REMEDIAL INVESTIGATION/ FEASIBILITY STUDY

PROJECT MANAGEMENT PLAN REVISION: 01

ASHLAND/NSP LAKEFRONT SUPERFUND SITE

ASHLAND, WISCONSIN

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Ashland/NSP Lakefront Site – BRRTS# 02-02-000013

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1.0 INTRODUCTION

This *Project Management Plan* (PMP) describes the overall management structure for the conduct of the Remedial Investigation/Feasibility Study (RI/FS) at the Ashland/NSP Lakefront Superfund site located in Ashland, Wisconsin (the "Site"). The plan is organized into the following sections:

- Introduction
- Site Description and History
- Overview of the Administrative Order on Consent (AOC) and Statement Of Work (SOW)
- Technical Approach
- Personnel
- Schedule

The general purpose of the RI/FS is to complete the site characterization sufficient to evaluate and select appropriate remedies for the site. The purpose of this PMP is to describe the mechanisms which will be used to manage the project, establish the schedule, and define the roles and responsibilities of key project personnel.

2.0 SITE DESCRIPTION

The Ashland/NSP Lakefront Superfund Site (the "Site") consists of property owned by Northern States Power Company, a Wisconsin corporation (d.b.a. NSPW, a subsidiary of Xcel Energy, Inc. ("NSPW")) a portion of Kreher Park, and sediments in an offshore area adjacent to Kreher Park. The Site is located within the City Limits of Ashland, and is bounded by Lake Shore Drive (also U.S. Highway 2) to the south, Prentice Avenue to the east, Ellis Avenue to the west and Chequamegon Bay to the north. The Site is located in Section 33, Township 48 north, Range 4 west in Ashland County, Wisconsin, shown on Figure 1 of the Work Plan.

The NSPW facility is located at 301 Lake Shore Drive East in Ashland, Wisconsin. The facility lies approximately 600 feet southeast of the shore of Chequamegon Bay of Lake Superior. The surface elevation at this location is approximately 640 feel MSL. The NSPW property is occupied by a small office building and parking lot fronting on Lakeshore 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 is also a gravel covered parking and storage yard area north of St. Claire Street between 3rd Avenue East and Prentice Avenue, and a second gravel covered storage yard at the northeast corner of St. Claire Street and Prentice Avenue. Residences bound the property east of the office building and the gravel parking area. Our Lady of the Lake Church and School is located immediately west of the NSPW property. Further west are private residences, beyond which is Ellis Avenue. Private homes are located immediately east of Prentice Avenue, along the eastern boundary of the NSPW property. To the northwest, the Site slopes abruptly to the Canadian National Railroad property at a bluff that marks the former Lake Superior shoreline, and then to the City of Ashland's Kreher Park, beyond which is Chequamegon Bay. This portion of the Site is described as the Upper Bluff/Filled Ravine area. The Upper Bluff Area is shown on Figure 2 of the Work Plan.

The Kreher Park area consists of a flat terrace adjacent to the Chequamegon Bay shoreline. The surface elevation of the park varies approximately 10 feet, from 601 feet MSL, to about 610 MSL at the base of the bluff overlooking the park. The bluff rises to an elevation of about 640 feet MSL, which corresponds to the approximate elevation of the NSPW property. The lake elevation fluctuates about two feet, from 601 to 603 feet MSL. At the present time, the park area is predominantly grass covered. A graveled overflow parking area for the marina occupies the

west end of the property, while a miniature golf facility formerly occupied the east end of the property. The former City of Ashland wastewater treatment plant (WWTP) and associated structures fronts the bay inlet on the north side of the property. The impacted area of Kreher Park is bounded by Prentice Avenue and a jetty extension of Prentice Avenue to the east, the Canadian National Railroad to the south, the Ellis Avenue and the marina extension of Ellis Avenue to the west, and Chequamegon Bay to the north.

The offshore area with impacted sediments occupies approximately ten acres and is located in an inlet created by the Prentice Avenue jetty and marina extensions previously described. For the most part, contaminated sediments are confined in the inlet bounded by the northern edge of the line between the Prentice Avenue jetty and the marina extension. Contaminated sediment levels fall off beyond this boundary. The affected sediments consist of lake bottom sand and silts and are overlain by a layer of wood chips, likely originating from former lumbering operations. The chips layer varies in thickness from 0 to seven feet, with an average thickness of 0.75 feet.

2.1 SITE HISTORY AND BACKGROUND

Between 1885 and 1947, gas was generated for heating and lighting at a former manufactured gas plant (MGP) located at the NSPW property. Manufactured gas plant wastes containing hazardous substances were released during the gas manufacturing process at the former MGP. The former MGP property was transected on the north by a ravine that deepened and opened to the historic shoreline of Chequamegon Bay along the bluff face that overlooks the Bay. Historical maps show that the ravine was open at the startup of gas production at the former MGP in the late 1880s and was filled by the early 1900s.

The lakefront portion of the Site has been the location of historic industrial activities, and currently consists of an area owned by the City of Ashland known as Kreher Park. Kreher Park was created in the late 1800s and early 1900s by the placement of various fill materials in Chequamegon Bay adjacent to the bluff. The fill material consists mainly of sawdust and wood wastes from a series of sawmills that operated at the Lakefront from the early 1880s until approximately 1939, most recently by the John Schroeder Lumber Company (“Schroeder Lumber”). Schroeder Lumber occupied the site from 1901 until 1939, when Ashland County took title to the site. Following Schroeder Lumber’s tenure, Ashland County transferred title to

the City of Ashland in 1942, which has owned the site since. During the 1940's and 50's, the City operated a waste disposal facility (landfill) in the present northwest portion of the Park area. Beginning in 1951, a WWTP was constructed, and operated as the City's sewage treatment facility until 1989. During the mid-1980's, the marina extension of Ellis Avenue was completed, which created more usable land to permit establishment of a marina with full service boat slips, fuel and dock facilities. In 1989 during exploratory work to expand the WWTP into the Kreher Park area, soil and groundwater contaminated with creosote/coal tar[1] compounds were encountered. The City notified the Wisconsin Department of Natural Resources (WDNR), and subsequently closed the WWTP, relocating the current facility a few miles away to the northeast.

In 1994, the WDNR authorized Short Elliot Hendrickson (SEH) to initiate an investigation and evaluation of the area to characterize the extent of contamination at Kreher Park and offshore sediments adjacent to the Park. The affected sediments consist of lake bottom sand and silts, and are overlain by a layer of wood chips, likely originating from former lumbering operations. The chips layer varies in thickness from 0 to seven feet, with an average thickness of nine inches. The entire area of impacted sediments encompasses approximately ten acres.

Since 1995, NSPW performed several investigations to characterize the extent of contamination in the buried ravine and Copper Falls Aquifer in the Upper Bluff Area. These investigations confirm that the ravine fill is a low permeability, mixed fill consisting of clays, cinders and rubble, with saturated conditions at depths varying from five feet below the NSPW service building, to about 20 feet at the north end of the gravel covered storage area. These investigations have also identified subsurface contamination resulting from historic MGP operations. Contamination exists as dissolved phase coal tar constituents in groundwater and as "pools" of non-aqueous phase liquid (NAPL) of coal tar by-product. Coal tar has been encountered at the base of the ravine and in the underlying Copper Falls Aquifer. In the ravine, coal tar varying from one to two feet in thickness is present at the base of the ravine from south of the service facility north to the area of St. Claire Street. In the upper Copper Falls Aquifer, coal tar has been encountered from south of the service facility north to the gravel parking and storage yard area north of St. Claire Street. It has also been measured in a piezometer installed

[1] The term "coal tar" is used generically herin to refer to a suite of VOC and PAH compounds the source of which was the former MGP and other lakefront industrial activities.

on the Our Lady of the Lake church property west of Third Avenue East. It has not been measured in wells screened in the Copper Falls aquifer north of the bluff face at Kreher Park.

NSPW installed an interim action coal tar recovery system on its property to remove coal tar from the Copper Falls Aquifer during the summer/fall of 2000; the system became fully operational in January 2001. The coal tar recovery system consists of three extraction wells, an oil/water separator, and an on-site groundwater treatment system. Groundwater samples have been collected quarterly since the coal tar recovery system began operating, and results have been presented in progress reports. Nearly 7,000 gallons of coal tar have been removed, and more than 1,100,000 gallons of contaminated groundwater have been treated between January 2001 and January 2005.

A distinct DNAPL pool varying in thickness up to five feet was present in the area around the former seep located in Kreher Park just north of the mouth of the former ravine. A clay tile that discharged to the "seep" area (located north of the mouth of the buried ravine at the railroad)[2] was encountered at the base of the backfilled ravine during investigations completed between September and November 2001. Coal tar encountered in the shallow southern portion of the ravine near the former MGP building provides a source for contaminated groundwater flow, north through the former ravine into Kreher Park. However, the contaminant levels measured in wells screened in the ravine north of St. Claire Street are significantly lower than wells screened in the ravine south of St. Claire Street (where free-product coal tar is present), or at the former seep. The buried clay tile likely behaved as a conduit for the migration of coal tar as well as contaminated groundwater. However, a significant portion of the clay tile was destroyed during the 2001 investigation activities. NSPW performed a second interim removal response during May 2002 to eliminate the seep area. Activities completed included the excavation 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 installed at the base of the buried ravine. Contaminated groundwater collected near the mouth of the ravine via this extraction well is conveyed to the on-site treatment system described above. (Figure 2 of the Work Plan shows the location of the extraction wells, EW-1 through EW-4, and the treatment building located on the NSPW property.)

[2] The seep area had been the location of intermittent groundwater discharge containing a sheen and occasional odor of coal tar, until NSPW performed the seep removal interim action in 2002.

2.2 NATURE AND EXTENT OF CONTAMINATION

Previous investigations have identified the general nature and extent of the contamination at the Site. The purpose of the RI at the Site is to expand the scope of the previous investigations sufficiently to determine the nature and extent of contamination in each of the affected areas and to gather sufficient additional data necessary to select a remedy or remedies for the site. The results of the previous investigations are summarized below.

2.2.1 Upper Bluff/Filled Ravine

The Upper Bluff/Filled Ravine has been the subject of several investigations to identify the extent of contamination in the area of the MGP. While the contamination in the former ravine is well characterized, there are still issues with respect to the extent of contamination at the MGP site now occupied by the NSPW offices and maintenance facility. The investigation will also address potential soil vapor pathways into buildings from the material in the ravine. The lateral extent of soil and groundwater contamination in the backfilled ravine has been characterized from borings advanced during previous phases of investigation, aerial photographs, and other historical information. The ravine fill unit consists of silty clay fill material mixed with ash, cinders, slag, and fragments of bricks, concrete, glass, and wood. The volume of the fill in the former ravine is estimated at 29,400 cubic yards.

The highest levels of soil contamination were detected within several feet of the surface in the vicinity of the MGP located south of St. Claire Street. The fine grained low permeability Miller Creek formation restricts the vertical and lateral migration of contaminants. The concentrations of contaminants decline with depth at several sample locations. Low levels of soil contamination were detected in soil samples collected around the perimeter of the former ravine which indicates that the concentrations of contaminants also decline laterally with distance from the MGP. Regardless, residual contaminant levels (RCLs) listed in ch. NR 720, WAC, for arsenic and coal tar constituents (benzene, toluene, xylene, acenaphthene, acenaphthylene, benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, and phenanthrene) have been exceeded in soil samples collected from the NSPW property.

Groundwater samples collected from shallow wells screened in the shallow aquifer on the NSPW property detected coal tar constituents (benzene, toluene, naphthalene, trimethylbenzene (total), and xylene (total), anthracene, benzo(a)pyrene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, naphthalene, and pyrene) above groundwater quality standards. Groundwater monitoring results from samples collected from wells screened in and around the backfilled ravine indicate that groundwater contamination in the shallow aquifer is limited to the former ravine.

Dense Non-Aqueous Phase Liquid (DNAPL) has historically been encountered in wells MW-9, TW-13, and MW-15 screened in the backfilled ravine located in the vicinity of the MGP. Several feet of DNAPL were measured in these wells after they had been installed. However, the thickness of DNAPL in these wells has declined since the interim response coal tar recovery system became operational. (Since the coal tar recovery system began operating, DNAPL thickness has been measured in site monitoring wells quarterly concurrent with the collection of groundwater samples; DNAPL is then bailed from each well if encountered, and discharged to the on-site remediation system.)

In the ravine, the estimated volume of fill material on the NSPW property is approximately 30,000 cubic yards. The maximum estimated volume of DNAPL within the ravine, based on an assumed thickness of DNAPL of 1.5 feet, an area of 4,000 ft^2 and a porosity of 25 percent, is 11,220 gallons.

The purpose of the remaining investigations in the ravine and upper bluff areas are to better define the extent of soil contamination on the NSPW property constructed above the backfilled ravine and to determine the lateral extent of the contamination at the MGP site. Soil vapor sampling will also be performed in the areas immediately above the ravine to determine whether or not a soil vapor plume exists which may create an additional exposure pathway which will need to be addressed. Details of the investigation are contained in the RI/FS Work Plan.

2.2.2 Copper Falls Formation

From north to south, the Miller Creek grades from a silty clay into a silt and silty sand unit at the base of the former ravine between wells MW-4 and MW-9. The lithologic change in the Miller

Creek south of St. Claire St. likely allowed the vertical (downward) migration of coal tars into the underlying Copper Falls aquifer. Elsewhere, the fine grained low permeability Miller Creek restricts the vertical migration of contamination, especially toward the bay where the Miller Creek thickens. Groundwater monitoring results detected elevated concentrations of coal tar constituents in samples collected from wells screened within the Copper Falls aquifer, as well as confirmed the presence of DNAPLs.

The highest concentrations of coal tar constituents were detected in samples collected from wells MW-2AR, MW-2B(NET), MW-4A, MW-5B, MW-7A, MW-13A, and MW-13B. The strong upward gradients observed in the confined Copper Falls aquifer has resulted in a plume in the Copper Falls that is deep near the source area, and laterally extensive down gradient from the source area. The upward gradients in the Copper Falls have "forced" these contaminants upward with the general northward flow of groundwater in this aquifer. Consequently, a mushroom shaped plume is present in the Copper Falls below the NSPW site. Although contaminants have also migrated laterally in the down gradient direction of groundwater flow, samples collected from wells screened in the lower Copper Falls aquifer indicate that contaminant concentrations decline with distance from the source area. Contaminant levels appear to decline laterally away from the site. Elevated levels have been measured in deep wells at Kreher Park; however, no DNAPL has been measured beyond the NSPW site in this aquifer. Additionally, two artesian wells east and northwest of Kreher Park have yielded no contaminants.

The estimated volume of contaminated groundwater in the Copper Falls Aquifer, based on an average thickness of 40 feet, and an area of 480,000 ft^2 and 25 percent porosity, is 40 million gallons. (This measurement does not include areas north of the Kreher Park shoreline which cannot be confirmed.) The maximum estimated volume of DNAPL, based on an assumed thickness of DNAPL of 13 feet, an area encompassing approximately 8,600 ft^2, and a porosity of 25 percent, is 204,000 gallons.

The purpose of the additional investigations into the Copper Falls groundwater are to determine the nature and extent of contamination laterally and vertically and to establish whether or not contamination has migrated vertically into the bedrock below the ravine.

2.2.3 Kreher Park

Kreher Park is characterized by varying levels of contamination in soils and groundwater. This contamination consists primarily of VOC and PAH compounds. Metals were also detected in soil and groundwater samples, likely resulting from characteristics of the fill material. Results of investigations completed at Kreher Park indicate that the park area was covered by a 1 to 2 foot layer of clean surficial soil overlying the contaminated fill which is comprised of soil mixed with slab wood and sawdust. VOC and PAH impacted soils at Kreher Park approximates the area of shallow groundwater contamination. PAH soil contamination generally begins near the shallow groundwater surface, and extends to the top of the Miller Creek Formation. Emulsified NAPLs as well as an area of DNAPLs near the seep and recently in one well north of the Waste Water Treatment Plant (TW-11) were also identified in Kreher Park fill soils. Potential source areas that have been identified at Kreher Park include: A former municipal solid waste disposal area in the western portion of the Park area; releases from the former WWTP; releases from the off-loading of petroleum-based materials at various railroad sidings; a former "coal tar dump"/wood treatment area identified on historic drawings south of the former WWTP, and the seep area at the mouth of the filled ravine. In addition there are several underground utility lines which may pose potential migration routes for contaminated groundwater.

The SEH March 1999 Remedial Action Options Report (RAOR) states that the depth of contamination at the Park ranges from 1 to 15 feet. The impacted fill is estimated at 150,000 cubic yards, and the volume of clean fill overlying the contaminated soils is estimated at 45,000 cubic yards. A free-product plume was historically measured at the seep, at the location of monitoring well MW-7. This plume was a separate, distinct source, which likely originated from a combination of coal tar migration along the former clay tile identified at the base of the ravine, as well as rail offloading of fuel materials known to have occurred at this location.

The purpose of the soil investigations will be to better characterize source areas, and evaluate pathways for migration of groundwater contamination. Additional shallow monitoring wells will be placed along the bay to evaluate groundwater/surface water/sediment interaction.

2.2.4 Chequamegon Bay Inlet

The lateral and vertical extent of contamination in the Chequamegon Bay inlet adjacent to Kreher Park has been identified during previous investigations. Contaminated near-shore sediments are located within the inlets created by the jetty extension of Prentice Avenue to the east, and the marina extension of Ellis Avenue to the west. Constituents of concern identified from previous investigations include VOCs and SVOCs characteristic of a coal tar/creosote origin. A layer of wood chips overlies native sediment throughout the study area. The wood chip layer varies in thickness from 0 to 6-feet, averaging about nine inches. Native sediment underlying the wood chip layer consists of interbedded layers of sand, silty sand, silt, and silty clay. The highest concentrations of VOCs and SVOCs were detected in soil samples collected west of the former WWTP at depths between 0 and 6 feet below the sediment surface. Contaminants are present at deeper intervals, but the lateral extent of contamination at these deeper intervals is limited to isolated hot spot areas.

During the winter of 2001, URS conducted a detailed study of the extent of sediment contamination to further refine work performed by SEH in 1996. The results of this study are included in URS June 2001 report. During the winter of 2003, SEH under contract to the WDNR and with the approval of USEPA, collected additional data for physical characterization of the bay sediments. This data included dredged samples of the shallow sediments (0 to six inches) as well as additional background samples beyond the affected area. The results of this testing generally confirmed the conclusions of the previous investigations.

Estimated volumes of contaminated sediment have been prepared by SEH and Dames & Moore/URS. Based upon the conclusions of the SEH 1998 Ecological Risk Assessment, an area of 410,000 square feet, or 9.4 acres, of sediments has been identified as requiring remediation. The SEH RAOR states that a wood waste layer of 9-inch average thickness is present over the contaminated sediments, and that the sediments vary from 0 to 7 feet of thickness over the site. The volume of contaminated sediments is estimated at 152,000 cubic yards, including approximately 4000 cubic yards of wood waste. In 2001, URS performed a sediment investigation that further characterized the vertical extent of contaminated sediments. The lateral extent of contamination identified within the first six feet of sediments was essentially similar to

that estimated by SEH. However, the presence of contaminants at greater depths was limited to a few hot-spots.

The additional investigations in the Chequamegon Bay Inlet will be in support of the ecological risk assessment and the remedy selection process. They will include sampling to determine representative background concentrations of contaminants of concern, sediment stability studies, ecological studies and evaluations of the impact of the wood waste on the ecology and on potential remedies.

2.3 POTENTIAL CONTAMINANT EXPOSURE PATHWAYS

The purpose of the Ecological and Human Health Risk Assessment process will be to recommend the appropriate clean up levels for the contamination at the Site, determine the areas which have sustained ecological impacts, and provide input into the remedy selection process.

2.3.1 Human Exposure Pathways

Potential contaminant exposure pathways to humans includes ingestion of contaminated soil or groundwater, inhalation of vapors from contaminated soil or groundwater, and physical contact with contaminated soil, groundwater, surface water, sediment, or coal tar. Minimal exposure can be expected from contaminated soil and groundwater via the ingestion and physical contact exposure routes because these exposure pathways are generally incomplete. Contaminated soil is located below relatively clean fill and/or pavements and structures, and groundwater is not a potable water source. Subsurface contamination on the NSPW property is located beneath buildings and asphalt pavement beneath and south of St. Claire Street. North of St. Claire Street in the buried ravine and at Kreher Park, relatively clean fill soil overlies the more contaminated soil and fill materials. Potential exposure scenarios for these pathways include construction workers encroaching contaminated materials in excavation trenches in the backfilled ravine on the NSPW property or at Kreher Park. Additionally, although groundwater in the vicinity of the site is not utilized as a primary source of drinking water by the City of Ashland (the City municipal water supply is obtained from Lake Superior from an intake over a mile away), two artesian wells screened in the Copper Falls Aquifer are located at Kreher Park. Samples routinely collected from these wells indicate the water is safe to drink.

Minimal exposure can also be expected from inhalation of vapors from soil or groundwater because migration pathways do not exist. As described above, clean fill, asphalt pavement and buildings overlie areas with contaminated soil. There are no buildings with basements currently occupied on either property overlying contaminated fill material and the shallow fill perched aquifers. (The former City of Ashland WWTP is built over contaminated fill material, but the building is currently vacant and not accessible.)

Because the underlying Copper Falls aquifer is confined, there is also no pathway for vapor migration from contamination in the aquifer; the low permeability Miller Creek formation behaves as a confining unit as well as a barrier to or migration.

The remediation of the seep area in 2002 has eliminated exposure to contaminated soil and groundwater previously discharged at the seep area. However, exposure to sediment and contaminated surface water in the Chequamegon Bay inlet adjacent to Kreher Park would occur if people were to swim or wade in this area. Currently, swimming, wading and fishing in the area are restricted, and the area is well marked with warning signs and buoys. Ecologic receptors including benthic organisms and fish are exposed to this contamination. Previous studies by SEH have shown some adverse exposure to benthic invertebrates, but further studies will be performed. Additionally, fish tissue analyses completed on specimens taken from Chequamegon Bay indicate that fish do not contain levels of site-related chemicals that are a health concern.

2.3.2 Ecological Exposure Pathways

Exposure pathways for ecological receptors include the following:

- Birds - ingestion of sediment, surface water, and food;
- Mammals- ingestion of sediment, surface water, and food;
- Fish - ingestion and direct contact with sediment and surface water;
- Reptiles and amphibians - ingestion and direct contact with sediment and surface water and ingestion of food;
- Aquatic invertebrates - ingestion and direct contact with sediment or surface water and ingestion of food;
- Aquatic plants - root uptake and direct contact with sediment and surface water; and,

- Phytoplankton and zooplankton – direct contact with surface water.

Aquatic invertebrates, including benthic, epibenthic, pelagic and planktonic invertebrates, may be exposed to chemicals in sediment and surface water through ingestion and direct contact or by absorption through their skin. They can also be exposed through their food. Aquatic plants potentially can absorb chemicals from sediment and surface water through their roots, leaves, or stems. Both aquatic invertebrates and aquatic plants can serve as a major exposure pathway to upper trophic levels since they are prey for fish, birds, and mammals; this is termed trophic (or food chain) transfer. Food chain transfer of chemicals is important only for those chemicals that are bioaccumulative.

Amphibians and reptiles may be exposed to chemicals in sediment and surface water along the shoreline through ingestion, dermal contact, and by feeding on contaminated aquatic invertebrates. Exposure may occur during feeding, early development of eggs and larvae, or burrowing. Amphibians and reptiles also may be an exposure pathway to birds and mammals through food chain transfer.

Fish may be exposed to chemicals in sediment and surface water through ingestion, dermal contact, uptake through gills, and by feeding on aquatic plants, invertebrates, or smaller fish. Exposure may occur during feeding, spawning, or burrowing. Aquatic vertebrates also may be an exposure pathway to birds and mammals through food chain transfer.

Birds and mammals may be exposed directly to chemicals in the sediment and surface water through incidental ingestion, dermal contact, and inhalation of particulates, although the latter exposure pathway will not be quantitatively evaluated. They may also be exposed indirectly through food chain transfer although as discussed previously, this exposure pathway is significant only for those chemicals that are bioaccumulative.

3.0 OVERVIEW OF THE SOW AND THE AOC PROBLEM DEFINITION

On November 14, 2003, the United States Environmental Protection Agency (USEPA), under the authority of CERCLA Section 104, 107, and 122, and NSPW signed an AOC for a RI and FS at the Site. The RI/FS consists of four major components: an RI, an Ecological Risk Assessment, a Human Health Risk Assessment, and an FS. The RI is intended to gather information regarding the nature and extent of contamination at the site and collect data to support the Ecological Risk Assessment, the Human Health Risk Assessment and the FS. The Ecological and Human Health risk Assessments are intended to provide an evaluation of the ecological and human health risks posed by the Site sufficient to identify contaminants of concern, and select appropriate clean up levels for the various contaminated media. The FS process will be used to evaluate remedies for the site based upon the nine criteria identified under the National Oil and Hazardous Pollution Contingency Plan and under CERCLA. The objectives as stated in the AOC are as follows:

a) To determine the nature and extent of contamination and any threat to the public health, welfare, or the environment caused by the release or threatened release of hazardous substances, pollutants or contaminants at or from the Site or facility, by conducting an RI as more specifically set forth in the SOW attached to the AOC;

b) To determine and evaluate alternatives for remedial action (if any) to prevent, mitigate or otherwise respond to or remedy any release or threatened release of hazardous substances, pollutants, or contaminants at or from the Site or facility, by conducting a FS as more specifically set forth in the SOW;

c) To collect sufficient data for developing and evaluating effective remedial alternatives; and

d) To recover oversight costs incurred by USEPA with respect to this AOC.

3.1 ACTIVITIES AND DELIVERABLES

Activities and deliverables are outlined in the AOC. All work is to be conducted in accordance with CERCLA, the NCP, and EPA guidance. The general activities that NSPW is required to perform are identified below, followed by a list of deliverables. The tasks that NSPW must perform are described more fully in the SOW and the Work Plan submitted in conjunction with the Project Management Plan. NSPW will submit in electronic form all portions of any report or other deliverable as stated in the AOC.

The AOC requires development of the following Plans:

- Remedial Investigation/Feasibility Study Work Plan;
- Field Sampling Plan;
- Quality Assurance Project Plan;
- Health and Safety Plan; and
- Project Management Plan/ Data Management Plan;

3.2 INVESTIGATION TASKS

The AOC requires the performance of the following Tasks:

Task 1: Prepare RI/FS Planning Documents –
RI/FS Work Plan, Field Sampling Plan (FSP), Quality Assurance Project Plan (QAPP), Health and Safety Plan (HASP) and Project Management Plan (PMP);
Task 2: Provide Community Relations Support to USEPA as requested;
Task 3: Perform Site Characterization;
Task 4: Prepare RI Report;
Task 5: Develop and Screen Alternatives (Prepare Technical Memoranda);
Task 6: Perform Treatability Studies (if needed);
Task 7: Develop a Detailed Analysis of Alternatives (FS Report), and
Task 8: Submit Monthly Progress Reports.

Details of the above tasks are provided in the RI/FS Work Plan submitted with this PMP.

4.0 MANAGEMENT AND TECHNICAL APPROACH

URS has elected to combine the discussion of the management approach and the technical approach in this section because the management philosophy for this project is intrinsically driven by the technical needs of the project and the schedule. The intent is to schedule the field work at each affected area in such a manner that the field resources can be efficiently utilized to gather the data needed for the critical tasks. A schedule for the field work has been developed and is attached to this plan (it is also included with the Work Plan) which identifies the work tasks that drive the decision making process, and ultimately the schedule.

4.1 OVERALL MANAGEMENT APPROACH

The purpose of the RI/FS is to determine the nature and extent of the contamination and to provide sufficient information to determine appropriate clean up requirements and evaluate the feasibility of various corrective actions. The RI/FS requires extensive coordination and management to avoid duplication of investigative efforts and to ensure that the information collected is complete and suitable for use in the remainder of the risk assessment and remedy selection process. The investigation of environmental media, characterization of contamination and sources, and identification of potential off-site receptors present a significant management challenge. The size, age, and complexity of the Site greatly increases the level of effort needed to effectively manage this project.

The AOC requires NSPW to satisfy the four objectives previously stated in Section 3. Because of the size and complexity of the site, the site is divided into affected areas for the purpose of the RI/FS. The prioritization of the affected areas investigations is the basis for the management of the RI/FS. Based on the evaluation of the data already gathered for the various affected areas, the primary focus of the RI/FS will be on the affected Bay sediments and the Ecological and Human Health Risk assessments that will be developed from the data generated. The investigations at Kreher Park, the Upper Bluff Area and the Copper Falls aquifer are no less important. Components of the Human Health Risk Assessment will address exposure from contaminants at these source areas. The investigations at these affected areas will focus on fully characterizing the lateral and vertical extent of contamination sufficient to select a final remedy which is protective of the human health and the environment. Regardless, the sediments

represent the greatest challenge that requires an environmentally and economically balanced solution.

The development of the affected areas concept for the RI/FS affects the conduct of the RI/FS. The affected areas concept will guide the investigative focus throughout the RI/FS process. Each affected area will be investigated separately. Once the data for an affected area is gathered, contaminants of potential concern (COPCs) will be identified, pathways defined and subsequently input and evaluated in the appropriate risk assessment. The exposure pathways will also be evaluated how they affect other affected areas (i.e., the exposure pathways from the Upper Bluff area and the ravine will be evaluated to determine if the COPCs affect the remedy selection process for the Copper Falls Aquifer; similarly, the exposure pathways from Kreher Park will be evaluated to determine if the COPCs affect the remedy selection process for the sediments). Thus the interrelationships between the various affected areas can be identified and considered in the remedy selection process.

The consideration of exposure pathways, risk assessment needs and ultimate remedy selection data needs will be considered throughout the investigation process. These factors will be considered throughout the RI to ensure that data gathering and evaluation is performed in a manner consistent with the overall Risk evaluation and remedy selection process and objectives.

The critical success factors are as follows:

- Critical Path driven RI implementation;
- Prioritized decision-making using risk evaluation;
- Use of site-specific, risk-based protection standards;
- Coordinated regulatory agencies interaction;
- Effective public communication;
- Focused investigation on the end-use of results, not the process;
- Reasonably streamlined processes;
- Maintenance of affected area focus; and,
- Emphasis on inclusion of stakeholder input.

The detailed schedule for implementation of the RI/FS is attached as Appendix C. This same schedule is included in the Work Plan. The program organization structure developed to provide the flexibility and depth of resources necessary to conduct the RI/FS is presented in Section 5.

4.2 TECHNICAL APPROACH

Soil, groundwater, sediment, and surface water at the Ashland Lakefront site are contaminated with PAHs, VOCs, and to a lesser degree, inorganic compounds (metals and cyanide). This contamination is the result of former activities completed on the NSPW property, and activities completed on the Kreher Park Property. The site history for each property and a description of the site is presented in the following sections. Contamination can be divided into the following four affected areas:

- **Upper Bluff/Filled Ravine** – Consists of soil and groundwater contamination, and free product coal tar within the backfilled ravine on the NSPW property.

- **Copper Falls Aquifer**– Consists of groundwater contamination and free-product coal tar in the Copper Falls aquifer on the NSPW property; groundwater contamination is also present downgradient in the aquifer below (and hydraulically separate from) the Kreher Park fill and the Bay sediments.

- **Kreher Park**– Consists of soil and groundwater contamination in the fill material in Kreher Park.

- **Chequamegon Bay Inlet**– Consists of sediment contamination in the near shore area adjacent to Kreher Park.

The overall goal of the RI/FS process is to collect sufficient data to characterize the extent of contamination and select the appropriate remedies at the Site. Additional site investigation data and historic site investigation data will be used to evaluate potential exposure pathways to select remedial alternatives protective of human health and the environment. Specific objectives of the RI/FS include the following:

- Identify hazardous substances released to the environment, and develop a list of these constituents of concern;
- Identify the vertical and lateral extent of coal tar present as DNAPL.
- Identify the vertical and lateral extent of soil and groundwater contamination at the site;
- Identify potential migration pathways for constituents of concern;
- Identify potential receptors for constituents of concern;
- Use previously developed data of sufficient quality for site characterization, risk assessment, and selection of remedial alternatives;
- Evaluate potential risk to human health and the environment; and
- Develop a remedial alternative or separate alternatives to remedy potential threats to human health and the environment.

NSPW has identified two key aspects of the technical approach to the RI/FS. First is the assessment of the shallow groundwater at Kreher Park as a continuing source of contamination to the sediments. Second is the assessment of the impacts of the contaminants and the wood waste on the ecology of the bay. This will enable NSPW to determine which remedies are required to meet the long-term effectiveness criteria in the remedy selection process since the remedies selected for Kreher Park and the Upper Bluff may have a significant impact on the remedy selection process in the Bay. Because of the importance of both aspects of the technical approach, the discussion of each of these technical approaches has been incorporated into the PMP and is described in detail below.

4.1.1 Kreher Park

Groundwater flow is the primary medium for chemical migration. As a result, groundwater provides the pathway for chemical transport between potential sources at Kreher Park and potential off-site human and/or ecological receptors. While it appears that the sediment contamination in the bay is of historical origin, it is important to determine what the current contribution of potential sources in this area is to the bay sediments either through groundwater discharge or surficial seeps. As a result, the first investigation performed at the site will consist of the installation of shallow monitoring wells along the bay. This will enable NSPW to plan remediation alternatives to reduce or eliminate future releases to the bay. It will also allow the determination of potential human health risks from contamination in Kreher Park.

4.1.2 Chequamegon Bay Sediment

Chequamegon Bay is the ultimate receptor for contaminated materials at the Site either from historic sources or from current ground water discharges. To determine the final remedy the following tasks need to be performed:

1. Complete field investigation and modeling for Chequamegon Bay that will include:

    - Confirmation of the vertical limits of contamination;
    - Identification of areas to conduct ecological testing;
    - Performance of PAH forensic analysis on sediment samples; and
    - Establishment of representative background and "ambient conditions" values for site compounds of potential concern (COPCs).

2. Finalize the data quality objectives and develop a supplemental sampling plan to complete data needs for the Bay. Data needs preliminarily identified to date include the following:

    - Pore water characterization;
    - Comprehensive evaluation of the benthic community;
    - Fish impact study;
    - Potentially, a wildlife ingestion study;
    - Evaluation of the sediment stability;
    - Evaluation of wood waste impact;
    - Evaluation of dissolved phase COPCs in the water column with undisturbed sediments, and an evaluation of dissolved phase and free product COPCs in the water column with disturbed sediments;
    - 28-day lifecycle tests for benthic species; and
    - Fish early life-stage bioassay.

3. Prepare a baseline ecological risk assessment to establish clean up criteria for the bay sediments. This will require significant input from the local stakeholders to determine the future use of the bay and set appropriate clean up goals.

The detailed scope of work for the execution of these tasks and related efforts are discussed in the RI/FS Work Plan.

4.3 RISK EVALUATION STRATEGY

The risk evaluation will assess potential exposures to human and ecological receptors in the vicinity of the Site. In addition, the risk evaluation will be performed to assist in the identification of areas of each affected areas that may require corrective measures for appropriate land use scenarios. The risk evaluation will be performed using USEPA standard risk assessment guidance as outlined in the RI/FS work plan.

4.3.1 Baseline Human Health Risk Assessment

A baseline human health risk evaluation will be conducted for the Site. The consideration of worker, residential, and recreational exposure is a component of the RI/FS process. Potential worker, residential, and recreational exposure pathways will be identified using information on use characteristics for the Site, information on NSPW worker job functions and job descriptions, and other relevant information. Consideration will also be given to addressing risks for those workers or visitors who may transit several potential exposure areas at Kreher Park or at the NSPW site (the MGP) during the course of a workday or a visit to the Park. The potential exposure routes and receptors are detailed in the separate Work Plan. In the human health risk evaluation, cumulative risk levels/hazard indices (HIs) will be calculated for COPCs in environmental media (i.e., soil, groundwater, surface water, and sediment) as identified for each affected area. If the cumulative risk level/HI for a particular COPC exceeds its target risk level, clean up levels will be derived based on the scenarios used in the risk evaluation.

NSPW will prepare the human health risk assessment according to the guidelines outlined below:

- Hazard Identification (sources);
- Dose-Response Assessment;
- Conceptual Exposure/Pathway Analysis;
- Characterization of Site and Potential Receptors;
- Exposure Assessment;

- Risk Characterization;
- Identification of Limitations/Uncertainties;
- Site Conceptual Model; and
- Final Human Health Risk Assessment Report.

After the draft Human Health Risk Assessment Report has been reviewed and commented on by USEPA, NSPW will incorporate USEPA comments and submit the final Human Health Risk Assessment Report.

The ultimate goal of the Human Health Risk Assessment is to identify potential human health risks at the site in its present condition, identify contaminants of concern to human health, assess their relative risk, and provide data necessary to aid in the selection of the site remedies. The remedy selected will be the one which reduces the level of risk to an acceptable level based upon the identified COPCs, exposure routes and the ultimate land use for the site.

4.3.2 Ecological Risk Evaluation

The ecological risk evaluation will characterize potential risk to ecological receptors at the Site. Based on the significance of the potential risk (i.e., evaluated by lines-of-evidence, spatial extent, etc.), ecological-based remediation goals may be developed. The risk management goal for the Site is to reduce the risk to ecological receptors that may result from site related contamination in the sediments. NSPW will evaluate and assess the risk to environmental receptors in accordance with USEPA guidance. This guidance is referenced in the RI/FS Work Plan.

NSPW will prepare a draft Ecological Risk Assessment Report that addresses the following:

- Source Identification;
- Exposure/Pathway Analysis;
- Characterization of the Site and Potential Receptors;
- Select Chemicals, Indicator Species, and Endpoints;
- Conceptual Ste Model;
- Exposure Analysis;
- Effects Analysis;

- Risk Characterization; and
- Identification of Limitations/Uncertainties.

The ultimate goal of the Ecological Risk Assessment process is to identify COPCs and their current effects to receptors, and provide data necessary to select a remedy, if necessary, that will reduce the exposure to the extent necessary to allow for the maintenance of healthy local populations and communities of biota. Details of what will be required to accomplish this task are listed in the RI/FS Work Plan, along with descriptions of two alternative proposed sampling strategies. The ultimate remedy will be based upon the present levels of contamination, their distribution, the future land use for the site, and the levels necessary to achieve the health and ecological risk based cleanup levels identified during the RI/FS process.

5.0 PROPOSED SCHEDULE

A proposed schedule meeting the requirements of the AOC has been prepared and is included in Appendix C. The same schedule is included in the Work Plan. Specific conditions of this schedule are discussed below.

Based on the technical scoping meeting held on January 8, 2004, and subsequent discussions with USEPA on September 8 and 9, 2004, the following assumptions are included in the preparation of the schedule:

- There is no need to divide the Site into separate operable units at this time; however the site may be divided at a later date if circumstances warrant such a separation for decision making purposes and will expedite remediation of the site; and

- The previously developed data gathered in earlier investigations is acceptable for decision making purposes and will not need to be redone.

Reports and Submittals

The AOC specifies the following required deliverables. These documents and the associated submittal dates known at this time include:

Submittal	**Date**
Final RI/FS Work Plan	February 1, 2005
Final FSP	February 1, 2005
Final QAPP	February 1, 2005

Submittal	**Date**
Final HASP	February 1, 2005
Final PMP/DMP	February 1, 2005

Draft Baseline Human Health Risk Assessment	TBD
Draft Baseline Ecological Risk Assessment	TBD
Final Baseline Human Health Risk Assessment	TBD
Final Baseline Human Health Risk Assessment	TBD
Draft RI Report	TBD
Final RI Report	TBD
Remedial Action Objectives Technical Memorandum	TBD
Alternatives Screening Technical Memorandum	TBD
Candidate Technologies and Screening Tech Memo	TBD (if treatability testing is necessary)
Treatability Testing Statement of Work	TBD (if treatability testing is necessary)
Draft Treatability Study Work Plan	TBD (if treatability testing is necessary)
Final Treatability Study Work Plan	TBD (if treatability testing is necessary)
Treatability Study Evaluation Report	TBD (if treatability testing is necessary)
Comparative Analysis of Alternatives Tech Memo	TBD
Draft FS Report	TBD
Final FS Report	TBD
Monthly Reports	15th of each month

NSPW will update these schedules, as appropriate, throughout the duration of the RI/FS. Submittals will be made in electronic format and hard copy to the USEPA Remediation Project Manager (RPM) and the WDNR Project Manager as required in the AOC.

6.0 PERSONNEL

This PMP identifies the key positions of the RI/FS team and the related responsibilities for those positions. In addition, the qualifications for the personnel filling those positions are provided.

The size and complexity of the site requires a program organization structure flexible enough to respond to changing project demands, but with access to the various expertise needed to complete the investigative, analytical, and risk evaluation tasks required to complete the RI/FS. NSPW has authorized URS Corporation (environmental engineering company), Newfields (a project management company), Northern Lake Service (analytical laboratory) and Severn Trent Laboratories (analytical laboratory) to perform the relevant RI/FS tasks. The Project Organization Flow Chart is included at the end of this section as Figure 6-1. The discussion below defines the program organizational structure and identifies key positions.

6.1 PROJECT ORGANIZATION AND MANAGMENT

The project organization and responsibilities of key individuals of the project team are described below. URS has subcontracted with NewFields for project management activities. The project will be coordinated out of the URS Milwaukee office with Project Management from the NewFields Madison office. Field personnel from URS Milwaukee office will perform the various field activities for the project.

Project leadership and primary staff will be composed of personnel familiar with anticipated activities. The project team will provide experience in hydrogeologic analysis, environmental engineering, risk assessment, and remedial design. Brief descriptions of key project team members follow.

6.1.1 Project Coordinator

Mr. Jerry Winslow of Xcel Energy will act as the overall project coordinator. Mr. Winslow is a Principal Environmental Engineer with Xcel Energy. He is responsible for the overall management of the project and will act as the primary contact with Sharon Jaffess, the USEPA RPM.

6.1.2 Project Director

Mr. Paul Sklar will serve as the URS Project Director. Mr. Sklar is a Senior Geologist with more than 18 years of experience in the environmental field. The Project Director is responsible for the overall quality of the project, along with the oversight of subcontractors and tracking budgets. The Project Director will also work with the Project Coordinator and Project Manager in developing schedules and work plans, establishment of project policies and procedures, and review and analyze overall task performance. The URS Project Director has overall responsibility for ensuring that the project meets Agency and Xcel Energy's objectives and URS' quality standards, and will be responsible for overall technical supervision and quality assurance/quality control.

6.1.3 Project Manager

David Trainor, P.E., P.G., of NewFields will function as Project Manager for the project, as a subcontractor to URS. Mr. Trainor has more than 25 years of experience in the environmental field. Mr. Trainor has served as the Project Manager for the NSP/Ashland Lakefront project since the initial investigation was completed in 1995. The Project Manager is responsible for managing the project, and has the authority to commit the resources necessary to meet project objectives and requirements. The Project Manager's primary function is to ensure that technical, financial, and scheduling objectives are achieved. The Project Manager will provide the major point of contact and control for matters concerning the project, and will be responsible for the following:

- Define project objectives to develop detailed schedules for work plans;
- Develop and implement work plans, schedules, and adherence to management-developed study requirements;
- Establish project policies and procedures to address the specific needs of the project as a whole, as well as the objectives of each task;
- Acquire and apply technical and corporate resources as needed to ensure performance within budget and schedule constraints;
- Coordinate and manage field staff that are collecting soil and groundwater samples and supervising drilling activities;

- Orient all field leaders and support staff concerning the project's special considerations;
- Provide day-to-day coordination on technical issues in specific areas of expertise with the field managers;
- Develop and meet ongoing project and/or task staffing requirements, including mechanisms to review and evaluate each task product;
- Review the work performed on each task to ensure its quality, responsiveness, and timeliness; and,
- Review and analyze overall task performance with respect to planned requirements and authorizations;

6.1.4 Field Manager(s)

The Field Manager(s) will be responsible for performing field measurements, supervising drilling and well installation activities, preparing field boring logs, collecting soil samples, collecting groundwater samples, preparing samples for shipment, and documenting field conditions and observations. Field managers will be experienced professionals who possess the technical competence to effectively perform the required work. Field Managers will also identify any problems at the site and discuss resolutions of potential problems with the Project Manager. Field Managers will report directly to the Project Manager. Mr. Benjamin Nelson (URS-Milwaukee) and Mr. Mark McColloch (NewFields – Madison) will serve as the Field Managers. Field Manager responsibilities include:

- Implementation of QA/QC procedures required by the Field Manager;
- Adherence to work schedules provided by the project manager;
- Review of text and graphics required for site activities;
- Coordination and oversight of technical efforts of sub-contractors assisting the field team;
- Identification of problems in the field, and discussion of resolutions with the project manager, and
- Assistance with data analysis and report preparation.

6.1.5 QA/QC Manager

The URS QA/QC Manager for the RI/FS will be responsible for all QA/QC aspects of the program. The URS QA/QC Manager will be responsible for ensuring that all required QA/QC

protocols are met in the field, office, and laboratory, and for overseeing the implementation of the QAPP requirements. In addition, the URS QA/QC Manager will be responsible for ensuring that internal system and/or performance audits are conducted as necessary and will oversee the data validation process. The URS QA/QC Manager will report directly to the Project Manager(s).

Ms. Susanne Tomajko of URS Corporation is the URS QA/QC Manager. Ms. Tomajko has over 10 years of experience in the management of QA issues on CERCLA/RCRA projects and has extensive experience working in USEPA Region 5.

6.1.6 Laboratory Manager

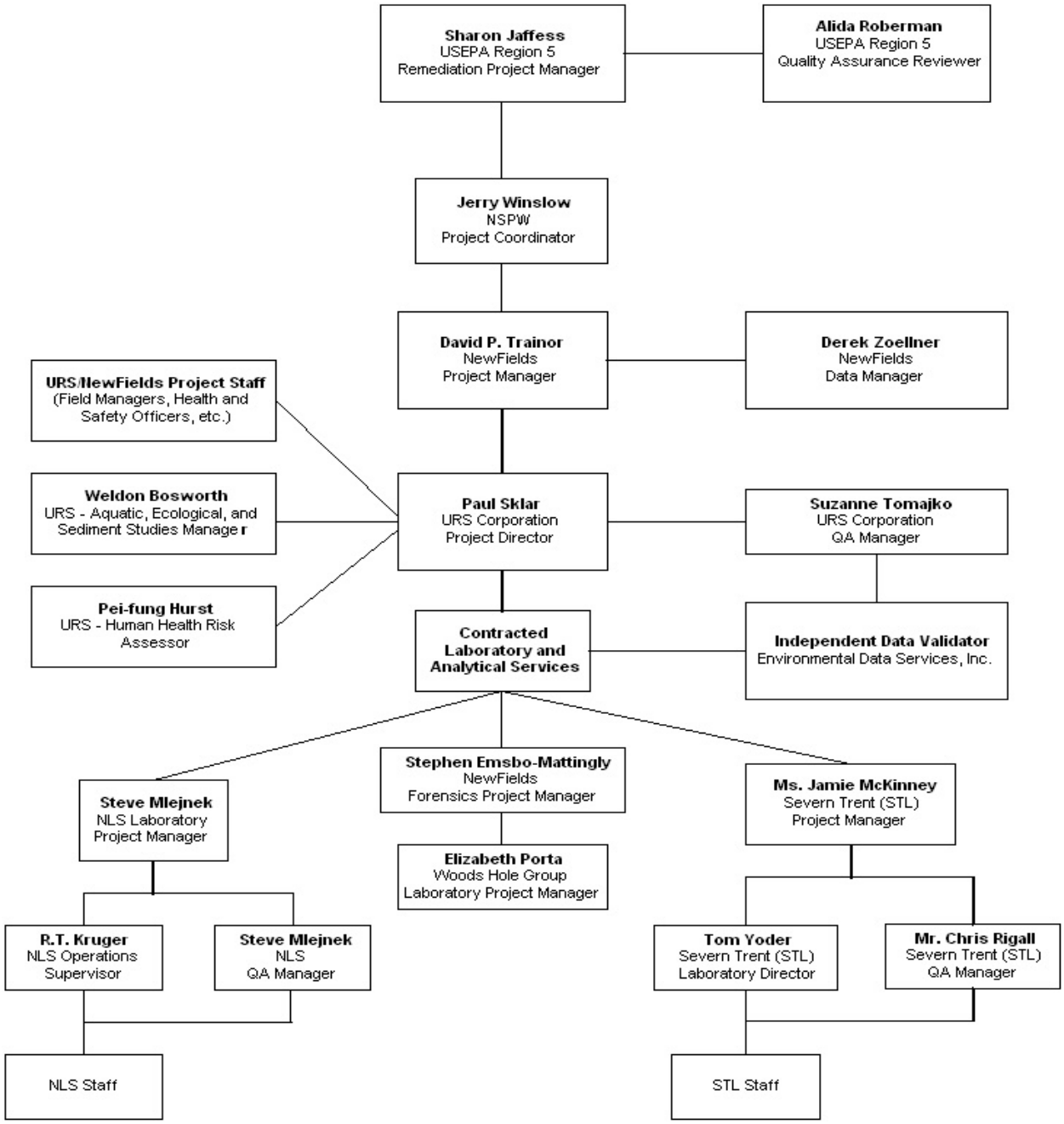
The Laboratory Project Manager for the RI/FS will be responsible for all laboratory operations, and is ultimately responsible for the data produced by the laboratory. The Laboratory Project Manager is responsible for implementing and adhering to the Laboratory QA Management Plan and all corporate policies and procedures within the laboratory. In addition, the Laboratory Manager will be the principal point of contact between the laboratory and the project team. The Laboratory Manager will report directly to the URS QA/QC Manager and the Project Manager(s).

URS has chosen Northern Lake Services (NLS) be the laboratory services supplier for the Facility RI/FS. Mr. Steve Mlejnek of NLS will serve as the Laboratory Manager for the RI/FS.

6.1.7 Health and Safety Manager

The URS Health and Safety Manager for the RI/FS will be responsible for the implementation of the HASP of the RI/FS Work Plan, as well as all other health or safety considerations that might possibly arise during RI/FS activities. The URS Health and Safety Manager will also be responsible for ensuring that the appropriate personal protective and monitoring equipment is available to all field personnel and for performing on-site safety audits as necessary. The URS Health and Safety Manager will report directly to the Project Manager(s).

FIGURE 6-1
ASHLAND/NSP LAKEFRONT SUPERFUND SITE
ORGANIZATION CHART



APPENDIX A

DATA MANAGEMENT PLAN

1.0 INTRODUCTION

This *Data Management Plan* (DMP) has been prepared as part of the Remedial Investigation/Feasibility Study (RI/FS) Work Plan for the Ashland/NSP Lakefront Site (the "Site") in Ashland, Wisconsin. The goal of the DMP is to provide a method to produce a series of validated databases for samples collected during future site investigations conducted at the site. The DMP is a central component of the RI/FS Planning Documents. It describes how data obtained during the RI/FS will be documented, stored, managed, and reported. Further details of the components of the DMP are provided in the following sections.

The DMP serves as a supplement to the Project Management Plan (PMP). The primary purpose of the DMP is to communicate to users and decision-makers how sample information from the investigation will be handled in the field and office. This plan outlines the close interaction of the project team from data entry to final use.

This DMP includes three sections describing data processing procedures to be used for the RI/FS. Included are such practices as field sample documentation, chain-of-custody forms, electronic deliverable standards, and electronic storage and management.

The database to be utilized is Microsoft Access. The Access database system will be used to tabulate, manage, archive, and assess sample data collected at the site. Electronic Data Deliverables (EDDs) will be generated with the Access database in conjunction with Microsoft Excel for reporting purposes. When data validation is complete, EDDs will be submitted in monthly status reports to USEPA Region 5 in the Electronic Data Management and Analysis Network (EDMAN) format as outlined in the Electronic Data Deliverable Specification Manual Version 1.05.

2.0 RESPONSIBILITIES AND QUALIFICATIONS

The project organization and responsibilities of key individuals of the NSPW and URS project team are described below. URS has subcontracted with NewFields for project management activities.

2.1 PROJECT COORDINATOR

Mr. Jerry Winslow of Xcel Energy (Minneapolis) will serve as the Project Coordinator. The Project Coordinator has the overall responsibility for management of the project. His primary functions are as follows:

- Define and establish project objectives, policies and procedures to meet the needs of each task;
- Acquire and apply technical and corporate resources as needed to ensure performance within budget and schedule constraints;
- Reviews and analyzes task performance with respect to planned requirements and authorizations; and
- Approves all work plans, schedules, and reports (deliverables) before submission to USEPA Region 5.

2.2 PROJECT MANAGER

Mr. David Trainor (NewFields-Madison) will serve as Project Manager for the project as a subcontractor to URS. The Project Manager serves as the primary point of contact and is responsible for the day-to-day management of the project including the following:

- Developing and implementing work plans, schedules, project objectives, policies, and procedures;
- Coordinate and manage field staff;
- Provide day-to-day coordination on technical issues with project team members;
- Develop and meet ongoing project staffing requirements as needed;
- Review and analyze overall task performance to ensure quality, responsiveness, and timeliness; and
- Represent the project team at meetings and public hearings.

2.3 FIELD MANAGER

Mr. Benjamin Nelson (URS-Milwaukee) and Mr. Mark McColloch (NewFields – Madison) will serve as the Field Managers. Other field managers will be assigned as needed. The Field Manager directs field staff, reports directly to the Project Manager and is assisted where needed by the Quality Assurance (QA) Officer and Data Manager. The Field Manager will be responsible for the following tasks:

- Ensuring that the field-based portions of this data management plan are correctly executed;
- Recording accurate information on the chain-of-custodies and in field logbooks;
- Documenting all communications with the Project Manager, QA Officer, Data Manager, and Laboratory Project Manager;
- Discussing all quality-based aspects of the work plan with the QA Officer; and
- Transmitting (by fax) a copy of the completed chain-of-custodies to the QA Officer daily.

2.4 QUALITY ASSURANCE OFFICER

Ms. Susanne Tomajko (URS-Chicago) will serve as the QA Officer. The QA Officer reports directly to the Project Manager and will be responsible for verifying that all procedures for the investigation, including execution of the DMP, are followed. The QA Officer will provide assistance and guidance to the Data Manager, Field Manager, and the Laboratory Project Manager, where needed. The QA Officer will be responsible for the following tasks:

- Verifying that the correct information is included on the chain of custodies and in the logbooks;
- Verifying that the correct number of field quality control samples are collected and analyzed;
- Verifying that the correct number of laboratory QC samples are analyzed;
- Communicating daily with the Field Manager; and
- Overseeing that data validation is completed in accordance with the DMP and QAPP.

2.5 DATA MANAGER

Mr. Derek Zoellner (NewFields-Madison) will serve as the Data Manager. The Data Manager reports directly to the Project Manager and will be responsible for compiling the data into a comprehensive and usable database. The Data Manager will work closely with other team members to implement and carry out data management activities according to this plan. Any progress or problems encountered in executing this plan will be reported as appropriate to the Project Manager, QA Officer, or Field Manager. The Data Manager is responsible for the following:

- Correctly uploading, downloading, reporting, and maintaining the project database;
- Verifying the samples have been received and logged into the laboratory correctly;
- Entering the deliverables received from the laboratory into the project files so that they are easily retrieved;

- Verifying that the information reported in the EDD matches what was provided on the paper copy;
- Loading the information into the database and checking that the loading process was completed accurately; and
- Entering the data validation qualifiers into the final, reportable database per the validation report.

2.6 LABORATORY PROJECT MANAGER

The Laboratory Project Manager will report directly to the Project Manager, but will also be responsible to provide direct assistance to the QA Officer, Field Manager, and Data Manager. The Laboratory Project Manager will be responsible for ensuring that all activities inside the laboratory meet project requirements including the following:

- Providing early notification of any discrepancies or problems associated with sample custody and delivery;
- Providing a "log-in summary" (by fax or via website) each day samples are received and logged at the laboratory;
- Ensuring all resources of the laboratory are available on an as-required basis; otherwise, having an alternate analysis plan for the testing of time-critical samples;
- Providing written responses to all inquiries into custody, sample handling, or analytical performance issues;
- Verifying the quality and completeness of both paper copy and EDD analytical reports; and
- Inspecting, reviewing, and signing all final analytical reports prior to release to URS.

Northern Lake Service, Inc. of Crandon, Wisconsin (Steve Mlejnek-Project Manager) will provide laboratory analytical services for all soil and water samples. Test America of Cedar Rapids, Iowa (Brian Graettinger-Project Manager) will provide laboratory analytical services for the interim action remediation system air samples. Severn Trent Laboratories of Knoxville, Tennessee (Ms. Jaime McKinney-Project Manager) will provide laboratory analytical services for air samples collected during the RI/FS.

2.8 DATA VALIDATOR

Mr. Doug Weaver of Environmental Data Services, Inc. (Concord, NH) will serve as the independent Data Validator and will report directly to the Project Manager. Level 4 data validation will be completed on 10 percent of all samples collected during the RI. Level 3

validation will be completed on the remaining 90 percent. Once complete, copies of the data validation report will be sent to the Project Manager and the QA officer. This report will accompany the monthly reports containing electronic data deliverables when submitted to USEPA.

3.0 DATA MANAGEMENT PROCEDURES

Data management involves the handling of information associated with sample collection, analytical reporting, data review, and final data presentation and reporting. This section describes the processes involved in data management for the site investigation. A flow diagram showing the data stream from generation to final Agency submittal is included at the end of this section as Figure 1.

3.1 SAMPLE COLLECTION

Environmental data obtained during the RI will be documented using three methods. Primary data documentation is primarily raw data gathered directly from the field. Secondary data documentation is the transformation of the raw data into a usable and computer accessible format. At this time, the data have not undergone data validation, and therefore are considered part of the working data record. Tertiary data documentation is data that have been validated and is used for technical decision-making during the RI/FS. These validated data are considered part of the permanent data record.

3.1.1 Primary Data Documentation

Raw data will consist of manual transcription of records, measurements, and observations written directly into field data logbooks and field data sheets. Field data logbooks will be used to record events that occur during a particular field activity, as well as measurement readings and other information. Standardized field data sheets, such as soil boring logs or monitoring well construction forms, will also be used in addition to field data logbooks. Chain-of-custody forms will accompany samples at all times and be used to document the collection, transport, and receipt of samples from the field to the laboratory. All field entries will be legible, recorded in ink, and signed and dated by the person recording the data. Further details regarding field logbook procedures and chain-of-custodies are outlined in the QAPP and FSP.

3.1.2 Secondary Data Documentation

Secondary data documentation will consist of the transcription of written field and laboratory data to computerized database formats. To enable efficient and accurate documentation, tracking, retrieval, use, and presentation of field and laboratory data, this information will be transcribed or downloaded into a computerized database located at NewFields Madison office.

Electronic and hard copies of analytical reports will be provided by the laboratory. These reports will contain all analytical results and supporting detailed documentation. Laboratory reporting requirements have been specified in the QAPP. Any written documents and forms presented in the laboratory reports will be used for data validation on the analytical results.

3.1.3 Tertiary Data Documentation

Tertiary data documentation will consist of the validated data and is the permanent data record. Data validation will be completed in accordance with the laboratory QA/QC manual in the QAPP. Once validated, all electronic data will be compiled in an electronic MS Access database. This database is one developed by NewFields that serves as a total environmental data management package. It will form the foundation of the site geographical information system (GIS). The database package, called Environmental Data Management System (EDMS), is a comprehensive management tool designed for compilation of historical and ongoing environmental investigations. Computerized data records will be archived to secondary backup computer media (i.e. compact discs) to ensure the integrity of the data in the event of failure of the primary computer storage media.

3.2 ANALYTICAL REPORTING

3.2.1 Electronic Data Deliverables (EDDs)

The laboratories will provide EDDs to URS and NewFields by email. These files will contain only final data (no preliminary data). The Data Manager will make a replicate copy of all EDDs so as to not alter the original file. All changes, revisions, or other edits to the EDD will be made to the replicate copy of the original EDD.

The EDD files will be sent to the following two (2) individuals:

Data Manager – Derek Zoellner dzoellner@newfields.com
QA Officer – Susanne Tomajko susanne_tomajko@urscorp.com

The QA Officer will print a copy of the email and include this document in the final evidence file for the project. The Data Manager will verify that the EDD file was received. Any analytical reports provided by the laboratories that cannot be formatted into an EDD will be manually entered into the electronic database. All manually entered data will receive an independent 100% quality check by the Data Manager. The Data Manager will document this quality check.

As required by the AOC, all data shall be submitted to the USEPA in the EDMAN format as outlined in the Electronic Data Deliverable Specification Manual Version 1.05. Data validation will be completed on laboratory analytical reports before data can be submitted in EDMAN format. EDDs will consist of individual comma-delimited files (.csv) that will be final checked with USEPA Region 5 ELFC© field and ELDC© lab data checking software prior to submittal. The EDD files will be submitted to USEPA on electronic storage media (diskette or CD) accompanied by a cover letter. These EDDs will be included with status reports submitted to USEPA on a monthly basis. Only validated data will be submitted.

3.2.2 Hardcopy Analytical Reports

The laboratories will forward hardcopy analytical reports to the Project Manager, who will route copies of applicable information to the Data Manager and/or the QA Officer. The QA Officer is responsible for ensuring that the data packages are correctly entered into the project files. Hardcopy report requirements are listed in Section 7.0 of the QAPP. The Data Manager will perform a comparison of the data in the electronic files to the hard copy reports prior to data loading.

3.3 DATA MANAGEMENT

3.3.1 Sample and Analytical Data Package Tracking

Knowledge of the status of samples and analytical data packages during the RI/FS process is the primary goal of data tracking. The Data Manager is responsible for this tracking. The tracking

will managed through a combination of EDDs, chain-of-custodies, written and telephone correspondence and the project MS Access database.

To track samples, the Data Manager will perform the following:

- Note current location of the sample or data package;
- Readily retrieve chain-of-custody information; and
- Note the date the sample was received by the laboratory.

To assist the Data Manager, the QA Officer will perform the following to track samples:

- Record the date the analytical report was received by URS;
- Note the project file where the paper copy is filed;
- Check the completeness of the submitted report;
- Report any discrepancies (between items received and requested) to the Laboratory and to the Project Manager; and
- Resolve discrepancies as needed.

The Data Manager will work closely with the QA Officer to ensure that the information reported in the electronic database correlates to the records on the hardcopy analytical report.

3.3.2 Electronic Data Loading

Prior to loading data into the database, the EDD must be checked for errors and inconsistencies to ensure its accuracy and correctness. Any errors will be corrected prior to loading. The Data Manager will evaluate the accuracy of the following prior to data loading:

- Field sample identification numbers;
- Duplicate project samples and corresponding field sample identification;
- Re-extraction data;
- Spelling of synonymous parameter names; and
- Sample collection date.

The Data Manager will be supported by the QA Officer to assess the accuracy of the information in the incoming EDD file. A summary table regarding the corrections made during pre-loading

is to be completed by the Data Manager and retained in the final evidence file. The narrative will contain a log of the results of all the QA/QC tests performed.

After completion of pre-loading activities, the sample results will be loaded into the database. The Data Manager will review the loaded file to ensure that the result of the load was accurate. The database will be queried to check analyte counts, duplicate results and/or samples, missing qualifiers, and relational joins.

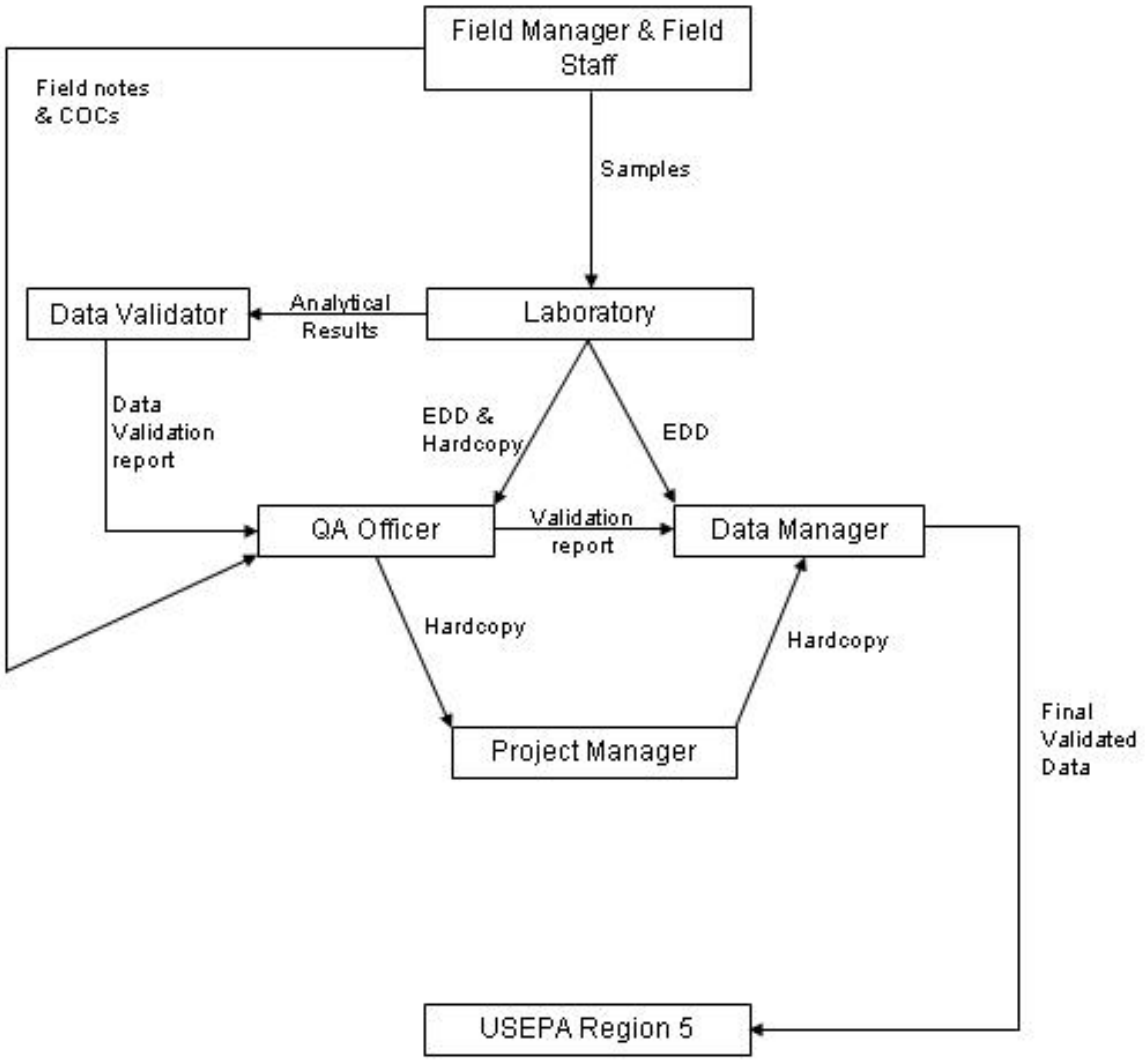
3.3.3 Manual Data Loading

When data are loaded manually, the Data Manager (or designated staff member) will perform an independent 100% check of the information to confirm the accuracy of the prepared database. It is the responsibility of the Data Manager to ensure that the information is entered correctly. Examples of manual data entry include the following: entry of data validation qualifiers, entry of survey information for sample locations, and entry of any field parameters.

3.3.4 Data Validation and Qualifies

Data validation will be completed by the independent data validator on all samples collected during the RI. A Level 4 validation process will be done on a select 10 percent of samples, while Level 3 validation will be done on the remaining 90 percent of samples. Once data validation is complete, the validator will send copies of the final report to the QA Officer and the Data Manager. The report shall contain the field identification, laboratory identification, parameter, result, units of measure, laboratory qualifiers, dilutions, and laboratory reporting limits. The Data Manager shall label the copy with the sampling delivery group (SDG) number, laboratory name, project name, date, and edition (e.g., Version 1). Data validation results will then be entered into the EDD before final submittal to USEPA.

Figure 1
Data Management Flow Chart



APPENDIX B

RESUMES

DAVID P. TRAINOR, P.E., P.G.
Associate

EXPERIENCE SUMMARY

Mr. Trainor has over 23 years experience in numerous environmental projects and investigations, which include feasibility/plan of operation landfill siting studies, RI/FS programs, groundwater assessments, remedial design, and construction management. He has represented industrial and government clients in technical negotiations and presentations involving state and Federal regulatory agencies.

NewFields currently has 13 offices in Georgia, Alabama, Tennessee, Texas, New Jersey, Colorado, Maryland, Massachusetts, and Wisconsin and an International Division with projects in over 70 countries. The firm was established to focus on resolution of high profile environmental liabilities. Prior to joining NewFields, Mr. Trainor was employed by URS Corporation (formerly Dames & Moore) for 16 years where he held several positions, most recently as managing principal of the Madison, Wisconsin office.

REGISTRATIONS AND PROFESSIONAL AFFILIATIONS

Professional Engineer, Wisconsin, Michigan, Pennsylvania, California, Idaho, Iowa
Professional Geologist, Wisconsin
American Society of Civil Engineers
International Society for Soil Mechanics and Foundation Engineering
American Institute of Professional Geologists, Certified Professional Geologist, AIPG

EDUCATION AND TRAINING

B.S., Geology, Ohio State University, 1975,
B.S., Civil Engineering, Ohio State University, 1978
M.S. Civil and Environmental Engineering, University of Wisconsin, Madison, 1983
OSHA 40-hour Hazardous

PROFESSIONAL HISTORY

NewFields, Associate, 2003 to present
URS Corporation (previously Dames & Moore), Principal-in-Charge/Senior Engineer, 1987 to 2003
RMT, Inc., Geotechnical Project Engineer, 1983 to 1984; 1985 to 1987
Northern Engineering and Testing, Geotechnical Project Engineer, 1984 to 1985
Terratech, Inc., Staff Engineer, 1978 to 1981

REPRESENTATIVE PROJECT EXPERIENCE (Following listing is not exhaustive)

- Oversaw investigation, developed remedial options and directed remedial design and construction for interim coal tar removal system from a confined aquifer; coordinates completion of RI/FS for recently listed NPL site, former manufactured gas plant and wood treatment site; Ashland, Wisconsin.
- Coordinated investigation and developed remedial options for a former manufactured gas plant site currently used as a bulk propane distribution facility. Marshfield, Wisconsin.
- Performed research and provided expert testimony about the fate and transport of gasoline contaminants released from underground storage tanks allegedly contaminating a private residence.
- Coordinated and implemented environmental due diligence in preparation for acquisition for poultry processing operations at 90+ facilities.

- Provided expert testimony at an arbitration hearing on the validity of long-term remedial costs for a landfill (Superfund site) in southeastern Wisconsin.
- Developed remedial options for several manufactured gas plant sites; New York and Pennsylvania.
- Developed remedial options to expedite closure at a plating facility site contaminating groundwater with chromium.
- Evaluated applicability of past and future costs to validate insurance claims for remedial action at several landfill sites.
- Provided research and expert testimony at deposition for a named party at a Superfund site identifying other PRPs from individual waste stream analyses.
- Directed ROD implemented remedy including a gas extraction system upgrade and point-of-entry water filter installations for private homes, municipal sanitary landfill; Hudson, Wisconsin. Included expert testimony at trail.
- Provided expert testimony at deposition for a machine parts manufacturer evaluating the identification of manufactured gas plant waste disposed on their property; Milwaukee, Wisconsin.
- Provided expert testimony at trial for a paper company providing alternative water supplies for private residences affected by groundwater contamination from an industrial landfill; Eau Claire, Wisconsin.
- Developed strategy for investigating and providing cleanup options for dry-cleaning sites; Stevens Point, Wisconsin.
- Provided Agency negotiation, consultant review and oversight of an investigation and remedial options analysis for an abandoned sanitary landfill; Rice Lake, Wisconsin.
- Directed remedial design and remedial action oversight including final cover and landfill gas control, for an abandoned municipal waste landfill; Wausau, Wisconsin.
- Directed remedial design activities, including final cover and landfill gas control, for an abandoned municipal waste landfill; Rhinelander, Wisconsin.
- Performed a groundwater assessment, negotiated Agency approval for a selected remedial option, and directed construction management of a leachate extraction system for a paper waste landfill; Eau Claire, Wisconsin.
- Directed preparation of design plans and specifications, and construction management for remediation of 200,000 cubic yards of mining wastes under the Wisconsin Environmental Repair Program; Mineral Point, Wisconsin.
- Directed work plan development, negotiated USEPA approval, and directed the investigation for an abandoned landfill (NPL site); Tomah, Wisconsin.
- Oversaw design and construction of a landfill gas extraction system for an abandoned sanitary landfill; Tomah, Wisconsin.
- Directed investigation and remedial design activities for groundwater contamination from a former truck-trailer manufacturing operation; Edgerton, Wisconsin.
- Provided expert testimony at trial for food processing company siting a solid waste disposal facility.
- Provided expert testimony at deposition for a defendant for insurance claims at a foundry waste site (contaminated with lead); Milwaukee, Wisconsin.
- Prepared and implemented USEPA-approved RCRA facility investigation work plan for a hazardous waste incinerator (CWM Chemical Services); Chicago, Illinois.
- Directed preparation of Plan of Operation for a 3.5 million cubic yard sanitary landfill, including expert testimony before the Waste Facility Siting Board; Madison, Wisconsin.

- Directed preparation of plans and specifications for landfill cover restoration, state Superfund site; Madison, Wisconsin.
- Directed a remedial investigation and feasibility study for groundwater remediation options for an abandoned landfill; Dane County, Wisconsin.
- Directed remedial investigation for a former wood treatment (creosote) facility; Reed City, Michigan.
- Negotiated language for a voluntary consent order and directed investigation for a landfill remedial investigation (PRP group); Madison, Wisconsin.
- Coordinated design and construction of a landfill gas extraction system; Madison, Wisconsin.
- Directed preparation of a Feasibility Study and hydrogeologic assessment for a 1.5 million cubic yard industrial landfill; Wisconsin.
- Coordinated investigations and developed remediation options for several abandoned city sanitary landfills; Madison, Wisconsin.
- Developed a Feasibility Study for a 4 million cubic yard sanitary landfill, and provided expert testimony at a contested-case hearing; Madison, Wisconsin.
- Supervised subsurface investigations and prepared recommendations for remediation of two chlorinated hydrocarbon spill sites; Wisconsin manufacturing facilities.
- Supervised subsurface investigations and prepared hydrogeologic reports for several closed municipal landfill sites; Madison, Wisconsin.
- Prepared RCRA facility investigation work plan for a large military defense contractor (Hamilton Standards); Windsor Locks, Connecticut.
- Supervised investigations and developed remedial designs for several tank release sites; Wisconsin and Michigan.
- Developed remediation options for PCB-contaminated soils at an aluminum manufacturing plant; Kentucky.
- Coordinated investigation and developed design for a large demolition waste landfill facility; Portage County, Wisconsin.
- Developed an environmental and economic assessment for a county siting a hazardous waste facility; Minnesota.
- Prepared closure verification report for hazardous waste handling facilities in Wisconsin (APV Crepaco) and Illinois (Chemical Waste Management).
- Prepared feasibility/plan of operation report for a PCB transformer salvage facility; Juneau, Wisconsin.
- Designed a vacuum extraction system for remediation of an underground gasoline spill at a service station; Madison, Wisconsin.
- Designed and supervised construction of clay-lined earthen impoundments with dewatering facilities for foundry process sludge for a large industrial foundry facility; Defiance, Ohio.
- Devised geotechnical testing programs of various waste materials generated from paper manufacturing processes.
- Provided geotechnical analysis and recommendations for repair of a failure in a clay liner sidewall for a sanitary landfill; Minneapolis.
- Designed and implemented a modified multi-unit triaxial device to study the effects of leachate permeants on clay soils.
- Designed and provided construction documentation, kiln dust disposal facility; Alpena, Michigan.

- Designed and provided construction documentation, sanitary landfill; Minneapolis.
- Designed and provided construction documentation, foundry waste landfill; Milwaukee.
- Performed hydrogeological assessment of a solvent spill for an underground storage tank; South Bend, Indiana.
- Determined stability and projected settlements of embankments for bridge foundation; Idaho.
- Designed foundation and retaining structure recommendations for various commercial, industrial and transportation facilities; Idaho, Oregon and Washington.
- Designed foundation systems for residential, commercial and industrial buildings constructed on problem soils; San Francisco Bay area.
- Developed recommendations for the repair of residential structures damaged by soil expansion and settlement; San Francisco Bay area.
- Analyzed static and dynamic seacliff erosion and provided setback recommendations for a coastal development; Aptos, California.

PUBLICATIONS AND PRESENTATIONS

Author, "Characterization and Remedial Action at a Former MGP Adjacent to a Former Wood Treatment Operation," Gas Technology Institute Site Remediation Technologies Conference, 2000.

Co-author, "Isotopic Identification of the source of Methane in Subsurface Sediments of an Area Surrounded by Waste Disposal Facilities," in Applied Geochemistry, USGS, 1998.

Co-author, "Groundwater Remediation at a DeInk Landfill," TAPPI Environmental Conference, 1994.

Author, "Isotope Aging to Determine Methane Gas Sources, Geological Society of America, National Conference, 1992.

Author, "Current Status of Environmental Assessments," Government Institutes Seminar, Madison, 1992.

Author, "RCRA Corrective Action – 1990," paper presented to the Minnesota State Bar Association, Minneapolis, 1990.

Author, "Investigation and Remediation of a Printing Solvent Release," paper presented at the short course Detection and Corrective Action for Leaking Underground Storage Tanks, Department of Engineering-Professional Development, University of Wisconsin, Madison, 1989.

Co-author, "Case Studies in Constructive Use of Foundry Wastes for Landfill Construction," paper presented at the American Foundrymen's Society Casting Conference, 1987.

Author, "Moisture and Saturation Effects on Hydraulic Conductivity Testing," paper presented at the ninth annual Madison Waste Conference, 1986.

Co-author, "Use of Foundry Quenched Slag - Drainage Medium," presented at the 1986 Madison Waste Conference.

Weldon S. Bosworth, Ph.D.

Senior Scientist

AREAS OF EXPERTISE

- Contaminated Sediment Transport and Fate
- Ecological Risk Assessments
- Natural Resource Damage Assessment

EDUCATION

Ph.D. Concentration in Marine Ecology, 1976, Oregon State University

Master of Science in Zoology, 1969, University of New Hampshire

Bachelor of Arts in Zoology, 1964, University of New Hampshire

REGISTRATION

Professional Biologist, British Columbia, # 1230

PROFESSIONAL HISTORY

URS Corporation (formerly Dames & Moore), Senior Consultant, 1994-present.

Balsam Environmental Consultants, President and Senior Consultant, 1986-1994.

Normandeau Associates, Inc., President, Executive Vice President, Vice President of Operations, and Project

REPRESENTATIVE EXPERIENCE

Dr. Bosworth is a Senior Scientist with URS. He has over 30 years of consulting experience in evaluating environmental impact and working with clients to develop strategies for site remediation. This work has included studies for the siting and operation of major facilities as well as fate and transport studies for a variety of contaminants in aquatic and marine environments. Dr. Bosworth also conducts ecological risk assessments and Natural Resource Damages Assessments and develops and negotiates site-specific environmental cleanup criteria for contaminated sites. He has been involved in a number of large projects dealing with the management or remediation of contaminated sediments or dredge materials.

Dr. Bosworth has negotiated numerous scopes of work for environmental studies with state and federal regulatory agencies and has provided expert testimony on environmental impact at over a dozen regulatory hearings at state and federal levels as well as for cost recovery litigation. He has also made project presentations and moderated panels at various public meetings.

Dr. Bosworth was a member of and past Chair of the Scientific Advisory Committee of the U.S. EPA's Hazardous Substances Research Center South/Southwest, a consortium of universities led by Louisiana State University which conducts exploratory research in issues dealing with contaminated sediments and dredge materials.

Before joining URS, Dr. Bosworth was one of the founders of and President of Balsam Environmental Consultants, Inc., an environmental consulting company specializing in hazardous waste site investigations, environmental impact evaluations and wetlands restoration.

PROJECT RESPONSIBILITIES

- Principal Scientist and Ecological Risk Assessor to Xcel Energy for the Ashland/NSP Site in Ashland, WI. Sediment in area offshore from historical MGP plant is contaminated with elevated levels of PAHs. Responsibilities include supporting project team in evaluation of EPA contractor's ecological risk assessment and providing direction in issues dealing contaminated sediment fate and transport. Currently part of a multiple stakeholder team developing a Baseline Problem Formulation for future remedial investigation work. Participated in presentation to EPA National Contaminated Sediments Technical Advisory Group.

- Principal Scientist and Risk Assessor to ConocoPhillips for sites in Weymouth, MA. Risk assessment being conducted

Manager, 1972-1985.

AFFILIATIONS

Past Chair and Member, Scientific Advisory Committee of the Hazardous Substance Research Center/South and Southwest, 1992-2002.

Member, Society of Environmental Toxicology and Chemistry 1998-Present.

Member, Marine Studies Curriculum Advisory Committee, Southern Maine Vocational Technical Institute, 1979-1980.

Invited member to NOAA North and Mid-Atlantic Region Conference on Marine Pollution Studies, 1980.

Executive Board Member, New England Estuarine Research Society, 1976-1980.

Participated in OCEANLAB (undersea laboratory) workshop sponsored by New England Marine Advisory Service, 1976.

under Massachusetts Contingency Plan. As part of evaluation of sediment quality in Weymouth Neck Region, conducted PAH forensic analysis. Results indicated predominantly low temperature pyrogenic sources of PAHs in the nearshore sediments.

- Principal Scientist and Project Manager to Union Carbide for site in Ponce, Puerto Rico. Work involved developing work plan for sampling PAH-impacted sediments in former discharge. A management-level ecological risk assessment was also conducted to develop alternative action levels for cleanup of PAHs in order to guide remedial decisions.

- Principal Scientist to AVX Corporation for an independent evaluation of a U.S. EPA feasibility study at New Bedford Harbor Superfund Site. Included assessments of environmental and transport issues related to Natural Resource Damages issues and site remediation. Developed recommendations to address potential adverse impacts of PCB and heavy metals contamination in the estuarine sediments of the harbor. Provided management of, and collaborated with a team of nationally recognized PCB experts who evaluated PCB fate and transport, sediment quality criteria, toxicology, ecological risk, epidemiology, etc. As an alternative to dredging of over one hundred acres of estuary a Remedial Action Plan was developed that involved alternative cleanup levels and in-situ sub-aqueous capping of approximately 50 acres of contaminated sediment in shallow Upper Estuary of New Bedford Harbor. In addition a mitigation plan for restoration of 13-acre salt marsh potentially affected by site remediation was developed. Evaluated apportionment of damages and remediation costs of various PRPs and third parties.

- Principal Scientist and Project Coordinator for Operable Unit 2 of Sullivan's Ledge Superfund Site in New Bedford, Massachusetts. Addressed Natural Resource Damages and Ecological Risk Assessment issues for Middle Marsh. Evaluated potential effects of PCB in wetland site. Provided litigation support for and participated in negotiations with other parties on allocation and cost issues. This includes presenting an alternative limited action strategy for leaving PCBs in place rather than destroying valuable wetland area. Negotiated Statement of Work, managed Pre-Design and remedial design studies.

- Senior Consultant and Project Manager to Union Carbide (now Dow Chemical) for site in Belleville, Ontario. Evaluated alternatives for site remediation and conducted a Level I Ecological Risk Assessment of potential impacts of PCB and

other constituents in a Lake Ontario wetland. Evaluated comparative impacts of excavation versus monitored natural recovery of PCB wetlands. This Risk Assessment was conducted following Ontario Provincial guidelines. A natural attenuation strategy for the wetlands was approved by the Ontario Ministry of the Environment.

- Senior Consultant for an ecological risk assessment for evaluating potential effects of PCB in wetlands and Mystic River, Medford, MA. Involves evaluating potential for natural attenuation through burial and biodegradation. Risk assessments being conducted under the Massachusetts Contingency Plan protocol.

- Senior Consultant for an ecological risk assessment for evaluating potential effects of PCB and pesticides in wetlands and ponds of Alcan Rolled Products Company in Oswego, New York. Involves evaluating potential for natural attenuation through burial and biodegradation. PCB congener vertical distribution and toxicity equivalency is being addressed.

- Co-Principal Investigator with Drs. Louis J. Thibodeaux and Danny Reible, Louisiana State University, for technology transfer of methodologies for in situ capping of contaminated bed sediments. A workshop was conducted that brought together selected members of the research, regulatory and consulting engineering communities on a national level. The purpose of this workshop was to develop a common perspective of the state of the practice, identify and discuss technical issues that need solution and develop an action plan to address these issues. The results of this workshop was published and incorporated into an Internet site.

- Principal Scientist to Tyco Suppression Systems-Ansul, Marinette, WI for site adjacent to Menominee River. Prepared baseline ecological risk assessment for evaluation of effects of arsenic in sediments of Menominee River to invertebrate, fish and wildlife receptors. Identified different species of inorganic and methylated arsenic species to differentiate their respective effects. Work has included sediment characterization, sediment bioassays and comprehensive benthic community characterization.

- Principal Scientist and Project Manager for a Baseline Ecological Risk Assessment for Hercules Chemical in Parlin, NJ. The objective of this study was to develop risk-based cleanup criteria for DDT in Brook 3 where DDT manufacturing by-products had historically been discharged. The assessment has involved evaluation of site-specific exposure pathways to receptors found in the area and estimating levels of DDT in

sediment and surface water that would be protective of these receptors. Further work is presently being conducted to characterize nature and extent as well as potential risk from DDT in sediments in the South River into which Brook 3 discharges. A baseline ecological risk assessment currently is being conducted. Supporting work has included sediment characterization and benthic and fish community characterization.

- Principal Scientist to ConocoPhilips, Inc. for conducting an evaluation potential impact to intertidal and subtidal sediments near Weymouth Neck Massachusetts from contaminants associated with former fertilizer operation. Potential contaminants included arsenic, copper, zinc, and PAHs.

- Senior Consultant to CITGO Petroleum Corporation for a site in Sulfur, LA along the Calcasieu River Estuary. Independently evaluated the fate and transport of sediment-associated chemicals in Calcasieu Estuary. Critically reviewed preliminary Natural Resource Injury Evaluation prepared by NOAA. Monitoring and providing critical review of Calcasieu Estuary RI/FS investigations for CITGO.

- Principal Scientist for critique of a Natural Resources Damages Assessment of the Southern California Bight. Provided litigation support and expert opinion on issues related to fate, transport and ecological effects of DDT and PCB associated with the sediment bed on the Palos Verdes Shelf.

- Principal Scientist and Project Manager to Nexen (formerly Canadian Occidental Petroleum Ltd.) for site in Squamish, BC. Completed human health and ecological risk assessment for assessing the potential effects of chlor-alkali and chlorate plant operations on Howe Sound and surrounding upland areas. Risk assessment evaluated the potential effects from several chemicals, including, mercury and chromium. Provided guidance to Nexen for management of contaminated sediments and ground water. Conducted sediment toxicity bioassays and benthic community characterization. Provided expert testimony before BC Environmental Appeals Board on aspects of the project.

- Principal Scientist and Senior Peer Reviewer to BCMWLAP contract managed by Golder Associates for screening ecological risk assessment evaluating the potential impacts from Britannia Mine on Howe Sound intertidal and subtidal

ecosystems.

- Principal Scientist to Domtar, Inc. for evaluation of sediment contamination at Vancouver Shipyard. Work consisted of critical review of historical reports and development of an expert opinion.

- Principal Scientist and Project Manager to Dow Chemical Canada, Inc. for site in Sarnia, Ontario. Worked with Dow to help develop strategy for addressing impacted sediments in St. Clair River along Dow waterfront. Developed work plan for sampling sediments to acquire data to support an evaluation of remedial alternatives for former Dow Outfall Area. Pilot dredging project for a portion of the St. Clair using TMT® dredge has been implemented and Phase I operational dredging is now being conducted. Currently working with Ontario MOE and Environment Canada on behalf of Dow to develop risk assessment guidance for the management of contaminated sediments in other areas of the St. Clair River.

- Project Manager for evaluating the environmental impact of various project alternatives for a 6-acre Portsmouth, New Hampshire port facility expansion on marine and wetland communities in the Piscataqua River. Project lead for development of mitigation plans, significant regulatory negotiations, and successful permitting effort including U.S. Army Corps of Engineers Section 10 and 404 permits for dredging and ocean disposal, Coastal Zone Management Consistency, and Section 401 Water Quality Certification. Marine terminal was successfully permitted and construction was initiated in 1996.

- Project Manager for a Lake Ontario shoreline protection study for the U.S. Army Corps of Engineers

- Officer-in-Charge for several projects at various New England harbors to provide information on the environmental impacts of dredging and spoil disposal for the U.S. Army Corps of Engineers.

- Senior Consultant and Risk Assessor for the GE Medford, MA site. Responsibilities have included preparation of a Stage I Ecological Risk Screening (under the Massachusetts Contingency Plan) addressing PCBs in the sediments of an aquatic area contiguous to the Mystic River.

- Principal Scientist providing litigation support and expert testimony for Natural Resources Damages claims for confidential client in Commencement Bay.

- Senior Consultant and Risk Assessor to General Electric for investigations at GE Schenectady Plant. Responsibilities have included development of a proposal for a habitat enhancement and natural attenuation plan in lieu of RCRA cap for 200 acre landfill on site. This work has also included the preparation of a screening ecological risk assessment.

- Senior consultant to Bethlehem Steel Corporation, Lackawanna, NY. Developed a Tier 2 ecological risk assessment of former coke and steel manufacturing operations site located on Lake Erie. Considered potential impacts on both terrestrial and aquatic receptors from various constituents of potential concern, including PAHs, resulting from those operations.

- Project Manager for Limited Ecological Risk Assessment for McKin site in Gary, Maine. This project evaluated the potential risk of trichloroethylene and 1,1,1-trichloroethane in ground water to aquatic receptors in a nearby stream. An instream benthic macroinvertebrate evaluation was also conducted following Maine Department of Environmental Protection protocols.

- Project Manager for a large, multi-year, multidiscipline baseline environmental study in coastal waters of New Hampshire for Seabrook Station, a nuclear generating station. Included design, development and evaluation of a sampling program for all biological communities, and collaboration on design of physical oceanographic studies. Supervised installation and maintenance of over 40 in-situ instruments in nearshore ocean environment, negotiated with state and federal regulatory agencies, and provided expert testimony on environmental impact at over a dozen regulatory hearings.

- Project Manager for a Method 2 Modification to Massachusetts Contingency Plan Standards. This project involved the use of a ground water transport model to predict concentrations of cyanide in ground water and extrapolate potential effects to downstream surface water receptors.

- Project Manager for a wetlands functional evaluation used as part of a Stage 1, Method 3 Environmental Assessment conducted in accordance with the Massachusetts Contingency Plan.

- Principal-in-Charge for an ecological risk assessment under CERCLA for a municipal landfill in Vermont. Identified ecological receptors that may be exposed to chemicals associated with landfill seeps, quantified levels of exposure and developed information on toxic effects of chemicals to

characterize risks to the ecosystem.

- Officer-in-Charge for studies of water quality, benthos, and aquatic and terrestrial habitats for FERC Exhibit E for proposed "Big A" hydroelectric facility. Included developing scope of work, reviewing and approving study plans and technical reports, and using Habitat Evaluation Procedures (HEP) for developing mitigation plans.

- Officer-in-Charge of physical and biological studies of OCS test site prior to leasing of offshore areas for exploratory drilling, George's Bank, Baltimore Canyon, Georgia Embayment.

- Officer-in-Charge of development of a candidate environmental impact study for a proposed dredging program at the Portsmouth Naval Shipyard in Kittery, Maine. Involved assessing dredging impacts as well as evaluating and selecting both offshore and upland spoil disposal sites.

PUBLICATIONS AND PRESENTATIONS

- Bosworth, W.S. and Turner, R.R. 2001 The Fate and Transport of Mercury in a Canadian Fjord. Presented at SETAC 2001.

- Turner, R.R. and Bosworth, W.S. 2001. Identification and Evaluation of Potential Groundwater Transport Pathways from Former Chlor-alkali Plant into a Fjord System. . Presented at SETAC 2001.

- Bosworth, W. S. and S. A. Sundstrom. 1995. How Much Do We Need to Dredge?: Strategies for Decision Making When Dredging Contaminated Sediments. Presented at the Fourteenth World Dredging Congress. November 1995. Amsterdam, The Netherlands.

- Short, F. T., R. Davis, D. M. Burdick, D. McHugh and W. S. Bosworth 1995. Restoration and Creation of Eelgrass, Salt Marsh and Mudflat Habitat in the Piscataqua River, New Hampshire. Presented at the autumn 1995 meeting of the Estuarine Research Federation Conference.

- Bosworth, W. S. and L. J. Thibodeaux. 1990. Bioturbation: A Facilitator of Contaminant Transport in Bed Sediment. Environmental Progress. 9(4):210-217.

- Thibodeaux, L. J., D. D. Reible, W. S. Bosworth, L. C. Sarapas. 1990. A Theoretical Evaluation of the Effectiveness of Capping PCB-Contaminated New Bedford Harbor Bed Sediment. Louisiana State University Research Center Report. 180 pp.

- Bosworth, W. S. and L. J. Thibodeaux, 1989. Bioturbation: A Facilitator of Contaminant Transport in Bed Sediment. Presented to American Society of Chemical Engineers, Session No. 120. Annual Meeting.
- Grabe, S. A., J. W. Shipman, and W. S. Bosworth, 1983. New

	Hampshire Lobster Larvae Studies. IN: Michael J. Fogarty (Ed), Distribution and Relative Abundance of American Lobster, Homarus americanus, larvae: New England Investigations during 1974-1979. p.63-64. NOAA Tech Rep. NMFS SSRF-775. • Bosworth, W. S., J. Germano, D. J. Hartzband, A. J. McCusker and D. C. Rhoads, 1980. Use of Benthic Sediment Profile Photography in Dredging Impact Analysis and Monitoring. IN: Proceedings of the Ninth World Dredging Conference (WODCON IX), 29-31 October 1980, Vancouver, B.C., Canada. • Mattice, J. S. and W. S. Bosworth, 1979. A Modified Venturi Suction Sampler for Collecting Corbicula. Progressive Fish Culturist. 41(3):121-123. • Bosworth, W. S., 1976. The Biology of the Genus Eohaustorius (Amphipoda: Haustoridae) on the Oregon Coast. Ph.D. Dissertation. Oregon State University. 200 pp. • Bosworth, W. S., 1973. Three New Species of Eohaustorius (Amphipoda: Gammaridea) from the Oregon Coast. Crustaceana. 25(7):253-260. Authored and/or contributed to hundreds of technical reports on various aspects of marine and aquatic communities.

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AREAS OF EXPERTISE

- Design/Implementation of Environmental Sampling Programs
- Interpretation of Geochemical and Hydrogeologic Data
- Evaluation and Implementation of Remedial Options at Sites with Soil, Sediment and/or Groundwater Contamination

EDUCATION

Jersey City State College, B.A. Geoscience, 1980

University of Iowa, M.S. Geology, 1982

CONTINUING EDUCATION

Graduate Level Hydrogeology Courses

Geologic Characterization in Glaciated Areas Short Course

Natural Attenuation for Remediation of Contaminated Sites Short Course

Fractured Glacial Till Workshop

REPRESENTATIVE EXPERIENCE

Mr. Sklar has 17 years of experience in environmental site investigation and remediation projects, particularly as they relate to groundwater and soil/sediment contamination. His work experience includes project management, interaction with regulators, design of environmental sampling programs, interpreting geochemical and hydrogeological data, supervising drilling operations, evaluating remedial alternatives, writing technical reports, and preparing health and safety plans.

RELAVENT PROJECT EXPERIENCE – PROJECT MANAGEMENT

- Project manager for municipal water supply well contaminant source investigation. Reviewed regulatory databases, land usage, and well capture zone data to identify potential source areas and to locate monitoring wells. Prepared work plans, specifications and variance request for drilling and installation of multilevel well network that combined intermediate and deep wells in single borehole. Utilized discrete interval groundwater sampling and borehole digital video logging to refine well screen placement. Identified potential source area and management/technical options.
- Project manager/hydrogeologist for remedial investigation, alternatives evaluation and remedial action implementation at chlorinated solvent site. Evaluated groundwater quality and identified VOC degradation mechanisms. Developed and prepared documents and specifications for site remediation strategy that consisted of source area "hot spot" removal, utilization of site-specific soil cleanup standards, natural attenuation monitoring, and restricted site closure with institutional controls.
- Project manager for phased closure of five large fuel oil USTs (18,000 to 50,000-gallon capacity) and installation of replacement AST system. Obtained variance for in-place closure of one UST.

PROJECT EXPERIENCE – SUBSURFACE INVESTIGATION

- Technical manager/hydrogeologist for remedial investigation at medical instrument manufacturing facility with chlorinated solvent and petroleum hydrocarbon impacts. Developed rapid site characterization work scope to delineate extent of groundwater plume that utilized

CERTIFICATIONS

Certified Hazardous Materials Manager No. 5210

40-Hour Hazardous Waste Site Worker Training

8-Hour Hazardous Waste Site Supervision Training

REGISTRATIONS

Professional Geologist – Wisconsin, No. 83

Professional Geologist - Indiana, No. 1373

PROFESSIONAL HISTORY

URS Corporation, 2003 - Present

Earth Tech, Inc., 1995 - 2003

Woodward-Clyde Consultants, 1988 – 1995

Ecology & Environment, Inc., 1987-1988

Geophysical Services, Inc., 1984-1986

Iowa Geological Survey, 1982-1983

South Dakota Geological Survey, 1981

multi-level sampling and a field laboratory. Reviewed historical information to target potential source areas for investigation.

- Project geologist for subsurface investigations at planned ANR Pipeline river crossing locations in Wisconsin and Michigan. Supported horizontal directional drilling program by directing geotechnical drilling activities, preparing summaries of regional and local geology, and subsurface conditions at river crossings.
- Project hydrogeologist for remedial investigation and alternatives evaluation of historical 600,000-gallon pipeline release at Air National Guard base. Prepared work plans for soil, groundwater, surface water and sediment analysis. Characterized two groundwater plumes and evaluated risk to off-site groundwater users. Successfully obtained site closure by demonstrating that off-site groundwater users were not at risk due to natural attenuation of gasoline constituents.
- Developed groundwater monitoring program to investigate release of plating solution containing hexavalent and trivalent chromium. Demonstrated that the hexavalent chromium was being reduced to trivalent species through formation of insoluble precipitates.

PROJECT EXPERIENCE – WATER RESOURCES

- Prepared project control documents including field sampling plans and SOPs for Sheboygan River and Harbor Superfund Site river channel and floodplain sediment characterization. Directed sampling of floodplain soil for evaluation of PCBs in support of remedial planning.
- Supported water resources staff in evaluation of flood management alternatives. Reviewed regulatory agency files and environmental reports, designed drilling and sampling plans and prepared report identifying environmental issues that could impact construction of flood management infrastructure.
- Developed sampling protocol for Des Plaines River sediment as part of a remedial investigation of a historical disposal site adjacent to the river. Evaluated site and basin-wide sediment data and prepared project reports. Client obtained no further action determination for sediment issues from regulatory agency.

- Developed field sampling plan and methodology for pond sediment sampling in support of dredging project. Proposal to utilize depth-composite samples approved by regulatory agency resulting in reduced analytical costs.
- Measured thickness and prepared cross-sections of sediment thickness throughout Fields Brook Superfund Site in support of remedial alternatives evaluation.
- Developed field sampling plan and methodology for sediment sampling to evaluate impacts from skeet shooting activities. Supervised sample collection and evaluated analytical data.
- Technical manager for evaluation of sediment adjacent to gasoline pipeline beneath a lake. Prepared geotechnical drilling plan, negotiated with land owners to secure access to the lake, coordinated mobilization of barge-mounted drilling equipment, logged and characterized lake sediments and prepared cross-sections, sediment thickness maps and project report.

PROJECT EXPERIENCE – WASTE MANAGEMENT

- Prepared work plans for investigation of soil and groundwater quality and excavation of source areas at former printing facility. Evaluated facility material and waste storage practices and successfully demonstrated that site soil should not be regulated as listed hazardous waste.
- Prepared RCRA closure plan for container storage area at manufacturing facility. Obtained regulatory agency approval for on-site use of low-temperature thermal treatment unit for remediation of hazardous waste soil.

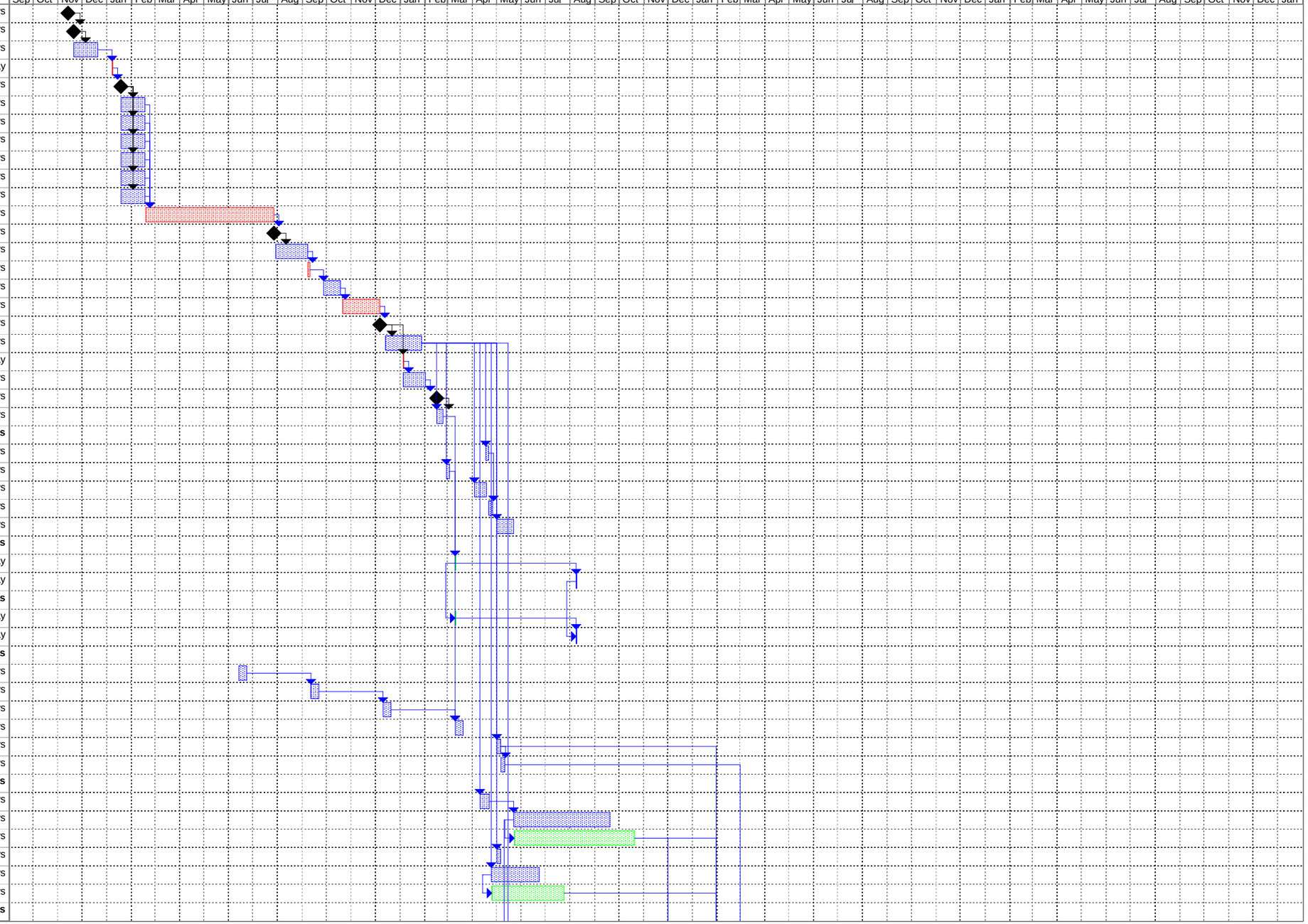
PROJECT EXPERIENCE – POWER PLANTS

- Evaluated hydrologic budget of a coal pile, subsurface hydrogeologic conditions and storage practices at a power plant facility to determine if coal storage is adversely affecting groundwater quality.
- Prepared work plan for site assessment of former power plant site. Supervised investigation of former coal ash lagoons and fuel oil storage areas. Collected sediment samples from ash lagoons and identified specific suite of polynuclear hydrocarbons in lagoons that differed from those in adjacent harbor area. Evaluated discharge of sulfate and boron into Lake Michigan via groundwater.

APPENDIX C

PROPOSED SCHEDULE

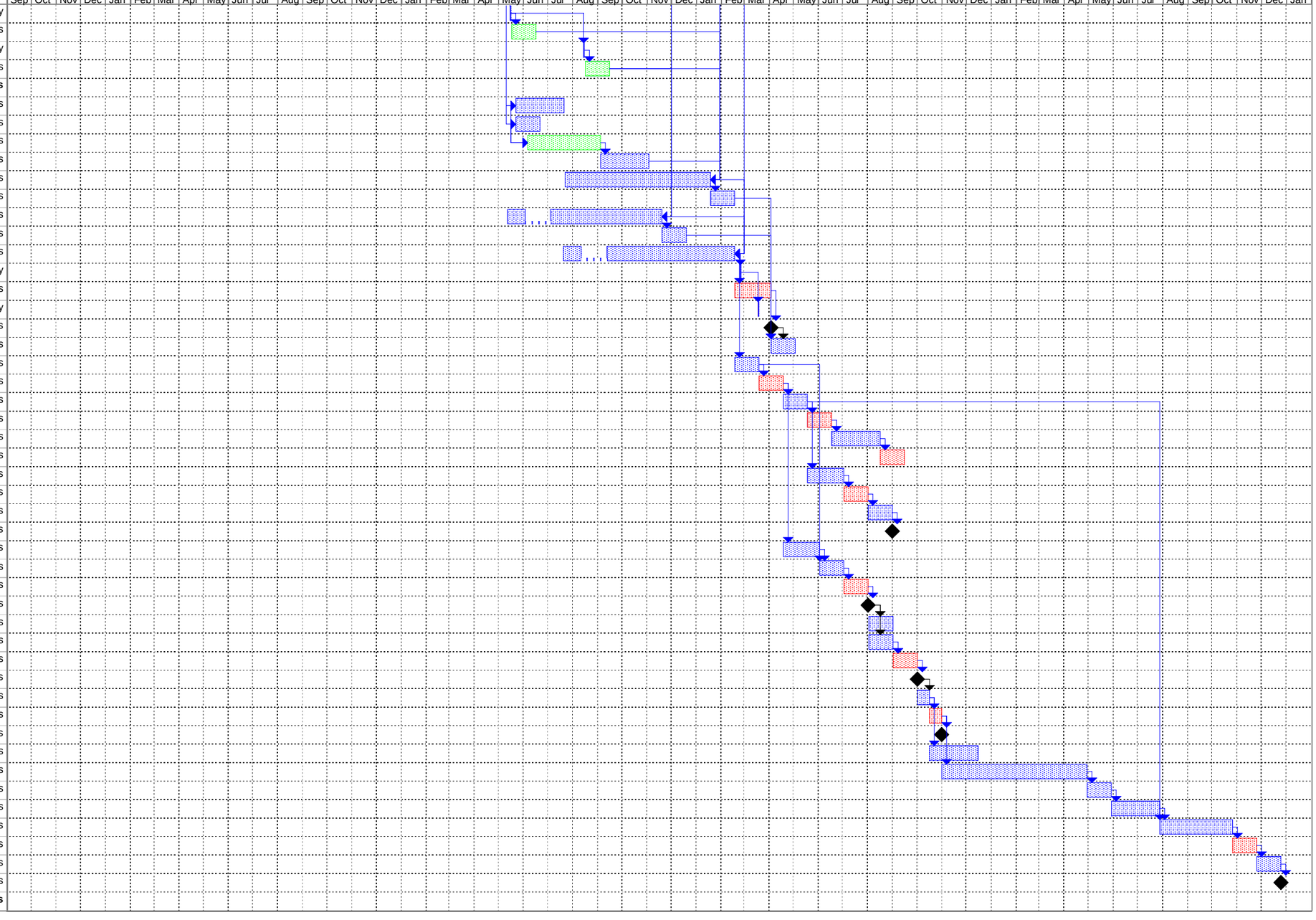
ID	Task Name	Duration
1	**Sign AOC (11/14/2003)**	0 days
2	WDNR/SEH Work Plan	0 days
3	Technical Letter Report	30 days
4	Technical Scoping Meeting	1 day
5	Technical Scoping Meeting EPA Summary	0 days
6	RI/FS Workplan Revision 01	30 days
7	QAPP	30 days
8	FSP	30 days
9	HASP	30 days
10	QMP	30 days
11	DMP/PMP	30 days
12	Agency Review of Plans	160 days
13	Agency Comments on Plans	0 days
14	Review and Revise Workplan and Planning Documents	40 days
15	Meeting with Agency & Trustees	3 days
16	Revise and Resubmit Plans	21 days
17	Agency review	46 days
18	**Agency Approval (12/7/2004)**	0 days
19	Mobilization/Subcontractor Selection	45 days
20	Conference Call to Discuss Approval Conditions	1 day
21	Revise and Submit Errata Sheets and Workplan Addenda	28 days
22	Approval of Workplan Addenda	0 days
23	Monitoring Well Abandonment and Replacement	8 days
24	**Upland & Kreher Park Investigation**	**422 days**
25	Surface Soil	4 days
26	Soil Vapor Probe Installation	4 days
27	Subsurface Soil (Geoprobe)	15 days
28	Geophysics	5 days
29	Test Pits	21 days
30	**Soil Vapor Sampling**	**152 days**
31	Round 1	1 day
32	Round 2	1 day
33	**Vapor Intrusion Sampling**	**152 days**
34	Round 1	1 day
35	Round 2	1 day
36	**Groundwater Sampling**	**280 days**
37	Round 1	10 days
38	Round 2	10 days
39	Round 3	10 days
40	Round 4	10 days
41	**Wildlife Habitat Survey**	5 days
42	**Wetland Survey and Functional Values Analysis**	5 days
43	**Sediment Quality Triad Investigation**	**193 days**
44	Reconnaisance Survey	12 days
45	Sediment Quality Triad Sampling	120 days
46	Laboratory Analysis	150 days
47	UV Light Measurements	5 days
48	**Fish Tissue Sample Collection**	60 days
49	Laboratory Analysis	90 days
50	**Suface Water Sample Collection**	**123 days**



Project: RIFS Schedule for WSB
Date: Tue 2/1/05

NSPW Task | Agency Task | Lab Task | Split | Progress | Milestone | Deadline

ID	Task Name	Duration
51	Round 1	1 day
52	Laboratory Analysis	30 days
53	Round 2	1 day
54	Laboratory Analysis	30 days
55	**Sediment Stability Studies**	**165 days**
56	Sample Collection	60 days
57	ADCP Deployment	30 days
58	Laboratory Analysis & Analytical Modeling	90 days
59	Sediment Stability Evaluation Report	60 days
60	**BERA Report**	180 days
61	Revised ERA Report	30 days
62	**HHRA Report**	160 days
63	Revised HHRA Report	30 days
64	**RI Report**	180 days
65	Presentation of Data	1 day
66	Agency Review	45 days
67	Meeting	1 day
68	**Agency Comments**	0 days
69	Revised RI Report	30 days
70	Remedial Action Objectives Technical Memorandum	30 days
71	Agency Review	30 days
72	Alternative Screening Technical Memorandum	30 days
73	Agency Review	30 days
74	Comparative Analysis of Alternatives Memorandum	60 days
75	Agency Review	30 days
76	**FS Report**	45 days
77	Agency review	30 days
78	Revised FS Report	30 days
79	**Agency approval**	0 days
80	**Treatability Study Work Plan (if warranted)**	45 days
81	Candidate Technologies and Testing Needs Technical Memorandur	30 days
82	EPA Review of Technical Memorandum	30 days
83	EPA Notice of Need for Treatability Testing	0 days
84	**Treatability Testing Work Plan and SAP**	30 days
85	Treatability Study HASP	30 days
86	Agency Review	30 days
87	Agency Comments	0 days
88	Revised Treatability Study Work Plan	15 days
89	Agency Review of Revised Treatability Study Work Plan	15 days
90	**Approve Revised Treatability Study Work Plan**	0 days
91	Pre Treatability Study Activities	60 days
92	Perform Treatability Study	180 days
93	Receive Analytical Results	30 days
94	Treatability Study Evaluation Report	60 days
95	**FS Report (if treatability study completed)**	90 days
96	Agency review	30 days
97	Revised FS Report	30 days
98	**Agency approval**	0 days
99	**Progress reports**	**1646 days**



Project: RIFS Schedule for WSB
Date: Tue 2/1/05

NSPW Task | Agency Task | Lab Task | Split | Progress | Milestone | Deadline

APPENDIX D

LIST OF ACRONYMS

AC	Area of Concern
ADD	Average Daily Dose
ANCOVA	Analysis of Covariance
AVS:SEM	Acid Volatile Sulfildes
AOC	Administrative Order on Consent
ARAR	Applicable or Relevant and Appropriate Requirement
ASTM	American Society of Testing Materials
ATSDR	Agency of Toxic Substance and Disease Registry
AWQC	Ambient Water Quality Criteria
BERA	Baseline Ecological Risk Assessment
BETX	Benzene, Ethylbenzene, Toluene, and Xylene
bgs	below ground surface
BTU	British Thermal Unit
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
ch. NR 140	Wisconsin Admim. Code Chapter NR 140 - Groundwater Quality
ch. NR 720	Wisconsin Admim. Code Chapter NR 720 - Soil Cleanup Standards
ch. NR 722	Wisconsin Admim. Code Chapter NR 722 - Standards for Selecting Remedial Actions
CFR	Code of Federal Regulations
COC	Chain of Custody
COPC	Compounds of Potential Concern
CSTAG	Contaminated Sediment Technical Advisory Group
CTE	Central Tendency Exposure
CV	Critical Value
DCA	Decision Consequence Analysis
D&M	Dames & Moore Inc.
DCOM	Wisconsin Department of Commerce
DHFS	Department of Health and Family Services - State of Wisconsin
DMP	Data Management Plan
DNAPL	Dense Non-aqueous Phase Liquid
DW	Dry Weight
DQO	Data Quality Objective
EPA	Environmental Protection Agency (USEPA)
EPC	Exposure Point Concentration
ERA	Ecological Risk Assessment
ERAGS	Risk Assessment Guide for Superfund Sites
ERM	Effects Range - Median
ES	Enforcement Standard per Wisconsin Administrative Code ch. NR 140
ESA	Environmental Site Assessment
eV	Electron-volt
FS	Feasibility Study for Remedial Action Options
GIS	Geographic Information System
GLI	Great Lakes Initiative
GTI	Gas Technology Institute (f.n.a. IGT)
HA-28	*Hyallela azteca* 28 day Toxicity Test
HASP	Health and Safety Plan

HEAST	Health Effects Assessment Summary Tables
HHRA	Human Health Risk Assessment
HQ	Hazard Quotient
IGT	Institute of Gas Technology (n.k.a, GTI)
IRIS	Integrated Risk Information System
LOAEL	Lowest Observed Adverse Effects Level
LOEC	Lowest Observed Effects Concentration
LSDP	Lake Superior District Power
LNAPL	Light Non -aqueous Phase Liquid
mg/kg	milligram/kilogram
mg/L	milligram/liter
MCL	Maximum Contaminant Level
MDD	Minimum Detectable Difference
MDL	Maximum Detection Limit
MGP	Manufactured Gas Plant
MSA	Mid-States Associates, Inc.
MSL	Mean Sea Level
MVUE	Minimal Variance Unbiased Estimate
NAPL	Non Aqueous Phase Liquid
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NET	Northern Environmental Technologies, Inc.
NLS	Northern Lake Service, Inc.
NOAA	National Oceanic and Atmospheric Administration
NOAEL	No Observed Adverse Effects Level
NOEC	No Observed Effects Concentrations
NPL	National Priorities List
NRDA	Natural Resource Damage Assessment
NSE	No Standard Established
NSP	Northern States Power Company
O&M	Operation and Maintenance
OMM	Operations Maintenance and Monitoring
ORNL	Oak Ridge National Lab
OSWER	Office of Solid Waste and Emergency Response
PAH	Polycyclic Aromatic Hydrocarbons
PAL	Preventive Action Limit per Wisconsin Administrative Code ch. NR 140
PE	Professional Engineer
PEL	Probable Effects Level
PG	Professional Geologist
PID	Photo-ionization Detector
PMP	Project Management Plan
ppb	parts per billion
PPE	Personal Protective Equipment
ppm	parts per million
PQL	Practical Quantitation Limit
PRG	Preliminary Remediation Goal
PRP	Potential Responsible Party

PVOCs	Petroleum Volatile Organic Compounds
QAPP	Quality Assurance Project Plan
RAGS	Risk Assessment Guide for Superfund Sites
RAOR	Remedial Action Options Report
RBSC	Risk Based Screening Concentrations
RCL	ch NR 720 Residual Contaminant Level
RfC	Reference Concentrations
RfD	Reference Dose
RI	Remedial Investigation
RL	Reporting Limits
RME	Reasonable Maximum Exposure
ROC	Receptors of Concern
ROD	Record of Decision
SEH	Short Elliott Hendrickson Inc.
SOEI	Sigurd Olsen Environmental Institute
SOW	Scope of Work
SSL	Soil Screening Level
STL	Severn Trent Laboratories, Inc.
SVE	Soil Vapor Extraction
SVOC	Semi-volatile Organic Compounds
SQL	Sample Quantitation Limit
TIC	Tentatively Identified Compounds
TCLP	Toxicity Characteristic Leaching Procedure
TLR	Technical Letter Report
TOC	Total Organic Carbon
TOSC	Technical Outreach Service for Communities
TPAH	Total Polycyclic Aromatic Hydrocarbons
TRV	Toxicological Reference Values
TSCA	Toxic Substances Control Act
TSS	Total Suspended Solids
UCL	Upper Control Limit
µg/kg	microgram/kilogram
µg/L	microgram/liter
URS	URS Corporation
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UV	ultraviolet
VOC	Volatile Organic Compound
WAC	Wisconsin Administrate Code
WCL	Wisconsin Central Limited
WDNR	Wisconsin Department of Natural Resources
WPDES	Wisconsin Pollution Discharge Elimination System
WWTP	Waste Water Treatment Plant