click or tap here to enter text. Depth: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

B. **Erosion** ☐ Erosion Not Evident

Areal Extent: Click or tap here to enter text. Depth: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

C. **Outlet Works** ☐ Functioning ☒ N/A

Remarks: Click or tap here to enter text.		
D. **Dam**	☐ Functioning	☒ N/A
Remarks: Click or tap here to enter text.		
8. **Retaining Walls**	☐ Applicable	☒ N/A
A. **Deformations**	☐ Location Shown on Site Map	☐ Deformation Not Evident
Horizontal Displacement: Click or tap here to enter text.		
Vertical Displacement: Click or tap here to enter text.		
Rotational Displacement: Click or tap here to enter text.		
Remarks: Sheetpile wall and slurry wall surround Kreher Park		
B. **Degradation**	☐ Location Shown on Site Map	☐ Deformation Not Evident
Remarks: Click or tap here to enter text.		
9. **Perimeter Ditches/Off-Site Discharge**	☐ Applicable	☒ N/A
A. **Siltation**	☐ Location Shown on Site Map	☐ Siltation Not Evident
Areal Extent: Click or tap here to enter text.	Depth: Click or tap here to enter text.	
Remarks: Click or tap here to enter text.		
B. **Vegetative Growth**	☐ Location Shown on Site Map	☒ N/A
☐ Vegetation Does Not Impede Flow		
Areal Extent: Click or tap here to enter text.	Type: Click or tap here to enter text.	
Remarks: Click or tap here to enter text.		
C. **Erosion**	☐ Location Shown on Site Map	☐ Erosion Not Evident
Areal Extent: Click or tap here to enter text.	Depth: Click or tap here to enter text.	
Remarks: Click or tap here to enter text.		
D. **Discharge Structure**	☒ Functioning	☐ N/A
Remarks: Discharge from Water treatment plant is functioning		
VIII. VERTICAL BARRIER WALLS		
☒ Applicable	☐ N/A	
1. **Settlement**	☐ Location Shown on Site Map	☒ Settlement Not Evident
Areal Extent: Click or tap here to enter text.	Depth: Click or tap here to enter text.	
Remarks: Click or tap here to enter text.		
2. **Performance Monitoring**	Type of Monitoring: Inspections	

☐ Performance Not Monitored ☐ Evidence of Breaching

Frequency: Semi-annual Head Differential: Click or tap here to enter text.

Remarks: Click or tap here to enter text.

IX. GROUNDWATER/SURFACE WATER REMEDIES

☒ Applicable ☐ N/A

1. Groundwater Extraction Wells, Pumps, and Pipelines ☒ Applicable ☐ N/A

A. Pumps, Wellhead Plumbing, and Electrical ☐ N/A

☒ Good Condition ☒ All Required Wells Properly Operating ☐ Needs Maintenance

Remarks: Pump and treat system is functioning as designed.

B. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances

☒ Good Condition ☐ Needs Maintenance

Remarks: Click or tap here to enter text.

C. Spare Parts and Equipment ☐ Needs to be Provided

☐ Readily Available ☒ Good Condition ☐ Requires Upgrade

Remarks: Click or tap here to enter text.

2. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☒ N/A

A. Collection Structures, Pumps, and Electrical

☐ Good Condition ☐ Needs Maintenance

Remarks: Click or tap here to enter text.

B. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances

☐ Good Condition ☐ Needs Maintenance

Remarks: Click or tap here to enter text.

C. Spare Parts and Equipment ☐ Needs to be Provided

☐ Readily Available ☐ Good Condition ☐ Requires Upgrade

Remarks: Click or tap here to enter text.

3. Treatment System ☒ Applicable ☐ N/A

A. Treatment Train (Check components that apply)

☐ Metals removal ☒ Oil/Water Separation ☐ Bioremediation

☐ Air Stripping ☒ Carbon Absorbers

☒ Filters Click or tap here to enter text.

☐ Additive (e.g. chelation agent, flocculent) Click or tap here to enter text.

☐ Others Click or tap here to enter text.

☐ Good Condition ☐ Needs Maintenance

☒ Sampling ports properly marked and functional

☒ Sampling/maintenance log displayed and up to date

☐ Equipment properly identified

☐ Quantity of groundwater treated annually Click or tap here to enter text.

☐ Quantity of surface water treated annually Click or tap here to enter text.

Remarks: Click or tap here to enter text.

B. Electrical Enclosures and Panels (properly rated and functional)

☐ N/A ☒ Good Condition ☐ Needs Maintenance

Remarks: Click or tap here to enter text.

C. Tanks, Vaults, Storage Vessels ☐ N/A

☐ Proper Secondary Containment ☒ Good Condition ☐ Needs Maintenance

Remarks: Click or tap here to enter text.

D. Discharge Structure and Appurtenances

☐ N/A ☒ Good Condition ☐ Needs Maintenance

Remarks: Click or tap here to enter text.

E. Treatment Building(s)

☒ N/A ☒ Good condition (esp. roof and doorways)

☐ Needs repair ☒ Chemicals and equipment properly stored

Remarks: Click or tap here to enter text.

F. Monitoring Wells (Pump and Treatment Remedy) ☐ N/A

☒ Properly secured/locked ☒ Functioning

☒ Routinely sampled ☐ All required wells located

☒ Good condition ☐ Needs Maintenance

Remarks: Click or tap here to enter text.

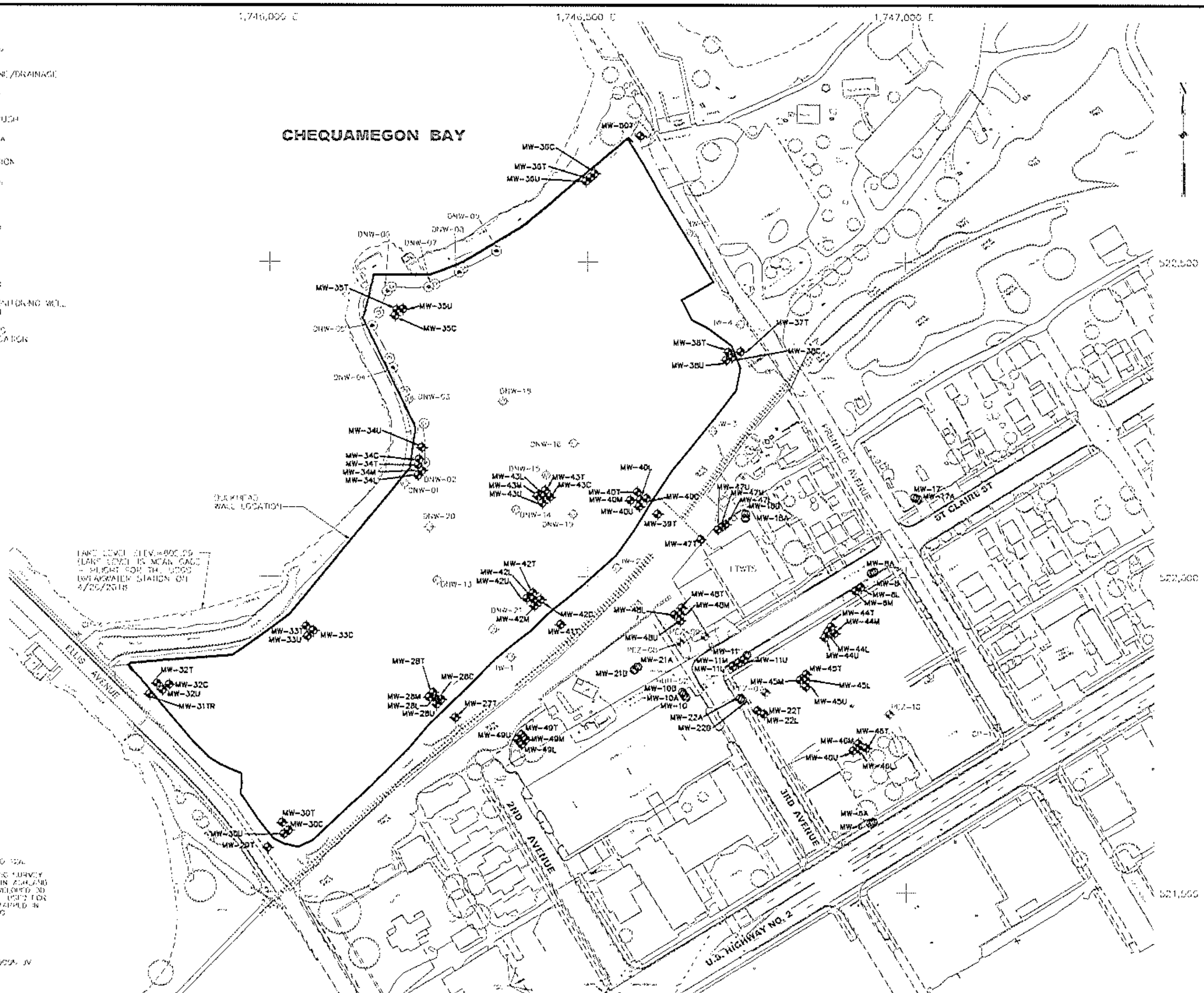
4. Monitoring Data

A. Monitoring Data:

☒ Is Routinely Submitted on Time ☒ Is of Acceptable Quality

B. Monitoring Data Suggests: ☒ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining
5. Monitored Natural Attenuation
A. Monitoring Wells (natural attenuation remedy) ☒ N/A   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled   ☐ All required wells located ☐ Needs Maintenance ☐ Good condition   Remarks: Click or tap here to enter text.
X. OTHER REMEDIES
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.
XI. OVERALL OBSERVATIONS
1. Implementation of the Remedy   Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).   The remedy that is currently complete is functioning as intended. However, the Site is not yet construction complete.
2. Adequacy of O&M   Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.   Click or tap here to enter text.
3. Early Indicators of Potential Remedy Problems   Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.   Click or tap here to enter text.
4. Early Indicators of Potential Remedy Problems   Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.   Click or tap here to enter text.

ATTACHMENT 5



LEGEND

- PRE-EXISTING ROADWAY
- PRE-EXISTING SHORELINE/DRAINAGE
- PRE-EXISTING CULVERT
- PRE-EXISTING TREE/BRUSH
- PHASE I PROJECT AREA
- BULKHEAD WALL LOCATION
- CUTOFF WALL LOCATION
- PERIMETER FENCE
- CONTROL POINT NUMBER AND LOCATION
- LONG-TERM WATER TREATMENT SYSTEM
- MW-32C 2015 MONITORING WELL NUMBER AND LOCATION
- MW-21A EXISTING PRE-2015 MONITORING WELL NUMBER AND LOCATION
- PIEZOMETER MONITORING WELL NUMBER AND LOCATION

NOTES:

1. COORDINATE SYSTEM = WISCS-NC, HORIZONTAL DATUM IS NAD83, VERTICAL DATUM IS NAVD88 USING GEOID 12A.

   THIS DRAWING IS A 3D PHOTOGRAMMETRIC SURVEY OF THE ASHLAND NSP LAKEFRONT SITE IN ASHLAND WISCONSIN. IT IS A COMPILATION OF DEVELOPED 3D GIS LAYERS, RECORDS, AND DATA TO BE USED FOR SITE ANALYSIS. DEVELOPED DATA WAS MAPPED IN ACCORDANCE WITH THE ACSM MAPPING STANDARDS.

2. TOPOGRAPHY DEVELOPED FROM DECEMBER 2015 IMAGERY.

3. MAPPING COMPLETED BY FOTH / ENVIROGEN JV

NO	DATE	APVD	REVISION

Cedar CORPORATION

PROPRIETARY DOCUMENT FOR SPECIFIC USE OF XCEL ENERGY AND ITS PARTNERS

ASHLAND/NSP LAKEFRONT SITE

LONG-TERM GROUNDWATER MONITORING OPTIMIZATION
JUNE 2018
ASHLAND, WISCONSIN

JOB NO.	X0059-050
DRAWN BY	MLW
CHECKED BY	JAL
DATE	JUNE 2018
SET TYPE	FINAL

MONITORING WELL LOCATIONS

SCALE 0 75' 150'

FIGURE NO. 1

ATTACHMENT 6

Table 1
Evaluation of Ashland/NSP Groundwater Monitoring Network

Well Name	Hydrostratigraphic Unit	Current Sampling Frequency	Monitoring Frequency Recommendation	Qualatative Analysis
MW-8L	Lower Copper Falls	Quarterly	Annual	Two COCs (manganese and chloroform) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese levels are below the WI Public Health standard of 300 ug/L. Chloroform concentrations show a decreasing trend and have been below the Cleanup Standard since July 2016. Based on the water quality trends observed to date, a reduction in sample frequency is recommended.
MW-11L	Lower Copper Falls	Quarterly	Annual	Three COCs (iron, manganese, and chloroform) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. One other compound (bis(2-Ethylhexyl)phthalate) was detected at concentrations above the WI Public Health standard. Iron is not considered hazardous to health.* Manganese levels are below the WI Public Health standard of 300 ug/L. Chloroform shows a decreasing trend and has been below the Cleanup Standard since October 2016. Based on the water quality trends observed to date, a reduction in sample frequency is recommended.
MW-22L	Lower Copper Falls	Quarterly	Annual	Two COCs (manganese and chloroform) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Two other compounds (bis(2-Ethylhexyl)phthalate and bromodichloromethane) were detected at concentrations above the WI Public Health standard. Manganese concentrations are below the WI Public Health standard of 300 ug/L. Chloroform was only detected in October 2016. Based on the water quality trends observed to date, a reduction in sample frequency is recommended.
MW-28L	Lower Copper Falls	Quarterly	Annual	One COC (manganese) was detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese concentrations are below the WI Public Health standard of 300 ug/L. Based on the water quality trends observed to date, along with additional monitoring complexities presented by flowing artesian conditions, a reduction in sample frequency is recommended.
MW-34L	Lower Copper Falls	Quarterly	Annual	Two COCs (manganese and methylene chloride) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese concentrations are below the WI Public Health standard of 300 ug/L. Methylene Chloride was only detected in December 2015. Based on the water quality trends observed to date, along with additional monitoring complexities presented by flowing artesian conditions, a reduction in sample frequency is recommended.
MW-40L	Lower Copper Falls	Quarterly	Annual	One COC (manganese) was detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese concentrations are below the WI Public Health standard of 300 ug/L. Based on the water quality trends observed to date, along with additional monitoring complexities presented by flowing artesian conditions, a reduction in sample frequency is recommended.
MW-42L	Lower Copper Falls	Quarterly	Annual	Two COCs (manganese and benzene) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese concentrations are below the WI Public Health standard of 300 ug/L. Benzene was only detected in December 2015. Based on the water quality trends observed to date, along with additional monitoring complexities presented by flowing artesian conditions, a reduction in sample frequency is recommended.
MW-43L	Lower Copper Falls	Quarterly	Annual	No compounds were detected above the Cleanup Standards established in the ROD or WI Public Heath standards after 8 rounds of sampling. A reduction in sampling frequency is recommended.
MW-44L	Lower Copper Falls	Quarterly	Annual	One COC (manganese) was detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. One other compound (bis(2-Ethylhexyl)phthalate) was detected at concentrations above the WI Public Health standard. Manganese concentrations are below the WI Public Health standard of 300 ug/L. Based on the water quality trends observed to date, a reduction in sample frequency is recommended.
MW-45L	Lower Copper Falls	Quarterly	Quarterly	Six COCs (benzene, toluene, naphthalene, styrene, arsenic, and chloroform) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Two other compounds (bis(2-Ethylhexyl)phthalate and bromodichloromethane) were detected at concentrations above the WI Public Health standard. COC concentrations, with the exception of arsenic, generally show a decreasing trend. Naphthalene in MW-45L was observed at over 40x the Cleanup Standard in April 2018. Given the impacts observed in this location and their scarcity in the rest of the Lower Copper Falls, no change in sampling is recommended.
MW-46L	Lower Copper Falls	Quarterly	Annual	Two COCs (manganese and chloroform) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese concentrations are below the WI Public Health standard of 300 ug/L. Chloroform concentrationss show a decreasing trend until November 2016, after which it was not detected. Based on the water quality trends observed to date, a reduction in sample frequency is recommended.

Table 1
Evaluation of Ashland/NSP Groundwater Monitoring Network

Well Name	Hydrostratigraphic Unit	Current Sampling Frequency	Monitoring Frequency Recommendation	Qualatative Analysis
MW-47L	Lower Copper Falls	Quarterly	Annual	Two COCs (manganese and chloroform) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Two other compounds (bis(2-Ethylhexyl)phthalate and bromodichloromethane) were detected at concentrations above the WI Public Health standard. Manganese concentrations are below the WI Public Health standard of 300 ug/L. Chloroform was only detected in December 2015 and October 2016. Based on the water quality trends observed to date, a reduction in sample frequency is recommended.
MW-48L	Lower Copper Falls	Quarterly	Annual	Two COCs (iron and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. One other compound (bis(2-Ethylhexyl)phthalate) was detected at concentrations above the WI Public Health standard. Iron was only detected in April 2016. Manganese concentrations are below the WI Public Health standard of 300 ug/L. Based on the water quality trends observed to date, a reduction in sample frequency is recommended.
MW-49L	Lower Copper Falls	Quarterly	Annual	Three COCs (arsenic, iron, and vanadium) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Arsenic concentrations show a decreasing trend and have been below the Cleanup Standard since April 2016. Iron was only detected above the Cleanup Standard once in October 2016. Vanadium concentrations show a decreasing trend and have been below the Cleanup Standard since July 2016. Based on the water quality trends observed to date, a reduction in sample frequency is recommended.
MW-8M	Middle Copper Falls	Quarterly	Quarterly	Four COCs (benzene, naphthalene, manganese and styrene) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese concentrations are below the WI Public Health standard of 300 ug/L. All COC concentrations show a decreasing trend and are now below the Cleanup Standard. No change in sampling frequency is recommended.
MW-11M	Middle Copper Falls	Quarterly	Quarterly	Three COCs (manganese, benzene, and chloroform) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. One other compound (bromodichloromethane) was detected at concentrations above the WI Public Health standard. Manganese concentrations are below the WI Public Health standard of 300 ug/L. All COC concentrations show a decreasing trend and are now below the Cleanup Standard. No change in sampling frequency is recommended.
MW-28M	Middle Copper Falls	Quarterly	Quarterly	No compounds were detected above the Cleanup Standards established in the ROD or WI Public Heath standards after 8 rounds of sampling. No change in sampling frequency is recommended.
MW-34M	Middle Copper Falls	Quarterly	Quarterly	Four COCs (chrysene, benzo(b)fluoranthene, benzo(a)pyrene, and methylene chloride) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Chrysene, benzo(b)fluoranthene, and benzo(a)pyrene were only detected in July 2017. Methylene chloride was only detected in December 2015. No change in sampling frequency is recommended.
MW-40M	Middle Copper Falls	Quarterly	Quarterly	One COC (manganese) was detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese concentrations are below the WI Public Health standard of 300 ug/L. No reduction in sample frequency is recommended.
MW-42M	Middle Copper Falls	Quarterly	Quarterly	Four COC (benzene, styrene, naphthalene, and iron) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health.* Benzene, styrene, and naphthalene were only detected in April 2018. No reduction in sample frequency is recommended.
MW-43M	Middle Copper Falls	Quarterly	Quarterly	No compounds were detected above the Cleanup Standards established in the ROD or WI Public Heath standards after 8 rounds of sampling. No change in sampling frequency is recommended.
MW-44M	Middle Copper Falls	Quarterly	Quarterly	One COC (manganese) was detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese concentrations are below the WI Public Health standard of 300 ug/L. No reduction in sample frequency is recommended.
MW-45M	Middle Copper Falls	Quarterly	Quarterly	One COC (manganese) was detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. One other compound (bis(2-Ethylhexyl)phthalate) was detected at concentrations above the WI Public Health standard. Manganese concentrations are below the WI Public Health standard of 300 ug/L. No reduction in sample frequency is recommended.
MW-46M	Middle Copper Falls	Quarterly	Quarterly	One COC (manganese) was detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese was only detected above the Cleanup Standard in December 2015, after which it remained below 50 ug/L. No reduction in sample frequency is recommended.
MW-47M	Middle Copper Falls	Quarterly	Quarterly	Two COCs (manganese and chloroform) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Two other compounds (bis(2-Ethylhexyl)phthalate and bromodichloromethane) were detected at concentrations above the WI Public Health standard. Manganese concentrations are below the WI Public Health standard of 300 ug/L. Chloroform was only detected above the Cleanup Standard in October 2016, after which it was not detected. No change in sampling frequency is recommended.

Table 1
Evaluation of Ashland/NSP Groundwater Monitoring Network

Well Name	Hydrostratigraphic Unit	Current Sampling Frequency	Monitoring Frequency Recommendation	Qualatative Analysis
MW-48M	Middle Copper Falls	Quarterly	Quarterly	No compounds were detected above the Cleanup Standards established in the ROD or WI Public Heath standards after 8 rounds of sampling. No change in sampling frequency is recommended.
MW-49M	Middle Copper Falls	Quarterly	Quarterly	Four COCs (benzo(a)pyrene, benzo(b)fluoranthene, manganese, and chloroform) were detected at concentrations above the Cleanup Standards established in the ROD after 7 rounds of sampling. One other compound (bis(2-Ethylhexyl)phthalate) was detected at concentrations above the WI Public Health standard. Manganese concentrations are below the WI Public Health standard of 300 ug/L. Chloroform was only detected above the Cleanup Standard in December 2015. Benzo(a)pyrene and benzo(b)fluoranthene were only detected in April 2018. No change in sampling frequency is recommended.
MW-28C	Miller Creek	Quarterly	Quarterly	Three COCs (benzene, manganese, and methylene chloride) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Benzene concentrations show a decreasing trend and have been below the Cleanup Standard since April 2016. Manganese concentrations are below the WI Public Health standard of 300 ug/L. Methylene chloride was only detected in December 2015. No change in sampling frequency is recommended.
MW-30C	Miller Creek	Quarterly	Quarterly	No compounds were detected above the Cleanup Standards established in the ROD or WI Public Heath standards after 8 rounds of sampling. No change in sampling frequency is recommended.
MW-32C	Miller Creek	Quarterly	Quarterly	One COC (manganese) was detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese concentrations are below the WI Public Health standard of 300 ug/L. No reduction in sample frequency is recommended.
MW-33C	Miller Creek	Quarterly	Quarterly	Six COCs (naphthalene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, iron, and manganese) and one other compound (bis(2-ethylhexyl)phthalate) were detected above the ES after 8 rounds of sampling. Iron is not considered hazardous to health.* Manganese concentrations are below the WI Public Health standard of 300 ug/L. There are no discernible trends seen for naphthalene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene, with concentrations and detections appearing sporadic. No change in sampling frequency is recommended.
MW-34C	Miller Creek	Quarterly	Quarterly	One COC (manganese) was detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese concentrations are below the WI Public Health standard of 300 ug/L. No reduction in sample frequency is recommended.
MW-35C	Miller Creek	Quarterly	Quarterly	Two COCs (iron and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health.* Manganese concentrations are sporadic, with no discernible trend. No reduction in sample frequency is recommended.
MW-36C	Miller Creek	Quarterly	Quarterly	One COC (manganese) was detected at concentrations above the Cleanup Standards established in the ROD after 5 rounds of sampling. One other compound (bis(2-Ethylhexyl)phthalate) was detected at concentrations above the WI Public Health standard. Manganese concentrations are below the WI Public Health standard of 300 ug/L. No reduction in sample frequency is recommended.
MW-38C	Miller Creek	Quarterly	Quarterly	Two COCs (benzene and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese levels are below the WI Public Health standard of 300 ug/L. Benzene data displays a decreasing trend, but is still well above the Cleanup Standard. To monitor if COC trends continue, no change in sampling frequency is recommended.
MW-40C	Miller Creek	Quarterly	Quarterly	Ten COCs (benzene, toluene, ethylbenzene, xylene, naphthalene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, iron, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 5 rounds of sampling. Iron is not considered hazardous to health.* Manganese concentrations are below the WI Public Health standard of 300 ug/L. There are no discernible trends seen for the VOC and SVOC COCs, with concentrations appearing sporadic. NAPL is commonly observed in MW-40C. No change in sampling frequency is recommended.
MW-42C	Miller Creek	Quarterly	Quarterly	Nine COCs (benzene, toluene, ethylbenzene, xylene, 1,2,4-trimethylbenzene, naphthalene, styrene, iron, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. One other compound (carbon tetrachloride) was detected at concentrations above the WI Public Health standard. Iron is not considered hazardous to health.* Manganese concentrations are below the WI Public Health standard of 300 ug/L. Benzene, ethylbenzene, 1,2,4-trimethylbenzene, and naphthalene concentrations all show increasing trends. Toluene and xylene concentrations appear more sporadic and have no discernable trend. Carbon tetrachloride was only detected once, in April 2016, and did not appear in a duplicate sample. No change in sampling frequency is recommended.
MW-43C	Miller Creek	Quarterly	Quarterly	Six COCs (benzene, toluene, ethylbenzene, xylene, methylene chloride, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese concentrations are below the WI Public Health standard of 300 ug/L. COC concentrations have no discernable trend. No change in sampling frequency is recommended.

Table 1
Evaluation of Ashland/NSP Groundwater Monitoring Network

Well Name	Hydrostratigraphic Unit	Current Sampling Frequency	Monitoring Frequency Recommendation	Qualatative Analysis
MW-6A	Upper Copper Falls	Quarterly	Quarterly	One COC (manganese) was detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese concentrations display a slightly increasing trend. No reduction in sample frequency is recommended.
MW-8A	Upper Copper Falls	Quarterly	Quarterly	Seven COCs (benzene, toluene, ethylbenzene, naphthalene, methylene chloride, iron, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health.* Manganese concentrations are below the WI Public Health standard of 300 ug/L. Methylene Chloride was only detected in Apri 2018. VOC COC concentrations have no discernable trend. No change in sampling frequency is recommended.
MW-10A	Upper Copper Falls	Quarterly	Quarterly	Four COCs (benzo(a)pyrene, benzo(b)fluoranthene, chrysene, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese levels are below the WI Public Health standard of 300 ug/L. SVOC COC concentrations show decreasing trends. No change in sampling frequency is recommended.
MW-10B	Upper Copper Falls	Quarterly	Quarterly	Sixteen COCs (benzene, toluene, ethylbenzene, xylene, 1,2,4-trimethylbenzene, styrene, naphthalene, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, fluorene, pyrene, iron, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 1 rounds of sampling. One other compound (bis(2-ethylhexyl)phthalate) was detected at concentrations above the WI Public Health standard. No change in sampling frequency is recommended.
MW-11U	Upper Copper Falls	Quarterly	Quarterly	Eleven COCs (benzene, toluene, ethylbenzene, xylene, naphthalene, 1,2,4-trimethylbenzene, iron, manganese, cobalt, nickel, and styrene) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health.* Cobalt, manganese, nickel, and naphthalene concentrations show decreasing trends. The rest of the COCs previously mentioned show no discernible trend. No change in sampling frequency is recommended.
MW-17A	Upper Copper Falls	Quarterly	Quarterly	Four COCs (benzo(a)pyrene, benzo(b)fluoranthene, chrysene, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese levels are below the WI Public Health standard of 300 ug/L. COC concentrations were only detected above Cleanup Standards in April 2018. No change in sampling frequency is recommended.
MW-18A	Upper Copper Falls	Quarterly	Quarterly	Eleven COCs (benzene, toluene, ethylbenzene, xylene, naphthalene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, styrene, iron, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Benzene, iron, and manganese concentrations show increasing trends. Naphthalene concentrations show a decreasing trend. Ethylbenzene, toluene, xylene, and styrene concentrations show no discernable trend. Benzo(a)pyrene, benzo(b)fluoranthene, and chrysene were only detected in December 2015. No change in sampling frequency is recommended.
MW-18B	Upper Copper Falls	Quarterly	Quarterly	No compounds were detected above the Cleanup Standards established in the ROD or WI Public Heath standards after 8 rounds of sampling. No change in sampling frequency is recommended.
MW-21A	Upper Copper Falls	Quarterly	Quarterly	Twelve COCs (benzene, toluene, ethylbenzene, xylene, 1,2,4-trimethylbenzene, naphthalene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, iron, manganese, and styrene) were detected at concentrations above the Cleanup Standards established in the ROD after 6 rounds of sampling. One other compound (1,2-dicholoroethane) was detected at concentrations above the WI Public Health standard. Manganese concentrations are below the WI Public Health standard of 300 ug/L. None of the COC concentrations show a discernable trend. Benzo(a)pyrene, benzo(b)fluoranthene, and chrysene were only detected in October 2017 and April 2018. 1,2-dichloroethane was only detected in December 2015. No change in sampling frequency is recommended.
MW-21B	Upper Copper Falls	Quarterly	Quarterly	One COC (benzo(b)fluoranthene) was detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Benzo(b)fluoranthene was only detected in April 2018. No reduction in sample frequency is recommended.
MW-22A	Upper Copper Falls	Quarterly	Quarterly	Nine COCs (benzene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, manganese, lead, cadmium, vanadium) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. One other compound (bis(2-ethylhexyl)phthalate) was detected at concentrations above the WI Public Health standard. None of the COC concentrations show a discernable trend. Notable spikes in iron, cadmium, lead, and vanadium concentrations were observed in April 2016. No change in sampling frequency is recommended.
MW-22B	Upper Copper Falls	Quarterly	Quarterly	Four COCs (benzo(b)fluoranthene, chrysene, iron, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. None of the COC concentrations show a discernable trend and detections of SVOCs appear sporadic. No change in sampling frequency is recommended.
MW-28U	Upper Copper Falls	Quarterly	Quarterly	No compounds were detected above the Cleanup Standards established in the ROD or WI Public Heath standards after 8 rounds of sampling. No change in sampling frequency is recommended.

Table 1
Evaluation of Ashland/NSP Groundwater Monitoring Network

Well Name	Hydrostratigraphic Unit	Current Sampling Frequency	Monitoring Frequency Recommendation	Qualatative Analysis
MW-30U	Upper Copper Falls	Quarterly	Quarterly	No compounds were detected above the Cleanup Standards established in the ROD or WI Public Heath standards after 8 rounds of sampling. No change in sampling frequency is recommended.
MW-32U	Upper Copper Falls	Quarterly	Quarterly	One COC (manganese) was detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese concentrations are below the WI Public Health standard of 300 ug/L. No reduction in sample frequency is recommended.
MW-33U	Upper Copper Falls	Quarterly	Quarterly	One COC (methylene chloride) was detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Methylene chloride was only detected in December 2015. No reduction in sample frequency is recommended.
MW-34U	Upper Copper Falls	Quarterly	Quarterly	One COC (manganese) was detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese levels are below the WI Public Health standard of 300 ug/L. No reduction in sample frequency is recommended.
MW-35U	Upper Copper Falls	Quarterly	Quarterly	One COC (methylene chloride) was detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Methylene chloride was only detected in December 2015. No reduction in sample frequency is recommended.
MW-36U	Upper Copper Falls	Quarterly	Quarterly	No compounds were detected above the Cleanup Standards established in the ROD or WI Public Heath standards after 8 rounds of sampling. No change in sampling frequency is recommended.
MW-38U	Upper Copper Falls	Quarterly	Quarterly	Two COCs (benzene and naphthalene) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Benzene concentrations show an increasing trend. Naphthalene concentrations have no discernible trend. No change in sampling frequency is recommended.
MW-40U	Upper Copper Falls	Quarterly	Quarterly	Samples from MW-40U have yet to be collected due to the presence of NAPL in the well during all 8 sampling event.
MW-42U	Upper Copper Falls	Quarterly	Quarterly	Eight COCs (benzene, toluene, xylene, 1,2,4-trimethylbenzene, naphthalene, chrysene, manganese, and styrene) were detected at concentrations above the Cleanup Standards established in the ROD after 5 rounds of sampling. Two other compounds (2,4-dinitrotoluene, and 2,6,-dinitrotoluene) were detected at concentrations above the WI Public Health standard. Manganese concentrations are below the WI Public Health standard of 300 ug/L. Chrysene was only detected in April 2016. 1,2,4-trimethylbenzene concentrations show no discernible trend. The remaining COCs all show a decreasing trend. Non-COC compounds, 2,4-dinitrotoluene and 2,6-dinitrotoluene were only detected in July 2016. NAPL has been observed in MW-42U. No change in sampling frequency is recommended.
MW-43U	Upper Copper Falls	Quarterly	Quarterly	Seven COCs (benzene, toluene, ethylbenzene, xylene, naphthalene, manganese, and styrene) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese concentrations are below the WI Public Health standard of 300 ug/L. Naphthalene concentrations show no discernible trend. All other VOC COCs show an increasing trend. No change in sampling frequency is recommended.
MW-44U	Upper Copper Falls	Quarterly	Quarterly	Eleven COCs (benzene, toluene, ethylbenzene, xylene, 1,2,4-trimethylbenzene, naphthalene, iron, manganese, styrene, phenol, and pyridine) were detected at concentrations above the Cleanup Standards established in the ROD after 7 rounds of sampling. Iron is not considered hazardous to health.* Styrene concentrations show a decreasing trend. All other COC concentrations show no discernible trend. No change in sampling frequency is recommended.
MW-45U	Upper Copper Falls	Quarterly	Quarterly	Fourteen COCs (benzene, toluene, ethylbenzene, xylene, 1,2,4-trimethylbenzene, naphthalene, iron, manganese, cobalt, nickel, cyanide, styrene, phenol, and pyridine) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health.* Cyanide concentrations show a decreasing trend. All other COC concentrations show no discernible trend. No change in sampling frequency is recommended.
MW-46U	Upper Copper Falls	Quarterly	Quarterly	Three COCs (benzene, iron, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health.* Benzene concentrations show an increasing trend. Manganese concentrations show no discernible trend. No change in sampling frequency is recommended.
MW-47U	Upper Copper Falls	Quarterly	Quarterly	Nine COCs (benzene, toluene, ethylbenzene, xylene, 1,2,4-trimethylbenzene, naphthalene, iron, manganese, and styrene) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health.* Manganese levels are below the WI Public Health standard of 300 ug/L. All other COC concentrations show no discernible trend. No change in sampling frequency is recommended.
MW-48U	Upper Copper Falls	Quarterly	Quarterly	Samples from MW-48U have yet to be collected due to the presence of NAPL in the well during all 8 sampling event.
MW-49U	Upper Copper Falls	Quarterly	Quarterly	One COC (manganese) was detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese concentrations are below the WI Public Health standard of 300 ug/L. No reduction in sample frequency is recommended.

Table 1
Evaluation of Ashland/NSP Groundwater Monitoring Network

Well Name	Hydrostratigraphic Unit	Current Sampling Frequency	Monitoring Frequency Recommendation	Qualatative Analysis
MW-6	Water Table	Quarterly	Quarterly	One COC (manganese) was detected at concentrations above the Cleanup Standards established in the ROD after 5 rounds of sampling. Manganese concentrations are below the WI Public Health standard of 300 ug/L. MW-6 has, at times, lacked sufficient water volume to sample. No reduction in sample frequency is recommended.
MW-8	Water Table	Quarterly	Quarterly	Five COCs (benzo(a)pyrene, benzo(b)fluoranthene, chrysene, iron, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health.* Manganese concentrations show no discernible trend. SVOC COC concentrations show an increasing trend. No change in sampling frequency is recommended.
MW-10	Water Table	Quarterly	Quarterly	Four COCs (benzo(a)pyrene, benzo(b)fluoranthene, chrysene, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. One other compounds (bis(2-ethylhexyl)phthalate) was detected at concentrations above the WI Public Health standard. Manganese levels are below the WI Public Health standard of 300 ug/L. None of the COC concentrations show a discernable trend. No change in sampling frequency is recommended.
MW-11	Water Table	Quarterly	Quarterly	No compounds were detected above the Cleanup Standards established in the ROD or WI Public Heath standards after 8 rounds of sampling. No change in sampling frequency is recommended.
MW-17	Water Table	Quarterly	Quarterly	No compounds were detected above the Cleanup Standards established in the ROD or WI Public Heath standards after 8 rounds of sampling. No change in sampling frequency is recommended.
MW-22T	Water Table	Quarterly	Quarterly	Two COCs (manganese and vanadium) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Neither COC shows a discernable trend. No change in sampling frequency is recommended.
MW-27T	Water Table	Quarterly	Quarterly	Two COCs (benzene and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Neither COC shows a discernable trend. No change in sampling frequency is recommended.
MW-28T	Water Table	Quarterly	Quarterly	Seven COCs (benzene, naphthalene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, iron, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health.* Manganese concentrations are below the WI Public Health standard of 300 ug/L. None of the VOC and SVOC COC concentrations show a discernible trend. No change in sampling frequency is recommended.
MW-29T	Water Table	Quarterly	Quarterly	Two COCs (iron and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health.* Manganese concentrations show no discernable trend. No change in sampling frequency is recommended.
MW-30T	Water Table	Quarterly	Quarterly	Two COCs (iron and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health.* Manganese concentrations show a decreasing trend. No change in sampling frequency is recommended.
MW-31TR	Water Table	Quarterly	Quarterly	Seven COCs (benzene, naphthalene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, iron, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 5 rounds of sampling. Iron is not considered hazardous to health.* More sampling events are required to discern trends of COCs. No change in sampling frequency is recommended.
MW-32T	Water Table	Quarterly	Quarterly	Nine COCs (benzene, ethylbenzene, naphthalene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, iron, manganese and chloroform) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. One other compounds (carbon tetrachloride) was detected at concentrations about the WI Public Health standard. Iron is not considered hazardous to health.* Chloroform and carbon tetrachloride were only detected in April 2016. Manganese and naphthalene concentrations show decreasing trends. All other COC concentrations show no discernable trend. A noticable spike in benzo(a)pyrene, benzo(b)fluoranthene, and chrysene was observed in July 2017. No change in sampling frequency is recommended.
MW-33T	Water Table	Quarterly	Quarterly	Samples from MW-33T have yet to be collected due to the presence of NAPL in the well during all 8 sampling event.
MW-34T	Water Table	Quarterly	Quarterly	Eight COCs (benzene, naphthalene, benzo(a)pyrene, chrysene, iron, manganese, zinc, and methylene chloride) were detected at concentrations above the Cleanup Standards established in the ROD after 3 rounds of sampling. One other compounds (bis(2-ethylhexyl)phthalate) was detected above the WI Public Health standard. NAPL is commonly been in MW-34T. More sampling events are required to discern trends of COCs. No change in sampling frequency is recommended.

Table 1
Evaluation of Ashland/NSP Groundwater Monitoring Network

Well Name	Hydrostratigraphic Unit	Current Sampling Frequency	Monitoring Frequency Recommendation	Qualatative Analysis
MW-35T	Water Table	Quarterly	Quarterly	Seven COCs (benzene, naphthalene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, iron, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 3 rounds of sampling. One other compounds (trichloroethene) was detected at concentrations above the WI Public Health standard. Iron is not considered hazardous to health. NAPL has been commonly observed in MW-35T. More sampling events are required to discern trends of COCs. No change in sampling frequency is recommended.
MW-36T	Water Table	Quarterly	Quarterly	Six COCs (benzene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, iron, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. One other compounds (pentachlorophenol) was detected at concentrations above the WI Public Health standard. Iron is not considered hazardous to health. Manganese concentrations show a decreasing trend. Benzene has not been detected in MW-36T since July 2016. SVOCs COCs were only detected in July 2017. Pentachlorophenol was only detected in April 2016. No change in sampling frequency is recommended.
MW-37T	Water Table	Quarterly	Quarterly	Three COCs (benzene, iron, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health.* None of the COC concentrations show a discernable trend. No change in sampling frequency is recommended.
MW-38T	Water Table	Quarterly	Quarterly	Eight COCs (benzene, naphthalene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, iron, manganese and arsenic) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health.* Benzene concentrations show an increasing trend. All other COC concentrations show no discernable trend. No change in sampling frequency is recommended.
MW-39T	Water Table	Quarterly	Quarterly	Two COCs (antimony and vanadium) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Neither anitmony or vanadium show a discernable trend and were not detected in October 2017. No change in sampling frequency is recommended.
MW-40T	Water Table	Quarterly	Quarterly	Samples from MW-40T have yet to be collected due to the presence of NAPL in the well during all 8 sampling event.
MW-41T	Water Table	Quarterly	Quarterly	Three COCs (benzene, iron, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health.* Benzene concentrations show no discernible trend. Manganese concentrations show a decreasing trend. No change in sampling frequency is recommended.
MW-42T	Water Table	Quarterly	Quarterly	Eleven COCs (benzene, toluene, ethylbenzene, naphthalene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, iron, manganese, choloform, and styrene) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. One other compound (carbon tetrachloride) was detected at concentrations about the WI Public Health standard. Iron is not considered hazardous to health.* Benzene and ethylbenzene concentrations show an increasing trend. All other COC concentrations show no discernible trend. No change in sampling frequency is recommended.
MW-43T	Water Table	Quarterly	Quarterly	Three COCs (benzene, iron, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health.* Benzene concentrations show no discernible trend. Manganese concentrations show a decreasing trend. No change in sampling frequency is recommended.
MW-44T	Water Table	Quarterly	Quarterly	One COC (vanadium) was detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Vanadium concentrations show no discernable trend. No change in sampling frequency is recommended.
MW-45T	Water Table	Quarterly	Quarterly	Four COCs (benzene, manganese, nickel, and vanadium) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Benzene concentrations and detections are sporadic and show no discernible trend. Manganese concentrations show a decreasing trend. Nickel concentrations show no discernible trend. Vanadium concentrations show an increasing trend. No change in sampling frequency is recommended.
MW-46T	Water Table	Quarterly	Quarterly	Three COCs (benzene, iron, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health. Benzene concentrations show a decreasing trend. Manganese concentrations show no discernible trend. No change in sampling frequency is recommended.
MW-47T	Water Table	Quarterly	Quarterly	Four COCs (benzene, iron, manganese, and vanadium) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health.* MW-47T commonly lacks sufficient water volume to sample. No change in sample frequency is recommended.

Table 1
Evaluation of Ashland/NSP Groundwater Monitoring Network

Well Name	Hydrostratigraphic Unit	Current Sampling Frequency	Monitoring Frequency Recommendation	Qualatative Analysis
MW-48T	Water Table	Quarterly	Quarterly	Three COCs (iron, manganese, and vinyl chloride) were detected at concentrations above the Cleanup Standards established in the ROD after 6 rounds of sampling. Iron is not considered hazardous to health.* Manganese levels are below the WI Public Health standard of 300 ug/L. Vinyl Chloride was only detected in October 2016. No change in sample frequency is recommended.
MW-49T	Water Table	Quarterly	Quarterly	Three COCs (iron, manganese, and vinyl chloride) were detected at concentrations above the Cleanup Standards established in the ROD after 6 rounds of sampling. Iron is not considered hazardous to health. Manganese levels are below the WI Public Health standard of 300 ug/L. Vinyl Chloride was only detected in October 2016. No change in sample frequency is recommended.
MW-50T	Water Table	Quarterly	Quarterly	Six COCs (benzene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, iron, and manganese) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Iron is not considered hazardous to health. Benzene and manganese concentrations show no discernible trend. Benzo(a)pyrene, benzo(b)fluoranthene, and chrysene were only detected in April 2018. No change in sample frequency is recommended.
PEZ-10	Water Table	Quarterly	Quarterly	Seven COCs (benzene, naphthalene, manganese, selenium, arsenic, antimony, and vanadium) were detected at concentrations above the Cleanup Standards established in the ROD after 8 rounds of sampling. Manganese levels are below the WI Public Health standard of 300 ug/L. Antimony concentrations show an increasing trend. Selenium concentrations show a decreasing trend. Benzene, naphthalene, and vanadium concentrations show no discernible trend. Aresenic was only detected above Cleanup Standards in April 2018. No change in sample frequency is recommended.

* Based on information available in the WDNR's Iron In Drinking Water Brochure (PUB-DG-035 2017).

ATTACHMENT 7

		WPDES			6/5/2019		6/12/2019			
Chemical / Parameter	Units	Daily Max.	Weekly Average	Monthly Average	WW_Effluent		WW_Effluent			
VOLATILE ORGANICS										
Total BTEX	ug/L			750	0.00		0.00			
Benzene	ug/L			55	< 0.15	U	< 0.15	U		
Ethylbenzene	ug/L				< 0.050	U	< 0.050	U		
Toluene	ug/L				< 0.070	U	< 0.070	U		
Xylenes, Total	ug/L				< 0.060	U	< 0.060	U		
1,2,4-Trimethylbenzene	ug/L				< 0.28	U	< 0.28	U		
1,3,5-Trimethylbenzene	ug/L				< 0.22	U	< 0.22	U		
Methyl-tert-butyl-ether	ug/L				< 0.070	U	< 0.070	U		
SEMI-VOLATILE ORGANICS										
PAHs	ug/L				0.18		0.159			
PAH, Total of Subset 1	ug/L			0.1	0.00		0.00			
Benzo(a)anthracene	ug/L				< 0.019	UJ	< 0.019	UJ		
Benzo(b)fluoranthene	ug/L				< 0.019	UJ	< 0.019	UJ		
Benzo(ghi)perylene	ug/L				< 0.019	UJ	< 0.019	UJ		
Benzo(k)fluoranthene	ug/L				< 0.019	UJ	< 0.019	UJ		
Chrysene	ug/L				< 0.019	UJ	< 0.019	UJ		
Dibenzo(a,h)anthracene	ug/L				< 0.019	UJ	< 0.019	UJ		
Fluoranthene	ug/L				< 0.028	UJ	< 0.028	UJ		
Indeno(1,2,3-cd)pyrene	ug/L				< 0.019	UJ	< 0.019	UJ		
Phenanthrene	ug/L				< 0.028	UJ	< 0.028	UJ		
Pyrene	ug/L				< 0.019	UJ	< 0.019	UJ		
PAH, Total of Subset 2					0.18		0.159			
1-Methylnaphthalene	ug/L				0.035	J	0.036	J		
2-Methylnaphthalene	ug/L				0.038	J	0.032	J		
Acenaphthene	ug/L			220	<0.019	UJ	< 0.019	UJ		
Acenaphthylene	ug/L				<0.028	UJ	<0.028	UJ		
Anthracene	ug/L	0.71	0.21		<0.028	UJ	< 0.028	UJ		
Benzo(a)pyrene	ug/L		0.24	0.054	<0.019	UJ	< 0.019	UJ		
Fluorene	ug/L		36		<0.019	UJ	<0.019	UJ		

		WPDES			6/5/2019	6/12/2019		
Chemical / Parameter	Units	Daily Max.	Weekly Average	Monthly Average	WW_Effluent	WW_Effluent		
Naphthalene	ug/L			70	0.11	0.091 J		
TOTAL PETROLEUM HYDROCARBONS								
Total BTEX + PAH	ug/L				0.18	0.159		

		WPDES			6/5/2019		6/12/2019			
Chemical / Parameter	Units	Daily Max.	Weekly Average	Monthly Average	WW_Effluent		WW_Effluent			
METALS										
Arsenic	ug/L				0.43	J	0.45	J		
Cyanide	ug/L	45			<7.0	UJ	<7.0	UJ		
GENERAL CHEMISTRY										
Total Suspended Solids	mg/L	40.00			<0.7	UJ	< 0.93	UJ		
COD	mg/L				4.2	J	<4.0	UJ		