EPA
United States
Environmental Proection
Agency

EPA Proposes Cleanup Plan

Ashland/Northern States Power Lakefront Superfund Site
Ashland, Wisconsin June 2009

U. S. Environmental Protection Agency is proposing a plan to clean up contaminated soil, ground water and sediment at targeted areas of the Ashland/NSP Lakefront site[1]. The areas are contaminated with waste tar and spilled oil from a former manufactured gas plant and some contaminated areas also contain wood debris left by a lumber mill. EPA is the lead agency and the Wisconsin Department of Natural Resources is the support agency for activities at the site.

EPA recommends digging up soil from the most contaminated areas of the site, treating the soil with heat to remove contamination and re-using the soil after treatment. EPA recommends using barriers to stop the movement of ground water contaminants and possibly injecting a chemical into wells. In the underlying aquifer, EPA recommends adding extraction wells to pump and treat contaminated ground water. EPA recommends dry excavation and removal of contaminated sediment in the inner bay area of Chequamegon Bay and wet dredging in the off shore area.

EPA's cleanup goals for the site are to protect people's health and the environment at risk by:

- Reducing or eliminating exposure to contaminants that pose an unacceptable risk at the site;
- Removing contamination, treating contaminated materials, and containing remaining contaminants to lessen effects of discharge to the air, land, sediment, or water;
- Stopping or minimizing the movement of contaminants from the soil to ground water or surrounding surface water; and
- Ensuring future beneficial use of land at the site.

Public comment needed

The purpose of this proposed plan fact sheet is to give you background information about the Ashland/NSP Lakefront site, describe the various cleanup alternatives considered, and explain EPA's recommended cleanup plan. You are encouraged to comment on this proposed plan. EPA will be accepting comments from June 17 through July 16. See the box to the left for ways to learn more and provide comments to EPA.

Share your opinions

EPA offers several ways for you to participate in the cleanup process at the Ashland/NSP Lakefront site. Before the Agency holds the public meeting and comment period, EPA and WDNR invite you to an information session on **Wednesday, June 17, 7:00 p.m. at the Northern Great Lakes Visitor Center, 29270 County Highway G**. At the information session you can hear about EPA's recommended cleanup plan and other cleanup alternatives that were considered and ask questions.

The information session will be followed by a public meeting and comment period. By commenting on the proposed plan your input helps EPA determine the best course of action. EPA will host a public meeting on **Monday, June 29, 7:00 p.m. at the Northern Great Lakes Visitor Center**, where oral and written statements will be accepted.

The **public comment period** runs from **June 17 – July 16**. You can submit comments on the cleanup plan:

- Via the Web at www.epa.gov/region5/publiccomment/ashland-pubcomment.htm
- E-mail to Patti Krause at krause.patricia@epa.gov
- Fax to Patti Krause at 312-697-2568
- Fill out and mail the comment form in this fact sheet

Based on public comments received EPA could modify its recommended cleanup plan or pick another alternative altogether so your opinion is important.

See back page for contact information.

[1] *Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA known as the Superfund law) requires publication of a notice and a proposed plan for the site remediation. The proposed plan must also be made available to the public for comment. This proposed plan fact sheet is a summary of more detailed information contained in the remedial investigation, feasibility study, and other documents in the administrative record for the Ashland/NSP Lakefront site. Please consult those documents for more detailed information.*

Aerial photo shows the Ashland Lakefront site. The "Upper Bluff/Filled Ravine includes the location of the former manufactured gas facility that created much of the pollution on the site.

EPA, in consultation with WDNR, will select a final cleanup plan for the Ashland/NSP Lakefront site. This will occur after review and consideration of information given by the public during the 30-day public comment period and at the public meeting. The final cleanup plan, which will be announced in a local newspaper notice and presented in an EPA document called a "record of decision," could differ from the proposed plan depending on information or comments EPA receives during the public comment period.

Documents for review

You are also encouraged to review the supporting documents for the Ashland site. The information includes the complete proposed plan, the "remedial investigation" and "feasibility study" reports and other documents (e.g., risk assessments). The remedial investigation is a study of the nature and extent of contamination at the site, while the feasibility study evaluates different cleanup options. The risk assessments evaluate potential risks to people and the environment from the contamination at the site. You can review these and other supporting documents in the information repositories listed on page 10 of this fact sheet and online at www.epa.gov/region5/sites/ashland.

About the Ashland/NSP Lakefront site

The Ashland/NSP Lakefront site consists of properties owned by Northern States Power Company of Wisconsin (doing business as Xcel Energy) and Canadian National Railroad, a portion of the city-owned Kreher Park and the former wastewater treatment plant, sediment in an area of Chequamegon Bay, Our Lady of the Lake church and school, and private residences. Cleanup is focused on four areas of the site:

Upper Bluff/Filled Ravine is the site of a former manufactured gas plant. The plant produced "water gas" for street and home lighting and other uses between 1885 and 1947. A ravine ran through the property, emptying out at the former Lake Superior shoreline, near what is now the Canadian National Railroad corridor (formerly known as Wisconsin Central Limited). The ravine was filled by the early 1900s. NSP-owned property in the Upper Bluff/Filled Ravine area still contains remnants of buildings and equipment from the plant and is now a NSP service facility. The property overlooks Kreher Park and is bounded by Lake Shore Drive, St. Claire Street, Prentice Avenue, and 3rd Avenue. The railroad, church and school, and private residences are also in the Upper Bluff/Filled Ravine area, but are not the focus of the cleanup.

Kreher Park is located along the bay and includes the area between the upper bluff and Chequamegon Bay. The area did not exist before the late 1800s as the shoreline was much closer to what is now the railroad corridor. Kreher Park was created over the decades as various fill materials were placed into the bay. The eastern portion was filled with sawdust, wood waste and other material from local sawmills, including the former Schroeder Lumber Co. that operated until the 1930s. Solid waste, primarily demolition debris, was disposed of along the western side of the property in the 1940s. In 1942 the City of Ashland took ownership of the property and the area was vegetated. There may have been a ponded area of a black tarry substance and a map of Kreher Park from 1953 indicated that a "coal tar dump" was present during that time. Kreher Park is mostly grass covered and a gravel overflow parking area for the marina occupies the west end of the property. The former City of Ashland wastewater treatment plant and associated structures front the bay inlet on the north side of the property.

Copper Falls aquifer is a thick water-bearing formation composed of layers of sand and gravel that lies underneath the Upper Bluff/Filled Ravine and part of Kreher Park. This aquifer is overlain by about 30 feet of clay/silt known as the Miller Creek rock formation.

The **Chequamegon Bay** impacted area of the site is roughly 16 acres between the boat marina and the Prentice Avenue boat launch extending out about 300 feet from the shoreline.

Waste, including tar and oil, moved from the gas plant to the park and the bay through a ravine, and later through a pipe buried inside the ravine. Later, after Kreher Park was filled in, additional pipes and a ditch may have conveyed waste to the bay. Other activities in the area, including possible wood treatment at local sawmills and construction in the 1950s of the former municipal wastewater treatment plant, may have added to contamination.

Site pollution was discovered in 1989 when workers encountered oil and tar in excavations to expand the former wastewater treatment plant. The wastewater plant was later closed when a new one was built in another location.

During the 1990s both WDNR and NSP performed a series of investigations to assess contamination at Kreher Park, at the NSP property and in Chequamegon Bay.

In response to a citizen's petition and to address long-term issues, EPA added the site to the National Priorities List in 2002. The NPL is a roster of waste sites eligible for cleanup under EPA's Superfund program. NSP signed an agreement in 2003 to conduct the remedial investigation/ feasibility study.

Cleanup actions taken so far

In 2000, NSP began pumping out ground water from the Copper Falls aquifer as a pilot project. The pumped water is treated at the NSP plant and discharged into the city's sanitary sewer. So far, more than 1.7 million gallons of contaminated water has been pumped out, yielding about 10,000 gallons of coal tar. Also, in 2002, NSP dug out contaminated soil and waste at a seepage point at the base of the bluff and removed much of the pipe in the ravine. This area was then covered with clean material.

Site pollution

Contamination at the site was primarily generated by the gas plant and has affected soil, ground water and sediment. The most commonly occurring contaminants at the site are as follows:

Carburated water gas tar/oil wastes/coal tar
Mixture of chemicals that make up part of the liquid waste from the gas production process. This tarry/oily substance is a mixture of hundreds of chemical compounds including VOCs, SVOCs, and PAHs (listed below) and is found throughout the site.

Volatile organic compounds and benzene
VOCs are organic chemicals that evaporate readily into the atmosphere. VOCs are found in many things, from paints, coatings, and glue to gasoline and diesel fuel. The most common VOC at the Ashland site is benzene.

Semi-volatile organic compounds
SVOCs are organic compounds that evaporate at standard temperatures over a longer period of time than VOCs. A variety of SVOCs are used in building materials to provide flexibility, water resistance or stain repellence as well as fire retardant.

Polycyclic or polynuclear aromatic hydrocarbons and napthalene
PAHs are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas and other organic substances. The most commonly occurring PAH at the Ashland site is naphthalene. Napthalene is strong smelling and is made from coal tar or petroleum.

These contaminants are found in different forms as **non-aqueous phase liquid, also known as "free product."** NAPLs are underground pockets of tar and other materials in liquid form that don't readily mix with water. There are two kinds of NAPLs found at the site:

> **Floating**
> Light non-aqueous phase liquid contains lighter VOCs that float on top of the water table. Most common petroleum fuels and lubricating oils are LNAPLs.
>
> **Sinking**
> Dense non-aqueous phase liquid contains heavier VOCs that sink through the water table. Typical monitoring wells do not indicate their presence because they sink to the bottom instead of floating on top of the water table. PAHs such as napthalene are DNAPLs.

Pollution found its way into soil, ground water and the bay, and the underlying debris at Kreher Park. Test pits dug in the park revealed an oily sheen running through the fill material. When there are large waves on Lake Superior, compounds are stirred up from the bay sediment and cause oil slicks on the surface of the bay.

Summary of site risks

EPA reviewed and approved a "human health risk assessment" and a "baseline ecological risk assessment" which identify how people and wildlife might be exposed to contamination at the site. These risk assessments look at what would happen if contamination is not cleaned up and there are no restrictions, fences, or signs to prevent people from being exposed. While some potential exposures are very unlikely, others are very possible or even known to have occurred at the site.

The risk assessment determined that elevated health risks do exist for three potential exposure paths:

- Cancer risk levels were above EPA limits if new homes were built over the filled ravine and potential residents were exposed to the soil. This risk assessment is very conservative since no homes sit there now and future residential construction is unlikely. Non-cancer health risks for a potential residential area were low.
- Construction workers digging holes and trenches in Kreher Park could be exposed to unsafe contamination levels but only at depths greater than 4 feet. The study determined that workers doing grading, road building, parking lot construction and landscaping activities would not be exposed to dangerous pollutant levels.
- Non-cancer health risks also are present for workers breathing contaminated indoor air in the utility service center but only if they worked in there full-time for 25 years. Currently, office space in the service center is used only part-time. Samples collected in the filled ravine area indicated that below surface vapors are not moving toward the residential area.

Sports fish from the site do not contain harmful levels of site-related contamination, but recent testing of some smelt at the site found unacceptable contaminant levels. People should continue to follow the general Lake Superior fish consumption advice available from the Ashland County Health Department. Modeling in the risk assessment suggested that oil slicks floating on surface water would pose a health risk for people who swim or wade at the site, but direct contact with sediment was not a health concern.

Wildlife was studied for pollution effects. Contamination posed little direct risk to birds, mammals and fish although occasionally contaminants are stirred up and cause an oily slick on the surface of the bay where it could potentially affect wildlife. The risk assessment did find that contamination is harming the tiny organisms that live at the bottom of the bay and form the base of the food chain.

Summary of cleanup alternatives

A number of different cleanup techniques for soil, ground water, and sediment went through a complex screening process explained in the feasibility study. These cleanup alternatives were evaluated by each of the nine criteria required by law (see box below). For a more complete description of alternatives and comparison to other

Evaluation criteria

EPA uses nine criteria to compare cleanup alternatives:

Threshold criteria are requirements each alternative must meet in order to be eligible for selection.

1. **Overall protection of human health and the environment** addresses whether an alternative adequately protects both human health and the environment. This standard can be met by reducing or removing pollution or by reducing exposure to it.
2. **Compliance with applicable or relevant and appropriate requirements (ARARs)** assures that each project complies with federal and state laws and regulations.

Balancing criteria are technical criteria with detailed analysis and are used to weigh major trade-offs among alternatives.

3. **Long-term effectiveness and permanence** evaluates how well an alternative will work over the long-term, including how safely remaining contaminants can be managed.
4. **Reduction of toxicity, mobility or volume through treatment** addresses how well the alternative reduces the toxicity (the chemical makeup of a contaminant that makes it dangerous), movement and amount of pollution.
5. **Short-term effectiveness** compares how quickly an alternative can help the situation and how much risk exists while it's being constructed.
6 **Implementability** evaluates how feasible the cleanup plan is and whether materials and services are available to carry out the project.
7. **Cost** includes not only buildings, equipment, materials and labor but also the cost to put the plan in place and operate and maintain it over time.

Modifying criteria can be fully considered only after public comment is received on the proposed plan.

8. **State acceptance** determines whether the state environmental agency, in this case WDNR, accepts the proposed cleanup alternative. EPA evaluates this criterion after receiving public comments.
9. **Community acceptance** determines what nearby residents and other stakeholders think about the proposed cleanup plan. EPA evaluates this standard after a public hearing and comment period.

alternatives considered please consult the feasibility study and the proposed plan.

Based on information currently available, the recommended cleanup meets the threshold criteria and gives the best balance of tradeoffs among the other alternatives with respect to the balancing criteria.

Common elements for all alternatives

Several of the cleanup alternatives require institutional controls (e.g., deed restrictions, land use controls such as an easement or covenant) to limit the use of portions of the property or ensure that the contaminated water is not used for drinking water purposes. In addition, most alternatives include long-term monitoring and maintenance on the surface barriers and sediment cap to make sure remaining buried pollution is not moving off-site.

Soil cleanup alternatives

S-1: No action. This alternative must be considered at every Superfund site. It means leaving soil in place with no engineering, maintenance or monitoring. **Cost: $0**

S-2: Containment using engineered surface barriers
This means covering an area with a barrier to stop rain and snow melt from seeping through the contamination and into the ground water and lake. This would also stop wind from blowing contaminated soil and protects people and animals from touching the soil. In areas of the Upper Bluff/Filled Ravine and Kreher Park existing asphalt pavement would be replaced and new asphalt pavement installed. A solid cap would be placed over the former coal tar dump area in Kreher Park. Surface barriers would be periodically inspected and repaired or replaced as needed. The amount of soil contained in the most contaminated areas is about 39,800 cubic yards.
Estimated cost: $1.9 million

All the remaining soil cleanup alternatives are based on either "limited" or "unlimited" removal.

Limited soil removal
Limited removal means digging up and removing contaminated soil from the most contaminated areas in the Upper Bluff/Filled Ravine area and Kreher Park. The upper bluff requires removal of material from the filled ravine. At Kreher Park removal of material is required in the coal tar dump area. Limited removal would involve demolishing the center section of the NSP service center, removing asphalt pavement, and digging up the former gas holders. Ground water seeping into the excavated area would be collected, placed in a holding tank and treated before discharge to the sanitary sewer. After excavation these areas of the site would be restored with clean fill material, new asphalt pavement, and an existing street would be upgraded. Heavy equipment such as backhoes, bulldozers, and front-end loaders would be used for digging. About 14,350 cubic yards of soil would be removed during limited soil removal.

Unlimited soil removal
Unlimited removal means digging up all contaminated areas of the Upper Bluff/Filled Ravine and Kreher Park. At the upper bluff area this would require the excavation of all fill material from the filled ravine, demolishing the center section of the NSP service center, removing asphalt pavement, and digging up former gas holders. After excavation, areas of the site would be restored with clean fill material and new asphalt pavement and an existing street would be upgraded. At Kreher Park small trees and bushes would be cleared. Layers of wood waste and the fill over the waste would be dug. Because digging would be done below lake level a temporary sheet pile wall would be constructed to allow for dry excavation. Ground water that seeps into the excavated area would be collected, placed in a holding tank and treated before discharge to the sanitary sewer. About 259,600 cubic yards of soil would be removed.

S-3A: Limited removal and off-site disposal: This alternative transports contaminated soil to an off-site landfill or landfills for disposal.
Estimated cost: $4.9 million

S-3B: Unlimited removal and off-site disposal: Removal of all fill material in Kreher Park may result in the permanent loss of the current use of Kreher Park. After digging, Kreher Park could be restored to a wetland area or filled with clean material to restore it to its present elevation. The contaminated soil would be disposed off-site in a specially constructed facility.

- Unlimited removal and off-site disposal and backfill Kreher Park to its current elevation.
  Estimated cost: $42.9 million

- Unlimited removal and off-site disposal and restore Kreher Park as a wetland.
  Estimated cost: $45.1 million

S-4A: Limited removal and on-site disposal: At Kreher Park there is enough space for the construction of an on-site disposal cell for the contaminated material removed from the filled ravine and from Kreher Park's coal tar dump area. A solid cap would be placed over the disposal cell. The cost includes constructing the one-acre disposal cell. **Estimated cost: $3.8 million**

S-4B: Unlimited removal and on-site disposal: At Kreher Park there is enough space for the construction of an on-site disposal cell for all the contaminated material

Comparison of soil cleanup alternatives

Evaluation Criteria	No action	Containment using engineered surface barriers	Limited removal and off-site disposal	Unlimited removal and off-site disposal	Limited removal and on-site disposal	Unlimited removal and on-site disposal	Limited removal and on-site thermal treatment	Limited removal and off-site incineration	Limited removal and on-site soil washing
	S-1	S-2	S-3A	S-3B	S-4A	S-4B	S-5A	S-5B	S-6
Overall protection of human health and environment	None	L	H	H	M	H	H	H	M
Compliance with ARARs	None	L	H	H	M	M	H	H	M
Long-term effectiveness and permanence	None	L	H	H	M	M	H	H	M
Reduction of toxicity, mobility and volume through treatment	None	L	H	H	M	M	H	H	M
Short-term effectiveness	None	H	H	H	M	M	H	H	H
Implementability	None	H	H	M	H	H	H	M	M
Cost	None	L	M	H	M	M	H	H	H
State acceptance	Will be evaluated after public comment								
Community acceptance	Will be evaluated after public comment								

[shaded] = EPA recommends this alternative L= Low M= Medium H = High

removed from the filled ravine and contaminated soil from Kreher Park. A solid cap would be placed over the disposal cell. The cost includes constructing the four-acre disposal cell at Kreher Park. **Estimated cost: $6.4 million**

***S-5A: Limited removal and thermal treatment* (*EPA recommends this alternative*):** Thermal treatment is a way to remove contaminants from soil by heating it in an on-site mobile unit. Wood waste and other debris would be separated from the soil before treatment and the waste and debris would be transported off-site for disposal. The mobile unit for thermal treatment would be set up at Kreher Park. **Estimated cost: $6.8 million**

S-5B: Limited removal and off-site incineration: Contaminated soil suitable for incineration would be transported off-site to a facility for treatment and disposal. Wood waste and fly ash and cinders would be separated from soil selected for incineration and would be transported off-site for disposal. Fill material not contaminated would be returned and used as backfill. **Estimated cost: $11.8 million**

S-6: Limited removal and soil washing: Soil washing mechanically scrubs dug up soil to remove contaminants. The wastewater would be treated on-site before discharge. A mobile unit would be used to wash the soil on-site. Wood waste would be separated from the soil and transported off-site for disposal. **Estimated cost: $8.3 million**

Ground water cleanup alternatives

GW-1: No action. This alternative must be considered at every Superfund site. This would mean leaving contaminated ground water in place with no engineering, maintenance or monitoring. **Cost: $0**

***GW-2A and 2B: Containment using engineered surface and vertical barriers* (*EPA recommends this alternative*)**
This alternative would use man-made barriers to stop the movement of contaminants and keep infiltrating water from touching contaminated soil. At the Upper Bluff area the filled ravine would be capped. Kreher Park could be partially capped or entirely capped. (These are alternatives GW-2A and GW-2B.) Surface barriers do not disturb the contaminated area and only minimal maintenance is required. Vertical barrier walls are slurry walls or sheet piling that would be installed around the area of the contaminated ground water. Contaminated material may be disturbed during construction of vertical barrier walls and long-term maintenance such as ground water extraction may be required. Vertical barriers would not work for the Copper Falls aquifer because this deep aquifer is confined by the Miller Creek rock formation and installing barrier walls could compromise the aquifer. Clearing trees and digging a ground water diversion trench would be involved in containment with surface and vertical barriers.

Long-term operation and maintenance of the containment would include removing contaminated ground water with added ground water extraction wells and annual inspection of surface barriers. Contaminated ground water would be treated on-site before discharge. A cap for the entire Kreher Park would result in significant disturbance and added costs. Long-term operation, maintenance and monitoring costs may be lower if capping the entire Kreher Park reduces the volume of ground water extraction.

***GW-2A: Containment for the filled ravine and partial capping at Kreher Park.* (*EPA recommends this alternative*) Estimated cost: $9.2 million**

GW-2B: Containment for the filled ravine and capping the entire Kreher Park. **Estimated cost: $10.9 million**

A number of ground water cleanup methods were evaluated. In general, installing wells to deliver treatment may be difficult and effectiveness may be limited in areas of shallow ground water where there are buried structures and debris such as wood waste, bricks, and cinders. Some treatment would not work for the Copper Falls aquifer because this deep aquifer is confined by the Miller Creek rock formation and installing certain treatment wells may compromise the confinement. Alternatives GW-3 through GW-8 are ground water treatment alternatives.

GW-3: In-place treatment using ozone sparge: This treatment injects ozone into the ground through wells to clean up ground water contamination. Ozone sparging can be used at the Upper Bluff/Filled Ravine, at Kreher Park and in the underlying Copper Falls aquifer.
Estimated cost: $3.5 million

GW-4: In-place treatment using surfactant injection and removal using dual phase recovery: Wells would be installed below the Miller Creek rock formation at the Copper Falls aquifer. A "wetting agent" would be injected to lessen the tension between NAPLs and water. Site conditions at the Upper Bluff/Filled Ravine and Kreher Park areas would limit effectiveness of this alternative.
Estimated cost: $1.4 million

GW-5: In-place treatment using permeable reactive barrier walls: Permeable reactive barrier walls (walls with holes to allow ground water flow) would be built below ground to clean up ground water at the Upper Bluff/Filled Ravine and Kreher Park. **Estimated cost: $6.2 million**

***GW-6: In-place treatment using chemical oxidation* (*EPA recommends this alternative*):** Chemicals would be injected into wells to break up pollution in ground water. Hydrogen peroxide is an oxidant that is commonly used to break up contaminants in ground water and this method was used in a demonstration at this site. Hundreds of holes would be drilled in the filled ravine and at Kreher Park and injected with the chemical. **Estimated cost: $10 million**

GW-7: In-place treatment using electrical resistance heating: This treatment delivers electric current underground to convert ground water and water in soil to steam and to evaporate contaminants.
Estimated cost: $16 million

Comparison of ground water cleanup alternatives

Evaluation Criteria	No action	Containment using engineered surface barriers	Treatment - ozone sparge	Treatment - wetting agent (surfactant injection)	Treatment PRBs	Treatment chemical oxidation	Treatment electrical resistance heating	Treatment steam injection	Ground water extraction	Enhanced ground water extraction
	GW-1	GW-2A, 2B	GW-3	GW-4	GW-5	GW-6	GW-7	GW-8	GW-9A	GW-9B
Overall protection of human health and environment	None	M	M	H	M	H	H	H	M	M
Compliance with ARARs	None	H	H	H	H	H	H	H	H	H
Long-term effectiveness and permanence	None	L	H	H	L	H	H	H	M	M
Reduction of toxicity, mobility and volume through treatment	None	M	L	M	M	H	H	H	M	M
Short-term effectiveness	None	H	H	H	H	H	H	H	H	H
Implementability	None	H	H	H	H	H	H	H	H	H
Cost	None	H	L	L	H	H	H	H	L	L
State acceptance	Will be evaluated after public comment									
Community acceptance	Will be evaluated after public comment									

[shaded box] = EPA recommends this alternative   L= Low   M= Medium   H = High

GW-8: In-place treatment using steam injection: Steam injection forces steam underground through wells drilled in contaminated areas. **Estimated cost: $12.5 million**

Ground water extraction and treatment

Also called pump and treat, extraction wells with pumps pull contaminated ground water to surface holding tanks and then into treatment systems. Ground water extraction wells can be used for both shallow and deep ground water. Enhanced ground water extraction would install additional extraction wells in the Copper Falls aquifer to increase DNAPL removal and include continued operation of the existing wells. Ground water extraction requires installing an on-site treatment system to operate for an extended period of time. Alternatives GW-9A and GW-9B are extraction and treatment alternatives.

GW-9A: Existing ground water extraction system: The existing ground water extraction system extracts ground water from one well at the mouth of the filled ravine and DNAPL from wells installed in the underlying Copper Falls aquifer. Contaminated ground water is placed in a holding tank and then treated. **Estimated cost: $3 million**

GW-9B: Enhanced ground water extraction systems **(*EPA recommends this alternative for the Copper Falls aquifer*):** Same as GW-9A with wells added in the Copper Falls aquifer. Because ground water extraction can be a relatively slow process adding more wells would speed the ongoing ground water cleanup. **Estimated costs: Upper Bluff/Filled Ravine - $164,000, Kreher Park - $18.9 million, and Copper Falls aquifer- $6.4 million**

Sediment cleanup alternatives

The goal for sediment is to clean up areas in Chequamegon Bay with contaminant levels greater than 9.5 parts per million PAH in sediment. A part per million or ppm is a tiny measurement equal to one second in 12 days and is commonly used to express a chemical concentration where even small amounts can be hazardous.

In designing a dredging project a number of factors must be considered, including physical obstructions, site access, staging areas, potential release of contaminants during dredging, and community disturbance. Kreher Park would be used as a staging area for sediment removal activities including storing, stabilizing and treating dredged material. Precautions would be taken such as paving the marina parking lot to make sure contaminated sediment does not affect the soil underneath the staging area. Wood debris removed would be disposed or treated separately. Water would be drained from the sediment and the resulting wastewater would be treated and discharged into the lake. Removing water from sediment is called "dewatering." Dry excavation or "dry dredge" would involve building a wall off the shoreline, pumping out water and letting the bay bottom and shoreline dry before removing all contaminated sediment.

Sed-1: No action. This alternative must be considered at every Superfund site. It means leaving the sediment in place with no engineering, maintenance, or monitoring. **Cost: $0**

Sed-2: Sediment containment within a confined disposal facility, dredging, and monitoring: A confined disposal facility is an enclosure where contaminated sediment is placed and then capped with clean soil. The CDF would be constructed over about seven acres of lake bed and 13 acres of Kreher Park. Sheet piling would be used to enclose the CDF. The CDF would contain all of the contaminated sediment and soil. Sediment outside the area

Comparison of sediment cleanup alternatives

Evaluation Criteria	No action	Consolidation, confined disposal facility and monitoring	Removal, capping, treatment and disposal and monitoring	Dredging, treatment, and/ or disposal and monitoring	Dry excavation, treatment and/ or disposal and monitoring	Dry excavation, dredging, treatment and/or disposal and monitoring
	Sed-1	Sed-2	Sed-3	Sed-4	Sed-5	Sed-6
Overall protection of human health and environment	None	H	H	H	H	H
Compliance with ARARs	None	L	M	H	H	H
Long-term effectiveness and permanence	None	M	M	H	H	H
Reduction of toxicity, mobility and volume through treatment	None	M	M	H	H	H
Short-term effectiveness	None	M	M	L	L	L
Implementability	None	M	H	H	H	H
Cost	None	H	H	H	H	H
State acceptance	Will be evaluated after public comment					
Community acceptance	Will be evaluated after public comment					

▭ = EPA recommends this alternative L= Low M= Medium H = High

of the CDF with levels of PAH above 9.5 ppm would be dredged and placed in the CDF.
Estimated cost: $35 million.

Sed-3: Dredging, capping, treatment and/or disposal, and monitoring: Dredge about four feet of wood debris and sediment with PAH greater than 9.5 ppm before capping with 6 inches of clean material. Dewater and stabilize the sediment, and either dispose off-site or reuse after thermal treatment. Sediment areas outside the cap would be monitored. **Estimated cost range without and with treatment: $37.1 – $47.8 million**

Sed-4: Dredging, treatment, and/or disposal, and monitoring: Dredge all sediment with PAH greater than 9.5 ppm, dewater, and then either thermally treat on-site at Kreher Park for reuse after treatment or dispose off-site. After dredging, place a 6-inch cap of clean material over the work area. Under this alternative the greatest amount of sediment would be removed, treated and disposed off-site. **Estimated cost range without and with treatment: $49.9 – $67.7 million**

Sed-5: Dry excavation, treatment and/or disposal, and monitoring: Dry excavation in the Chequamegon Bay would involve building a sheet pile wall off the Kreher Park shoreline, pumping out water and letting the bay bottom and shoreline dry before removing all contaminated sediment over 9.5 ppm. Dewater and stabilize sediment and dispose sediment at a permitted landfill. **Estimated cost range without and with treatment: $78.9 – $91.8 million**

Sed-6: Dry excavation (inner bay) and dredging (outer bay), treatment and/or disposal, and monitoring (EPA recommends this alternative): Use dry excavation near shore for wood waste and contaminated sediment and dredging offshore for contaminated sediment with PAH greater than 9.5 ppm. Cap offshore area with 6 inches of clean material, dewater sediment and stabilize at Kreher Park and either dispose off-site or reuse after treatment.
Estimated cost range without and with treatment: $68.5 - $80.4 million

Evaluation of alternatives

Each of the soil, ground water and sediment cleanup alternatives was evaluated against the first seven of the nine criteria set by Superfund law (see criteria explanation in the box on page 4). EPA picked its recommended alternatives based on the following justifications. State and community acceptance will be evaluated after EPA receives public comments.

Soil

EPA believes that limited removal and thermal treatment (S-5A) will achieve the best balance among the nine criteria because a significant mass of contaminated soil will be removed. EPA recommends treating contaminated soil after removal. If this is not cost-effective, then off-site disposal is recommended. This alternative will significantly reduce exposure to soil contamination by people and wildlife, will comply with federal and state regulations, and is a cost-effective way to manage the most contaminated material. The “no action” option would not protect human health and the environment. Although unlimited removal and off-site disposal would provide a high level of human health and environmental protection, limited removal would also provide a high level of protection. Containment of contaminated materials and on-site disposal of contaminated material would limit access to people and wildlife and would result in reduced risk. However, the overall level of protection in containment and on-site disposal is lower because there is no reduction of contaminant mass and contaminants will remain on site.

Ground water

EPA proposes using engineered surface and vertical barriers with ground water extraction for the shallow ground water in Kreher Park and the Upper Bluff/ Filled Ravine (GW-2A). For the Copper Falls aquifer, enhanced ground water extraction is recommended (GW-9B). In addition, in-place treatment (GW-6) can be used to possibly enhance ground water cleanup since treatment results in the removal of a significant amount of contamination. EPA believes using containment with surface and vertical barriers, ground water extraction, and possible in-place treatment will achieve the best balance among the nine criteria. The actual length of time necessary to operate extraction and treatment systems will be determined by considering the progress of the system during the cleanup period. The “no action” alternative would not protect human health and the environment.

Sediment

EPA proposes that the best way to handle the near-shore contaminated sediment and wood debris would be dry removal, with dredging of off-shore contaminated sediment and wood debris (Sed-6). Dry dredging would address concerns over the possible release of free product in the wood waste and sediment into the water of the bay which could potentially re-contaminate areas that had been cleaned up. In addition, before any sediment removal is conducted, controls would be put in place to make sure that sediment would not be re-contaminated. EPA recommends treating contaminated sediment after removal. If this is not cost-effective, then off-site disposal is recommended. The combination of dry removal and dredging and treatment is protective of human health and the environment because it results in the decontamination of sediment and removes it from the environment. If the sediment were to be sent to a landfill for disposal without treatment it would still be contaminated though there would be no exposure to people or wildlife. Dry excavation, dredging and treatment and/or disposal comply with federal and state regulations and provide the highest level of effectiveness over the long term. Containment of contaminated materials and on-site disposal of contaminated material would make the contaminated areas inaccessible to people and wildlife and would result in reduced risk. However, the overall level of protection in containment and on-site disposal is lower because there is no reduction of contaminant mass and contaminants will remain on site. The "no action" alternative offers the least protection and is not in compliance with federal and state regulations.

Cleanup alternative scenarios

To organize all of these cleanup alternatives for soil, ground water and sediment and the numerous combinations, the feasibility study formed 10 cleanup "scenarios." This fact sheet will reference the scenarios as 1 through 10 and the scenarios are summarized in the chart on page 11.

Summary of the recommended scenario

EPA concluded the "no action" scenario would not protect people or the environment and eliminated it from consideration. EPA recommends Scenario 10

- Sediment cleanup in Chequamegon Bay would be a combination of dry removal (inner bay) and dredging (outer bay) with thermal treatment and/or disposal of removed sediment and wood waste.
- Soil cleanup at Kreher Park and the Upper Bluff/ Filled Ravine would be limited soil removal with thermal treatment or off-site disposal.
- Ground water clean up for shallow ground water at the Upper Bluff/Filled Ravine and Kreher Park would be engineered surface and vertical barriers with ground water extraction. Ground water cleanup at the Copper Falls aquifer would be enhanced ground water extraction. Also recommended is using in-place treatment to possibly enhance ground water treatment and extraction. Ground water cleanup and monitoring will continue for a longer period of time.

Scenario 10 is recommended because it will achieve substantial risk reduction by treating the contaminants (free product) that are the principal threat at the site and safely managing the remaining material. If thermal treatment is not feasible based on pre-design studies or the cost is significantly higher, the contaminated soil and sediment would be disposed off-site. This combination reduces risk sooner and costs are less than some of the other scenarios. All of the scenarios, except Scenario 1 (no action), will take several years to complete.

Next steps

Before making its final decision, EPA will review statements received during the public comment period and at the public meeting. Based on new information presented in the comments, EPA, in consultation with WDNR, may modify its proposed plan or select another scenario outlined in the plan. EPA encourages the public to review and comment on the proposed cleanup plan. Much more detail on the cleanup alternatives and scenarios is available in the official documents on file at the information repositories or EPA's Web site: www.epa.gov/region5/sites/ashland. EPA will respond to the comments in a document called a "responsiveness summary." This will be part of the record of decision that describes the final cleanup plan. The Agency will announce its decision on a cleanup plan in a local newspaper and will place a copy of the record of decision in the repositories and on the Web site.

For more information:

The remedial investigation and feasibility study and other documents are available on EPA and WDNR Web sites and at information repositories:

www.epa.gov/region5/sites/ashland
www.dnr.state.wi.us/org/aw/rr/cleanup/ashland.html

Vaughn Public Library
502 W. Main St.
Ashland

Bad River Public Library
72682 Maple St.
Odanah

WDNR Spooner Service Center
810 W. Maple St.
Spooner

Red Cliff
Environmental Protection Agency Office
37295 Community Road
Bayfield

		Cost	1	2	3	4	5	6
Scenario 1	**Under this option no cleanup work would be performed and all contamination would be left in place.**	**$0**	○	○	○	○	○	●
Sediment	No action (Sed-1)							
Soil	No action (S-1)							
Ground water	No action (GW-1)							
Scenario 2	**This is the least expensive scenario.**	**$39.9 million**	◉	●	◉	○	◉	●
Sediment	Dredging up to four feet, treatment and/or disposal, and monitoring (Sed-3)							
Soil	Containment using engineered surface barriers - caps (S-2)							
Ground water	Operate existing ground water extraction system (GW-9A)							
Scenario 3	**Estimated costs are dominated by sediment removal and enhanced ground water treatment.**	**$89.2 - $104.4 million**	●	●	●	◉	◉	●
Sediment	Dredging, treatment and/or disposal, and monitoring (Sed-4)							
Soil	Limited removal, off-site disposal, off-site incineration, on-site treatment (S-3A, S-5A, S-5B)							
Ground water	On-site treatment, enhanced ground water extraction (GW-3, 4, 6, 7, GW-9B)							
Scenario 4	**Estimated costs are dominated by sediment removal.**	**$74.9 - $88.9 million**	●	●	●	◉	◉	●
Sediment	Dredging, treatment and/or disposal, and monitoring (Sed-4)							
Soil	Limited removal, off-site disposal, off-site incineration, on-site treatment (S-3A,S-5A, S-5B)							
Ground water	Containment using engineered surface barriers, vertical barriers, partial caps, on-site treatment (GW-2A, GW-3, 4, 5, 6, 7)							
Scenario 5	**Estimated costs are dominated by construction of the disposal facility.**	**$38.5 - $45.9 million**	◉	◉	◉	○	◉	◉
Sediment	Consolidation, Confined Disposal Facility , and monitoring (Sed-2)							
Soil	Limited removal, on-site disposal (S-4A)							
Ground water	Containment using engineered surface barriers and capping entire Kreher Park, on-site treatment, enhanced ground water extraction, (GW-2B,GW-3, 4, 6, 7,8, GW-9B)							
Scenario 6	**Estimated costs are dominated by sediment removal.**	**$86 - $103.6 million**	●	●	●	◉	◉	●
Sediment	Dry excavation , treatment and/or disposal, and monitoring (Sed-5)							
Soil	Limited removal, off-site disposal, off-site incineration, on-site treatment (S-3A,S-5A, S-5B)							
Ground water	Containment using engineered surface barriers and partial caps, or capping partial or entire Kreher Park,on-site treatment, operate existing ground water extraction system, (GW-2A or 2B, GW-3 through 8, GW-9A)							
Scenario 7	**Estimated costs are dominated by sediment removal.**	**$85.6 - $108.1 million**	●	●	●	◉	◉	●
Sediment	Dry excavation, treatment and/or disposal, and monitoring (Sed-5)							
Soil	Limited soil removal, off-site disposal, off-site incineration, on-site treatment (S-3A, S-5A, S-5B)							
Ground water	On-site treatment, enhanced ground water extraction, (GW-3, 6, 7,8, GW-9B)							
Scenario 8	**Estimated costs are dominated by sediment removal.**	**$69.2 - $90.4 million**	●	●	●	◉	◉	●
Sediment	Dredging, treatment and/or disposal, and monitoring (Sed-4)							
Soil	Limited removal, off-site disposal, off-site incineration, on-site treatment (S-3A, S-5A, S-5B)							
Ground water	Containment using engineered surface barriers and partial caps or capping entire Kreher Park, on-site treatment, enhanced ground water extraction, , (GW-2A or GW-2B, GW-3, 5, 6, 7, 8, GW-9B)							
Scenario 9	**Removing all material from Kreher Park dominates the cost for this most expensive scenario**	**$123.2 million**	●	●	●	○	◉	●
Sediment	Dry excavation, treatment and/or disposal, and monitoring (Sed-5)							
Soil	Unlimited soil removal, off-site disposal (S-3B)							
Ground water	Enhanced ground water extraction (GW-9B)							
***Scenario 10**	**EPA's recommended alternative. Estimated costs are dominated by sediment removal.**	**$83.4 - $97.5 million**	●	●	●	◉	◉	●
Sediment	Combination of dry excavation and dredging, treatment and/or disposal, and monitoring (Sed-6)							
Soil	Limited soil removal, off-site disposal, off-site incineration, on-site treatment (S-5A recommended)							
Ground water	Enhanced ground water extraction, containment using surface and vertical barriers and partial caps, on-site treatment. (GW-2A, GW-6, GW-9B)							

Contact EPA

For more information about the meeting or special accommodations:

Patti Krause
EPA Community Involvement Coordinator
77 W. Jackson Blvd. (SI-7J)
Chicago, IL 60604
krause.patricia@epa.gov
800-621-8431, ext. 69506
8:30 a.m. - 4:30 p.m., weekdays

For questions about the proposed plan or technical information:

Scott Hansen
EPA Remedial Project Manager
77 W. Jackson Blvd. (SR-6J)
Chicago, IL 60604
hansen.scott@epa.gov
800-621-8431, ext. 61999
8:30 a.m. - 4:30 p.m., weekdays

For information about the meeting or other questions:

John Robinson
WDNR, Northern Region Team Supervisor
107 Sutliff Ave.
Rhinelander, WI 54501
john.robinson@wisconsin.gov
715-365-8976

For public health and fish advisory information:

Henry Nehls-Lowe
Wisconsin Department of Health
1 W. Wilson St.
Madison, WI 53702
henry.nehlslowe@dhs.wisconsin.gov
608-266-3479

For questions about the site or technical information:

Jamie Dunn
WDNR, Project Manager
810 W. Maple St.
Spooner, WI 54801
james.dunn@wisconsin.gov
715-635-4049

EPA
United States
Environmental Protection
Agency

Region 5
Superfund Division (SI-7J)
77 W. Jackson Blvd.
Chicago, IL 60604-3590

RETURN ADDRESS REQUESTED