



United States
Environmental Protection
Agency

Office of Public Affairs
Region 5
230 South Dearborn Street
Chicago, Illinois 60604

Illinois Indiana
Michigan Minnesota
Ohio Wisconsin

July 1990



U.S. EPA Proposes Plan for Interim Cleanup Action at Oconomowoc Electroplating Company, Inc. Superfund Site

Introduction

This fact sheet presents the recommended alternative the United States Environmental Protection Agency (U.S. EPA), in consultation with the Wisconsin Department of Natural Resources (WDNR), is proposing for cleaning up contaminated soils, ground water, waste electroplating sludge, and contaminated wetland sediments near the Oconomowoc Electroplating Company Inc. located in Ashippun, Wisconsin. It also discusses the other alternatives which were considered for cleaning up the site and explains the reasons for selecting the proposed remedy. This Proposed Plan identifies the recommended final alternatives for the contaminated soils, ground water, and sludge. The remedy is an interim action for the contaminated wetland sediments. Further study of the contamination problems in Davy Creek and the Davy Creek Wetlands will be needed to determine whether further action is necessary in these areas.

Feasibility Study evaluated all the alternatives identified as effective and appropriate for cleaning up the Oconomowoc Electroplating Company, Inc. site (Oconomowoc site). It was conducted as part of the federal **Superfund** program which provides for the investigation and clean up of hazardous substance sites throughout the United States.

U.S. EPA is required by Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA) to publish this Proposed Plan describing the recommended method for responding to the contamination problems at the Oconomowoc site. U.S. EPA will announce its final decision on this cleanup proposal after it has received and reviewed comments from the public.

This fact sheet also summarizes the results of the investigation and studies leading up to the Proposed Plan and informs readers about the upcoming public comment period.

Words that first appear in this print are defined in a glossary on page 17.

TABLE OF CONTENTS

- Introduction.....1
- Proposed Plan.....2
- Public Comment Period/Mailing List Addition Form.....Insert
- Site Background.....3
- Scope of Response Action.....4
- Results of the Remedial Investigation.....5
- Risks Posed By The Contamination.....7
- The Cleanup Objectives and Remedial Alternatives.....8
- Technologies Considered for Cleaning up the Oconomowoc Site.....10
- U.S. EPA'S Evaluation Criteria.....11
- Evaluation of Remedial Alternatives.....12
- Glossary.....17
- Available Information.....18
- TABLE 1 Contaminant Concentration.....6
- TABLE 2 Evaluation of Remedial Alternatives for the Lagoons.....13
- TABLE 3 Evaluation of Remedial Alternatives for Contaminated Soil.....14
- TABLE 4 Evaluation of Remedial Alternatives for Ground Water.....15
- TABLE 5 Evaluation of Remedial Alternatives for Davy Creek and Wetlands.....16

U.S. EPA'S Proposed Plan is based on the results of the **Remedial Investigation** and the **Feasibility Study**, conducted in consultation with WDNR. Completed in July 1990, the

Public Meeting:

Residents are encouraged to attend a public meeting to learn more about U.S. EPA's Proposed Plan for cleaning up the Oconomowoc site. U.S. EPA will present its proposal, answer questions, and accept comments during the public meeting. The public also may submit comments in writing (see "The Public Comment Period" insert). The meeting will be held

Date: July 25, 1990 **Date:** 7:00 p.m.
Location: Ashippun Town Headquarters
Highway 67
Ashippun, Wisconsin

This Fact Sheet Describes...

- The results of a study of cleanup alternatives for the Oconomowoc Electroplating Company, Inc. Superfund site,
- U.S. EPA's Proposed Plan for addressing contamination problems at the Oconomowoc site; and
- How to get additional information on the site and how to become involved in upcoming activities.



U.S. EPA's Proposed Plan

After reviewing each remedial alternative developed for the four areas of concern at the Oconomowoc site (lagoons, soil, ground water, and wetlands and Davy Creek), U.S. EPA recommends the alternatives below as its Proposed Plan for cleaning up the site (For more information on the contamination found at the site, see "Results of the Remedial Investigation" (page 5). Figure 1 illustrates the activities described below

U.S. EPA estimates that the installation cost of the remedy would be approximately \$4.8 million. With costs for operation and maintenance and long-term monitoring of the cleanup program, total costs are estimated to be \$6.2 million. The estimated time for designing and implementing the remedy is 13 to 21 months, and once the ground-water pumping units and treatment facility are installed on site, ground-water treatment would take up to 30 years.

Lagoons

- Close the Lagoons

The lagoons would be clean closed according to RCRA regulations. U.S. EPA would pump 72,000 gallons of contaminated lagoon water to a ground-water treatment system installed on site. Metals would be removed from the lagoon water using an ion exchange unit (For a description of the technologies mentioned in the Proposed Plan, see page 10). In addition, the lagoon water would undergo air stripping and carbon adsorption processes to remove **organic compounds**. Air stripping aerates, or exposes air to water, allowing the **volatile organic compounds (VOCs)** to escape the water by changing from a liquid to a vapor. The collected vapors will be treated before discharge to meet applicable emissions standards. Then, carbon adsorption removes the remaining organic contamination by passing contaminated water through a chamber that is packed with granular carbon particles which adhere to contaminants. On-going monitoring of the discharged water would be conducted to ensure that all discharge standards are met. Approximately 650 cubic yards of lagoon sludge and surrounding soils would be excavated, stabilized according to land disposal restriction requirements, and tested using the **Total Concentrate Leachate Procedure**, and disposed of off the site at a landfill regulated by the **Resource Conservation and Recovery Act (RCRA), Subtitle C**. The excavated area would be back-filled with clean soil, regraded, and replanted.

Contaminated Soil

- Excavate, stabilize, and dispose of contaminated soil at an off-site, RCRA-regulated disposal facility

U.S. EPA would excavate approximately 700 cubic yards of contaminated soil from the fill area and low-lying land. The contaminated soil would be stabilized according to land disposal restriction requirements, and transported to a RCRA-regulated Subtitle C landfill. The excavated areas would be filled with clean soil, regraded, and re-

planted.

Ground-water Contamination

- Pump and treat contaminated ground water and discharge treated water to Davy Creek

Shallow, contaminated ground water would be pumped from the soil by extraction wells to a water treatment unit installed on site. Ground-water treatment would include ion exchange, air stripping, carbon adsorption, and chemical oxidation. Ion exchange and chemical oxidation are processes through which the contaminants are chemically altered to break down contaminants into less harmful forms. Once the ground water is treated, it would be discharged to Davy Creek. On-going monitoring of the discharged water would be conducted to ensure that all federal and state discharge standards are met.

Contaminated Sediments in Davy Creek and Davy Creek Wetlands

- Excavate contaminated sediments in Davy Creek and Davy Creek Wetlands, stabilize, and dispose excavated material at an off-site, RCRA-regulated disposal facility

U.S. EPA would excavate contaminated sediment from the wetlands for dewatering in a sedimentation basin. A sedimentation basin allows contaminant particles to settle out of water so that contaminated material can be removed. The dewatered sediment will then be stabilized by mixing it with cement, and disposed of at an off-site, RCRA-regulated facility. Liquid from the dewatering process would be treated, as necessary, in the ground-water treatment system. Monitoring of the discharged water would be conducted to ensure that all federal and state water quality standards would be met.

Additional investigation would be done in the wetland and in Davy Creek to determine the degree and extent of contamination, and the degree and extent of adverse environmental effects caused by this contamination. Future additional sediment excavation, or another type of sediment remedy, may occur. The recommended alternative to remove contaminated sediment is an interim remedy to remove the worst of the contamination in the wetland. However, additional work is necessary.

Based on the information available at this time, U.S. EPA believes that these activities would protect human health and the environment, and comply with all relevant and appropriate federal and state regulations. In addition, the cleanup activities would be cost effective, and would use permanent solutions and treatment technologies. Based on new information and public comments, U.S. EPA and WDNR may modify the Proposed Plan.

**Place
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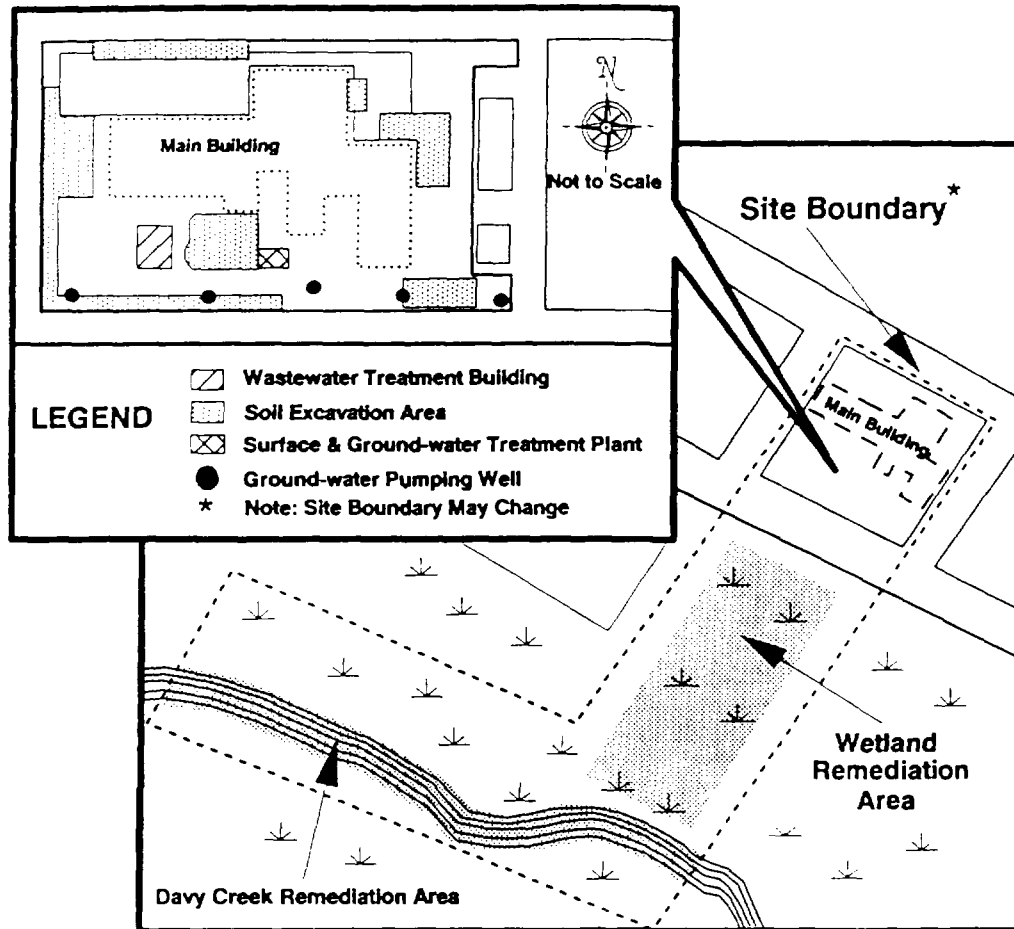


Figure 1: Proposed Cleanup Plan

Site Background

The Oconomowoc Superfund site lies on 10 to 15 acres of land at 2572 West Oak Street in the town of Ashippun, Wisconsin (see Figure 2). The site consists of a main building which houses company offices and electroplating equipment, a separate building for the wastewater treatment plant, parking lot areas, two wastewater treatment lagoons, and portions of Davy Creek and the Davy Creek Wetlands (see Figure 3). The Davy Creek Wetlands lie to the southeast of the site, and Davy Creek passes through these wetlands and within 500 feet of the site's southern boundary. Surface water and ground water from the site flow south toward the Davy Creek Wetlands.

Oconomowoc Electroplating Company, Inc. has been operating on the site since 1957 as an electroplating facility. The electroplating process coats unfinished products with metals using an electric current. In the course of its operations, the company has used a variety of metals and other materials, including cyanide and VOCs, to produce its products. As a result of these operations, Oconomowoc Electroplating Com-

pany Inc. has produced wastes containing metals, cyanide, and VOCs. The company was a generator of hazardous waste (F006) until 1984. The company reportedly discharged untreated wastewater, and may have dumped sludge into the wetlands. The company installed two lagoons to contain sludge, but because they were unlined, contamination to surface soils from the sludge occurred. The lagoons are regulated under RCRA Subtitle C.

In 1983, at the request of WDNR, U.S. EPA conducted an initial investigation of contamination at the Oconomowoc site, and placed the site on the National Priorities List, a federal roster of hazardous waste sites eligible for investigation and clean up under the Superfund program. Between 1983 and 1987, U.S. EPA and WDNR conducted several preliminary sampling studies at the site. These studies revealed contaminated sludge leaking from storage drums, and high concentrations of metals and cyanide in the wetlands south of the site.

Figure 2: Oconomowoc Site Location Map

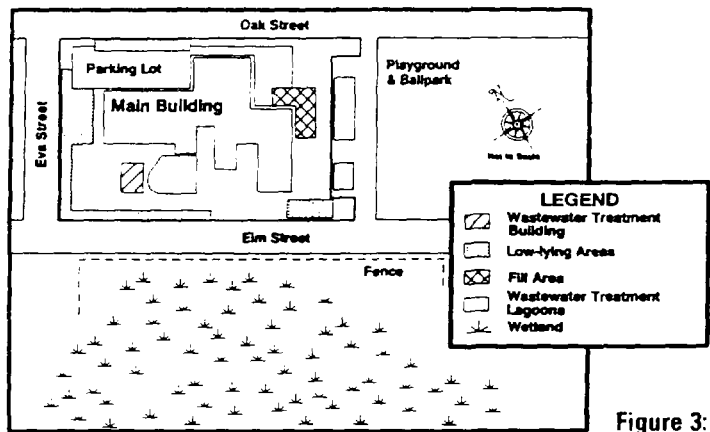
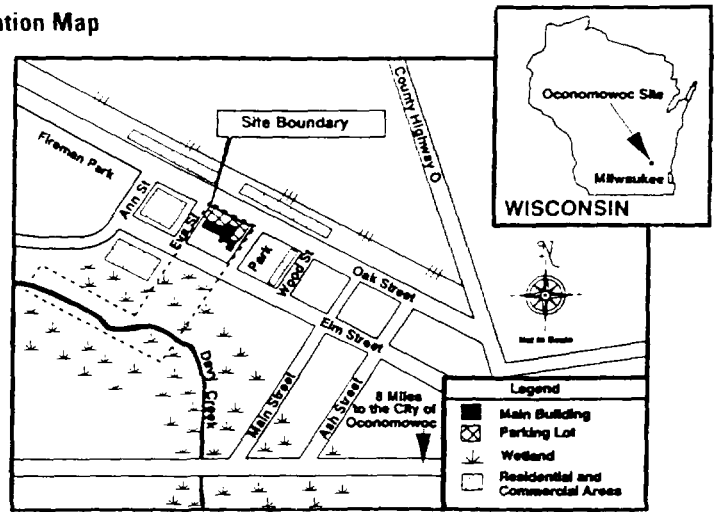


Figure 3: Oconomowoc Detail Map

Scope of Response Action

This is a complex site. There are several areas of concern, defined as "remedial response units". The operable units are as follows: the sludge lagoons, the contaminated soil areas, the contaminated ground water, the wetlands and Davy Creek, and the manufacturing plant building.

There are several principal threats posed by the Oconomowoc site. Ground water is contaminated in the shallow aquifer. The contaminated ground water poses a future health threat to the residents who use ground water as a drinking water source. Contaminated soil in the fill and lowland areas poses a threat to children who play in this area and to workers who may be involved in future development of this area. The contaminated soil and the sludge lagoons also act as potential sources of ground-water contamination in the future. The contaminated sediments also are toxic to the wetland environment.

The recommended alternative will remove the principal threats through:

- Removal and treatment of the contaminated ground water in order to eliminate the future drinking water health threat.

- Removal, treatment, and off-site disposal of the contaminated soil and portions of the contaminated wetland sediments in order to remove the potential ingestion health threat;
- Removal, treatment, and off-site disposal of contaminated wetland sediments in order to minimize toxic effects to the wetland; and
- Removal, treatment, and off-site disposal of the sources of ground-water contamination.

Action taken to remove contaminated sediments from Davy Creek and the wetlands is considered to be an interim action. Taken now, these actions would minimize environmental damage posed by the contaminated wetland. Further investigation of the contaminated wetland and Davy Creek would be conducted to determine if it continues to pose a threat to the environment. If further investigation is conducted, another Proposed Plan will be issued to select a final cleanup remedy for Davy Creek and the wetlands.

Results of the Remedial Investigation

In order to determine the nature and extent of the contamination problems at and near the site, U.S. EPA began a Remedial Investigation in 1988. As part of this investigation, U.S. EPA collected and analyzed sludge and liquid samples from the two lagoons, around the foundation of the main building, low-lying land on site, and the fill area (the fill area is a place where the wastes from the wastewater treatment processes were improperly stored). In addition, U.S. EPA installed several monitoring wells around the site to study ground water, and sampled residential and commercial ground-water wells located near the site. In addition to the Remedial Investigation, a separate study of contamination problems of the wetlands, known as an Extent of Contamination Study, was conducted.

The results of the Remedial Investigation and the Extent of Contamination Study indicated that four areas in and near the site are contaminated and pose a threat to human health or the environment. The manufacturing plant building may also be acting as a contaminant source. This area will be investigated in the future. The four areas which will be addressed at this time are the shallow ground water beneath the site, the wetlands south of the site, contaminated soil from the fill area and low-lying lands on the site property, and the lagoon area. These standards set forth the maximum amount of a particular contaminant that can be consumed and still protect human health. Table 1 (on page 6) presents a comparison of the contaminants found in each media with the background levels and/or health-based standards set for those contaminants.

Contaminants include a number of organic and **inorganic compounds** used in electroplating operations. Sludge samples collected from the lagoons are contaminated with a variety of VOCs. A number of inorganic compounds, such as metals and cyanide, are also found at high concentrations in sludge samples from the lagoons. The specific metals found include **cadmium, chromium, nickel, and zinc**. Water samples collected from the lagoons showed no inorganic compounds, but they did contain moderate concentrations of VOCs such as **acetone**.

Elevated levels of multiple inorganic contaminants were found in the residential wells. None of these contaminants were at levels exceeding federal drinking water standards. Levels of chromium and **lead** were detected in one well at levels above the **Wisconsin Preventive Action Limit**. The inorganic contaminants found in the residential wells were the same as those found in the on-site monitoring wells. Elevated levels of inorganic contaminants were found in the on-site monitoring wells. A number of organic contaminants such as **trichloroethene** are present in the on-site monitoring wells at levels exceeding federal drinking water standards and Wisconsin ground water quality standards. The ground water flow direction is toward Davy Creek, to the south-west.

Ground-water sampling indicated low levels of contaminants, such as **dichloroethene**, in residential wells, however, none of the contaminants were at levels exceeding federal drinking water standards. Ground-water sampling indicated elevated levels of contaminants in on-site monitoring wells. In shallow on-site monitoring wells drilled on the site, a number of organic contaminants such as trichloroethene are present at levels exceeding federal drinking water standards and Wisconsin ground-water quality standards. Elevated levels of metals also were found in on-site monitoring wells.

Across most of the site, soil sampled between the ground surface and five feet below contains a variety of metals, including **cadmium, chromium, nickel, and zinc**. Certain areas of the site property, including the eastern corner of the lagoons, sections around the main building, and the southeast corner of the site, show high concentrations of these metals. Trichloroethene is also found in soil samples from the southeast corner of the site. Most of the contaminants detected are within one foot of the ground surface, and no contamination is present in soil samples from depths below five feet.

Sampling conducted as part of the Extent of Contamination study indicated that portions of the Davy Creek Wetlands are contaminated with inorganic compounds including cyanide and a variety of metals. Portions of the contaminated wetlands were found to be acutely toxic to wetland organisms. The degree and extent of contamination in the wetland, and the degree of toxicity to wetland organisms, were not defined by the previous study. Additional studies of the wetland will be conducted in order to determine the degree and extent of contamination in the wetlands and in Davy Creek. The studies will also determine the degree of toxicity to wetland and stream organisms posed by the contaminants. U.S. EPA has determined that an additional study of the wetland and creek areas is needed, and will be conducted after a cleanup plan is chosen for the site.

Contamination at the site is believed to have resulted from direct discharges into the wetlands, overflow of sludge from the lagoons, improper storage of wastewater treatment sludge, and **leaching** from the lagoons. Contaminated soil, the sludge lagoons, and the contaminated wetlands could continue to contaminate ground water and surface water as surface water or rain water flows through the soil and enters the ground-water flow. For more information on the results of the Remedial Investigation and the Extent of Contamination study, readers are encouraged to consult the fact sheets and related documents that are available in the Administrative Record and Information Repository located at the F & M Bank in Ashippun.

Table 1

CONTAMINANT BY AREA OF CONCERN	CONCENTRATION FOUND	BACKGROUND	
SOIL (MICROGRAMS/KILOGRAM)			
Cadmium	1.6 - 6,100	<1.0	
Chromium	6.1 - 3,560	7.1 - 18.0	
Nickel	9.8 - 9,160	9.8 - 13.0	
Zinc	16.9 - 37,300	12 - 52	
SLUDGE (MICROGRAMS/LITER)			
Cadmium	117 - 1,600	<1.0	
Chromium	1,531 - 18,700	7.1 - 18.0	
Nickel	948 - 7,960	9.8 - 13.0	
Acetone	76 - 1,200	—	
WETLANDS (MICROGRAMS/LITER)			
Cadmium	4.4 - 3,600	<1.0	
Chromium	4.1 - 8,840	7.1 - 18.0	
Nickel	8.6 - 16,500	9.8 - 13.0	
Zinc	11 - 10,800	12 - 52	
Cyanide	0.25 - 2,690	<0.2	
HEALTH-BASED STANDARD			
GROUND WATER (MICROGRAMS/LITER)		MCL	PAL
		Maximum Containment Level	Preventive Action Limit
Trichloroethene	20 - 2100	5.0	18
Nickel	41 - 566	—	—
Dichloroethene	7 - 810	—	10

Risks Posed by the Contamination

Human Health Risk

Superfund law requires U.S. EPA to seek permanent solutions to protect people and the environment from hazardous chemicals. These solutions do not, however, mean removing every trace of contamination. What these solutions or cleanup projects do is remove, treat, or contain dangerous chemicals so that the remaining contamination is considered an acceptable health risk to anyone who may come in contact with it. To determine if the site poses unacceptable risks to human health, a baseline risk assessment was conducted for the site. The baseline risk assessment is a calculation of risks that the site would pose to human health if no remedial action is taken. The Superfund regulations establishes a risk range for Superfund sites between 1 in 10,000 and 1 in 1 million excess cancer cases, with 1 in 1 million being the point of departure (expressed in scientific notation this would be between 1×10^{-7} and 1×10^{-6}), with 1×10^{-6} being the level at which remedial actions are considered. The baseline risk assessment also evaluates risk to humans of contracting other, non-cancerous health effects from substances associated with the site. This calculation is made by dividing the human exposure estimates associated with the site by exposure levels that are determined to not cause adverse effects. Any result of this calculation which results in a hazard index that is greater than 1 is considered to present an unacceptable risk. Risks posed by the various scenarios are quantified and compared to these risk scenarios. This comparison can be used to justify action or inaction.

Using the results of the Remedial Investigation, U.S. EPA conducted a Public Health Environmental Risk Assessment to determine if contamination from the site poses a risk to human health, or the environment. For the human health portion of the Risk Assessment, U.S. EPA examined nine situations in which people could come into contact with contaminants, either at the present time or in the future, and evaluated the health risks associated with each of these situations. Several areas which were evaluated had calculated risk levels below the 10^{-6} risk range. These areas include: risks to children playing in the ballpark playground area southeast of the site, risks to nearby residents from inhaling resuspended dry lagoon sludge and eating vegetables grown in backyard gardens, risks to children and workers accessing the parking lot area, and risks to workers near the lagoon area.

The results of the Risk Assessment suggest, however, that soil in the fill area, lagoons, and low-lying land areas of the site pose an actual or potential human health risk. Direct contact with, or incidental ingestion of, soil from the fill and low-lying land areas on the site may pose a potential health risk if children were to play on the site property or if soil was disturbed in these areas. An unacceptably high level of risk, or hazard index of 1.83, was calculated for children accessing the fill and lowlands areas on the southeast side of the site. A hazard index of 3.70 was calculated for a worker involved in

possible future development of the fill area. Since these hazard indices present unacceptable risk levels, an action must be taken to prevent exposure to the fill and lowland areas.

U.S. EPA is concerned that the future movement of the contaminated ground water might result in unacceptable levels of contaminants in the nearby residential wells. The shallow aquifer on site is contaminated with VOCs and metals. The on-site monitoring wells show levels of these contaminants above health-based standards. The residential wells are showing impacts from the Oconomowoc site operations. Elevated levels of nickel and some chromium and lead have been seen in the residential well water quality results. The concentrations seen in the residential wells have been below the 10^{-6} risk level. Many of the residential wells draw water from the shallow aquifer, and some of these wells are located downgradient from the Oconomowoc facility. Risks were calculated for residents drinking the ground water assuming that in the future, shallow on-site contaminated ground water would migrate to residential wells. When these calculations were performed, an excess cancer risk of 3.33×10^{-3} (3.3 excess cancer cases in 1,000 people) and a hazard index of 3.2 were calculated for the future ground-water ingestion pathway. Since these risk levels exceed U.S. EPA's guidelines, an action must be taken to address the contaminated ground water. U.S. EPA is concerned that the future movement of the contaminated ground water might affect the nearby residential wells if contamination was to move into the shallow or deeper aquifers which provide the water source for residential wells.

Environmental Risk

As part of the Environmental Risk Assessment, a toxicity investigation was conducted by U.S. EPA to examine the effects on aquatic organisms of the contamination in the wetlands southeast of the site. In a laboratory, researchers exposed animals and plants to some of the contaminated sediments found in the wetlands and anticipated that some of the contaminants which have spread to the wetlands are acutely toxic to aquatic organisms. In addition, the contaminated soil in the fill area, lagoons, and low-lying land areas will continue to pose a risk to the ground water if not addressed. As surface water and/or rain water flows through these soil areas, contaminants will be released to the ground water flow system.

The Cleanup Objectives and Remedial Alternatives

Based on the results of the Remedial Investigation and Public Health/Environmental Risk Assessment, U.S. EPA's next step was to explore cleanup methods that would reduce the risks posed by the site. U.S. EPA identified the following objectives for this next step, called a Feasibility Study:

- Protect human health from any future risk posed by possible direct contact with incidental ingestion of contaminated surface soils;
- Control the sources of ground-water contamination and protect human health from any risk posed by potential movement of contaminated surface water or ground water;
- Comply with all state and federal environmental and health-based regulations, known as applicable or relevant and appropriate requirements or ARARs;
- Protect the environment through removal of contamination which is currently causing environmental harm, and prevention of further environmental degradation caused by the movement of existing contamination.

During the Feasibility Study, U.S. EPA identified and evaluated cleanup methods and technologies determined to be effective and appropriate for the clean up of the Oconomowoc site. U.S. EPA then conducted a detailed analysis of the most appropriate technologies (described on page 10) for the four main areas of concern: lagoons, on-site soils, ground water, and wetlands and Davy Creek. These technologies were combined to form alternative cleanup plans for the site, known as "remedial alternatives." The four areas of concern, referred to as "remedial response units," have a set of cleanup alternatives to choose from, each designed to prevent the contamination in that area from affecting public health or the environment. What follows is a list and brief description of the remedial alternatives that could be used to address contamination in each remedial response unit.

No Action

When identifying cleanup alternatives, U.S. EPA is required by Superfund law to consider a "no-action" alternative. This alternative serves as a basis for comparing and considering the benefits offered by the other alternatives. The no-action alternative would not include any cleanup activities; however, it would include a long-term, ground-water monitoring program at the site to observe possible changes in contaminant levels. The wetlands would also be monitored, including the annual collection of three surface water and two sediment samples. The samples would be tested for the presence of both VOCs and metals. There would be no installation costs associated with this alternative, but the net worth cost to operate the long-term monitoring program would be \$332,992.

Minimal Action

A second remedial alternative considered for all of the response units is the "minimal-action" alternative. It was retained for consideration because it can be implemented quickly and easily and would reduce, to some extent, health

risks associated with ingestion, inhalation, or direct contact with the contaminated areas. This alternative would not include cleanup activities; however, it includes the same monitoring program as the "no-action" alternative. In addition, approximately 1,200 feet of six-foot-high fencing would be used to enclose the areas that are presently accessible. Warning signs would be posted along the fence at 100-foot intervals. Other institutional controls included would be deed restrictions, preventing the installation of ground-water wells in the future. U.S. EPA estimates that the total installation net worth cost for the fencing would be \$15,200. With operations and maintenance and monitoring, the total cost of implementing this remedy would be \$348,192.

Remedial Response Unit 1: Lagoons

1. Pumping/Metal Removal/Air Stripping/Carbon Adsorption/Excavation/Off-site Disposal

Contaminated water in the lagoons would be removed, treated, and discharged to Davy Creek. The treated water would meet all applicable state and federal surface water quality criteria prior to discharge. Six hundred and fifty cubic yards of sludge and soil associated with the lagoons would be removed, treated and disposed of in an off-site, RCRA-regulated landfill. The lagoons would be clean-closed in accordance with RCRA subtitle C regulations, and the sludge treatment would be performed in accordance with land disposal restriction requirements. The excavated area would be backfilled with clean fill, regraded, and revegetated. U.S. EPA estimates that the total net worth cost of implementing this remedy would be \$481,662.

Remedial Response Unit 2: Contaminated Soil

1. Excavation/Stabilization/Off-site Disposal

Approximately 700 cubic yards (35 truckloads) of contaminated soil in the fill and lowland areas would be excavated, then stabilized, and disposed of off the site in a RCRA-regulated landfill. The soil removal would be performed in accordance with RCRA subtitle C regulations. Land disposal restriction requirements would be met. The excavated areas would be backfilled with clean fill, regraded, and revegetated. U.S. EPA estimates that the total net worth cost for implementing this alternative would be \$250,987.

2. Capping

A multi-layer cap would be placed over the contaminated soils in the fill and lowland areas, which would prevent water from penetrating into these places. The capping would be performed in accordance with RCRA regulations. In addition, contaminated soils outside this area would be excavated and consolidated under the cap. The excavated areas would be backfilled, regraded, and revegetated. U.S. EPA estimates that the installation costs for this alternative would be \$870,359. With operations, maintenance, and monitoring, the total net worth cost of implementing this remedy would be approximately \$1.1 million.

Remedial Response Unit 3: Ground Water

All the alternatives in this response unit involve pumping and treating contaminated ground water which lies just below the ground surface. The alternatives vary only in the technologies and methods used to accomplish those tasks. The ground-water pumping and treatment would be performed in accordance with state and federal environmental regulations. Ground water would be pumped until monitoring showed that concentrations were below federal and state ground-water quality standards. Treatment would be performed such that the discharged treated water would meet all applicable state and federal surface water quality criteria. Vapors would be collected such that treatment system air emissions would be below applicable air emission standards.

1. Subsurface Drain/Ion Exchange/Air Stripping/Carbon Adsorption/Chemical Oxidation (if necessary)

Shallow, contaminated ground water would be collected in a subsurface drainage system and pumped through an ion exchange unit to remove metals and cyanides, and an air stripper and carbon adsorption unit to remove VOCs. The treated ground water would be discharged to Davy Creek. There would also be ongoing monitoring of treated ground water to ensure that all state and federal discharge standards are met prior to discharging. Chemical oxidation would be used if a treatability study deems it necessary. U.S. EPA estimates that the installation costs for this alternative would be approximately \$1 million, or \$1.2 million with chemical oxidation. With operations, maintenance, and monitoring, the total net worth cost of implementing this remedy would be approximately \$3.1 million, or \$3.4 million with oxidation.

2. Ground-water Pumping/Ion Exchange/Air Stripping/Carbon Adsorption/Chemical Oxidation (if necessary)

Shallow, contaminated ground water would be extracted from the soil and pumped through an ion exchange unit to remove metals and cyanides; and an air stripper and carbon adsorption unit to remove VOCs. The treated ground water would be discharged to Davy Creek. Ongoing monitoring of treated ground water would be conducted to ensure that all state and federal discharge standards are met prior to discharging. Chemical oxidation would be used if a treatability study deems it necessary. U.S. EPA estimates that the installation costs for this alternative would be approximately \$402,310, or \$432,908 if chemical oxidation is used. With operations, maintenance, and monitoring, the total net worth cost of implementing this remedy would be approximately \$1.8 million.

Remedial Response Unit 4: Davy Creek and Davy Creek Wetlands

The alternatives considered for Davy Creek and the Davy Creek Wetlands are interim cleanup actions until further study can be conducted in these areas to determine whether further cleanup activities are necessary.

1. Excavation/Off-site Disposal

Contaminated sediments within the wetlands and creek would be excavated, dewatered in a sedimentation basin, and disposed of off the site after stabilization. The contaminated sediment would be stabilized in accordance with land disposal restriction requirements at the off-site RCRA Subtitle C facility. The excavated area would not be backfilled. U.S. EPA estimates that the total net worth cost of implementing this remedy, including the long-term monitoring program, would be \$4.3 million.

2. Excavation/Stabilization/Off-site Disposal

Contaminated sediments within the wetlands and creek would be excavated, dewatered in a sedimentation basin, stabilized in accordance with land disposal restriction requirements on site, and then disposed of off the site at a RCRA-regulated Subtitle C landfill. The excavated area would not be backfilled. U.S. EPA estimates that the total net worth cost of implementing this remedy, including the long-term monitoring program, would be \$3.6 million.

The Next Step

U.S. EPA initially evaluated each of the remedial alternatives using seven criteria (see evaluation criteria on page 11, Tables 2-5 on pages 13-16) to rank each remedial alternative rates against these seven criteria. Based on this evaluation, U.S. EPA in consultation with WQNR identified the recommended alternative as the Proposed Plan for cleanup. Before any decision on selecting a final cleanup plan is made, U.S. EPA will hold a public comment period during which community members are encouraged to comment on the Proposed plan and all of the alternatives considered for the site.

U.S. EPA will evaluate public and state acceptance of the Proposed Plan based on comments received from the public and state during a public comment period and may modify the plan, or choose another alternative, based upon the comments received (see "Public Comment Period" insert). Following this evaluation, U.S. EPA will sign a Record of Decision (a document which outlines the clean-up method chosen for the site and includes U.S. EPA's responses to the public's comments). Specific engineering plans and schedules for implementing the cleanup plan will be developed after the Record of Decision is signed.

Technologies Considered for Cleaning Up the Oconomowoc Site

U.S. EPA identified and evaluated a wide range of available cleanup technologies for addressing site-related contamination at the Oconomowoc Electroplating Company Inc. site. Of those identified, the following cleanup technologies were chosen to develop the remedial alternatives under consideration for the Oconomowoc site.

Collection Technologies

- Sedimentation Basins: A sediment basin can be a pond or other depression in the ground where water is left to sit to allow time for particles containing contamination to settle. The settled material is later collected and removed. This settling process is also referred to as a method of "dewatering" contaminated material.

Containment Technologies

- Capping: Capping is used to reduce the potential for human exposure to contaminants and prevent rain water from becoming contaminated as it seeps through contaminated soil or landfill wastes and enters the ground water. Caps are often made of multiple layers of material including soil, clay, and synthetic water-tight liners.

Ground-water Removal and Treatment Technologies

- Ground-water Pumping: Ground-water pumping involves constructing extraction wells to pump water from the ground to a ground-water treatment facility. Pumping can be used to prevent the movement of contaminated ground water or extract ground water for treatment and disposal.

- Subsurface Draining: Subsurface drainage systems can serve the same general purpose as a ground-water pumping system. The systems intercept moving contaminated ground water or prevent water from moving into a contaminated area. The drains are constructed by excavating a trench, lining the trench with filter fabric, adding a gravel bed and perforated drain pipe, and backfilling the trench with more gravel. The trench channels intercept ground water to an area where it is pumped for treatment.

- Carbon Adsorption: Activated carbon treatment, which is a widely-used technology for removing organic compounds, involves passing contaminated ground water

or air through a chamber that is packed with granular carbon particles. Organic compounds chemically bind to the carbon, removing the organic contamination from the water or air.

- Ion Exchange: Ion exchange is a process in which contaminated ground water is passed through a material which alters the chemical makeup of the contamination by exchanging molecules with the contaminants. This process effectively breaks down and stabilizes contaminants into a less harmful form.

- Air Stripping: Air stripping involves a tower packed with plastic pellets which aid in the aeration or exposure to air of VOCs in water. After it has been pumped to the top of a tower, water contaminated with VOCs filters through the pellets as a fan at the bottom blows air on the falling water. When exposed to air, VOCs escape the water by changing from a liquid to a vapor.

- Chemical Oxidation: Chemical oxidation uses highly-reactive chemicals to break down contaminants, particularly cyanide.

- Metal Precipitation: Metal precipitation is a multi-step process to remove metal contaminants dissolved in water. Chemicals are added to the water to change the metal contaminants into a solid material by altering the chemistry of the ground water. The metals can then be filtered out of the ground water.

Soil, Sediment, and Sludge Removal and Treatment Technologies

- Stabilization: A process which binds wastes into a solid mass using a cement-like substance, making it easier to handle for off-site disposal to a RCRA-regulated landfill. Stabilization can be used to treat solids, liquid, or sludge.

- Excavation and Removal: Soil, sediment, and sludge can be excavated, loaded onto trucks, and treated on site or hauled off the site to a treatment facility which operates according to federal or state regulations.

- Off-site Disposal: Contaminated soil and sludge could be disposed of off-site in a RCRA-regulated landfill which is operated under strict environmental regulations.

U.S. EPA's Evaluation Criteria

U.S. EPA uses the nine criteria described below to evaluate proposed cleanup alternatives. The first seven criteria are used in evaluating all the alternatives. The final two criteria, state and community acceptance, are used to further assess U.S. EPA's Proposed Plan after comments from the community have been received during the public comment period. See Tables 2-5 on pages 13-16 for an evaluation of the remedial alternatives for the Oconomowoc site.

1. Overall protection of human health and the environment

U.S. EPA assesses the degree to which the alternatives eliminate, reduce, or control threats to public health and the environment through treatment (e.g., air stripping), containment methods, or institutional controls

2. Compliance with state and federal regulations

U.S. EPA assesses whether the remedial alternatives being evaluated comply with all environmental state and federal regulations (applicable or relevant and appropriate regulations or ARARs) pertinent to the site conditions, or whether a waiver will be necessary.

3. Long-term effectiveness and permanence

The alternatives are evaluated based on their ability to maintain reliable protection of human health and the environment after implementation.

4. Reduction of contaminant toxicity, mobility, and volume through treatment

U.S. EPA evaluates each alternative based on how its treatment methods reduce the harmful nature of the contaminants, their ability to move, and the amount of contamination.

5. Short-term effectiveness

The length of time needed to implement each alternative is considered, and U.S. EPA assesses the risks that implementation of a particular alternative may pose to workers and nearby residents.

6. Implementability

U.S. EPA considers the technical (e.g., how difficult is the alternative to construct and operate?) and administrative (e.g., how will other government agencies and U.S. EPA coordinate monitoring programs?) feasibility of a remedy, including the availability of goods and services needed to implement the remedial alternative

7. Cost

U.S. EPA assesses the estimated capital and operation and maintenance costs as well as a present net worth which is the cost today of activities that will take place over the next 30 years

8. State acceptance

U.S. EPA requests state comments on the Feasibility Study and Proposed Plan and must take into consideration whether the state agrees with or opposes U.S. EPA's Proposed Plan

9. Community acceptance

U.S. EPA assesses community acceptance of the Proposed Plan by providing the public with an opportunity to have input in the remedial alternative selection process. A public comment period is held, and U.S. EPA considers and responds to comments received from the community prior to the selection of a final cleanup plan

Evaluation of Remedial Alternatives

Each remedial response unit—lagoons, soil, ground water, and Davy Creek and Davy Creek wetlands—for the Oconomowoc site contains a “no action” and “minimal action” alternative for consideration. Neither of these alternatives provide adequate protection of human health and the environment. As such, the no action alternative and the minimal action alternative are not available for selection for any of the remedial response units being addressed at the Oconomowoc site, and will not be addressed during the remainder of this analysis.

Remedial Response Unit 1: Lagoons

The only alternative available for selection within this remedial response unit is lagoon closure. Lagoon closure will provide for overall protection of human health and the environment by removing the contaminated materials from the site. This alternative will also comply with ARARs. The removal of contaminated lagoon materials will be performed in accordance with RCRA regulations. The subsequent treatment and disposal of the contaminated lagoon materials will be in accordance with Land Disposal Restrictions (LDRs).

As the contaminated materials are being removed from the site, lagoon closure provides for a high degree of long-term effectiveness and permanence, as well as a significant reduction in the toxicity, mobility and volume of contaminated lagoon material at the site.

Lagoon closure can be easily implemented. Careful planning and the utilization of personal protective equipment by site workers will minimize any short-term risks associated with lagoon closure.

The estimated net worth cost of lagoon closure is \$481,662.

Remedial Response Unit 2: Contaminated Soil

Two alternatives—capping, and excavation and disposal—were evaluated for this remedial response unit. Both of these alternatives will provide adequate protection of human health and the environment. Capping the contaminated soil would reduce any direct contact threats presented by the contaminated soil as well as reduce the ability of contaminants to leach into the ground water, while excavation, treatment and disposal of the contaminated soil at a RCRA Subtitle C facility would remove the contaminated soil from the site. In addition, each of the alternatives considered for this remedial response unit complies with ARARs.

Excavation and disposal of the contaminated soil will provide for a greater degree of long-term effectiveness and permanence than capping the contaminated soil. Excavation and disposal removes the risks from the site and would not require any long-term monitoring, while capping merely prevents the contaminated soil from presenting a risk and long-term monitoring would be necessary.

Excavation and disposal also provides for a reduction in the toxicity, mobility and volume of the contaminated soil by removing the material from the site and subsequently treating it. Capping does not provide for a reduction in toxicity, mobility and volume of the contaminated solid as no treatment is provided by this alternative.

Both of the alternatives considered in this remedial response unit are easily implemented. The implementation of each of the alternatives could result in short-term risks to workers, the community and the environment. The implemen-

tation of various measures (i.e. dust suppression, prudent health and safety practices) would reduce the risks presented by implementation of either alternative.

The net worth cost estimates for excavation and disposal and capping are \$ 250,987 and \$ 1.1 million, respectively.

Remedial Response Unit 3: Ground Water

Two alternatives were evaluated for this remedial response unit. Each of these alternatives provides for the collection of groundwater with subsequent treatment. The primary difference between the two alternatives is the method by which ground water is collected. The method of ground-water treatment is identical for each alternative. As such, each of the alternatives considered provide for overall protection of human health and the environment and would comply with ARARs.

In addition, each of the alternatives evaluated would provide an equal degree of long-term effectiveness and permanence by reducing the level of contaminants in groundwater. Each alternative provides for the treatment of ground-water and therefore provides for a reduction in the toxicity, mobility and volume of contaminants present in ground water.

Each alternative could be easily implemented. The implementation of each alternative could result in some short-term risks to workers, the community and/or the environment. These risks would be reduced by the implementation of various controls (i.e. dust suppression, prudent health and safety practices).

The net worth cost estimates for ground-water Alternative 1 and ground-water Alternative 2 are \$3.1 million and \$1.8 million respectively.

Remedial Response Unit 4: Davy Creek and Davy Creek Wetlands

Two alternatives were evaluated for this remedial response unit. Each of these alternatives provides for the excavation, stabilization and off-site disposal of Davy Creek and Davy Creek Wetlands sediments. The primary difference between the alternatives is that in one alternative, stabilization will occur on-site and in the other alternative, stabilization will occur off-site. Each of the alternatives evaluated provides for overall protection of human health and the environment.

Both of the alternatives evaluated would be only partially compliant with ARARs. As the proposed action for Davy Creek and Davy Creek Wetlands remedial response unit is an interim action, an interim action ARAR waiver will be invoked.

Each of the alternatives evaluated provides for removal of the contaminated materials from Davy Creek and Davy Creek Wetlands. As such, each alternative provides for a high degree of long-term effectiveness and permanence, as well as a significant reduction in the toxicity, mobility and volume of contaminated sediments in Davy Creek and the Davy Creek Wetlands.

Each alternative could be easily implemented. The implementation of each alternative could result in some short-term risks to workers, the community and/or the environment. These risks would be reduced by the implementation of various controls (i.e. dust suppression, prudent health and safety practices).

The net worth cost estimates for the Davy Creek and Davy Creek Wetlands alternatives are \$ 4.3 million for excavation, off-site stabilization and off-site disposal and \$ 3.6 million for excavation, on-site stabilization and off-site disposal.

Table 2: Evaluation of Cleanup Alternatives for the Lagoons

Remedial Alternatives for the Lagoons

CRITERIA	NO ACTION	MINIMAL ACTION	LAGOON CLOSURE
1. Overall protection of human health and the environment	Not protective of human health and the environment. Contaminants would continue to move off site and into ground water.	Not protective of human health and the environment. Contaminants would continue to move off site and into ground water.	Protection would be provided by complete removal of contaminated materials.
2. Compliance with ARARs	ARARs would not be met.	ARARs would not be met.	ARARs would be met.
3. Long-term effectiveness and permanence	Present future risks to human health and the environment would continue. Source of ground water contamination would remain.	Would reduce risks from direct contact, ingestion, and inhalation. Risk from future ground water ingestion would continue. Long-term monitoring and maintenance required.	Remove risks to human health and the environment associated with lagoons. No long-term maintenance required.
4. Reduction of Toxicity, Mobility, or Volume through Treatment	No reduction of toxicity, mobility or volume. Toxicity may increase if source of ground water contamination is not removed.	No reduction of toxicity, mobility or volume. Toxicity may increase if source of ground water contamination is not removed.	Complete reduction of toxicity, mobility and volume at the site.
5. Short term effectiveness	No risk to the public or workers during implementation.	No risk to the public or workers during implementation. Workers would require protection. Two weeks to implement.	Measures would be required to protect public and workers from dust and volatile emissions. Protective equipment would be required for workers. One month to implement.
6. Implementability	Monitoring easily implemented using existing wells. Long term coordination between U.S. EPA and state would be required.	Fencing and long-term monitoring easily implemented. Long-term coordination between U.S. EPA and state would be required.	Technologies are all demonstrated and commercially available. Permits and other documents required for off site disposal of water and solids would be needed.
7. Cost	\$332,992	\$348,192	\$481,662

Table 3: Evaluation of Cleanup Alternatives for Contaminated Soil

Remedial Alternatives for the Contaminated Soil

CRITERIA	NO ACTION	MINIMAL ACTION	EXCAVATION & DISPOSAL	CAPPING
1 Overall protection of human health and the environment	Not protective of human health and the environment. Contaminants would continue to move off site and into ground water.	Not protective of human health and the environment. Contaminants would continue to move off site and into ground water.	Protection would be provided by complete removal of contaminated materials.	Protection would be provided by overlying of contaminated materials. This would reduce the ability of the contaminants to leach into the ground water.
2 Compliance with ARARs	ARARs would not be met for ground water.	ARARs would not be met for ground water.	ARARs would be partially met.	ARARs would be met.
3 Long-term effectiveness and permanence	Present future risks to human health and the environment would continue. Risks from future ground water ingestion would continue.	Would reduce risks from direct contact, ingestion, and inhalation.	Remove risks to human health and the environment associated with contaminated soil. No long-term monitoring required.	Capping, with proper maintenance, would remove risks from direct contact, ingestion, inhalation, and off site movement by erosion. Source of ground water contamination would remain, however, capping would reduce the mobility of the contaminants. Long-term monitoring would be required.
4 Reduction of Toxicity, Mobility, or Volume through Treatment	No reduction of toxicity, mobility, or volume. Toxicity may increase if source of ground water contamination is not removed.	No reduction of toxicity, mobility or volume. Toxicity may increase if source of ground water contamination is not removed.	Complete reduction of toxicity, mobility, and volume would be achieved at the site.	Contaminant mobility would be reduced. No reduction in toxicity or volume.
5 Short-term effectiveness	No risk to the public or workers during implementation.	No risk to the public during implementation. Workers would require protection. Two weeks to implement.	Measures would be required to protect the public and workers from dust and volatile emissions during excavation. One month to implement.	Measures would be required to protect the public and workers from dust and volatile emissions during excavation and construction. One to two months to implement.
6 Implementability	Monitoring easily implemented using existing wells. Long term coordination between U.S. EPA and state would be required.	Fencing and long-term monitoring easily implemented. Long term coordination between U.S. EPA and state would be required.	Technologies are all demonstrated and commercially available. Permits and other documents required for off site disposal of water and solids would be needed.	Technologies are all demonstrated and commercially available. Permits and other documents required for off site disposal of water and solids would be needed.
7 Cost	\$332,992	\$348,192	\$250,987	\$1.1 million

* Costs are presented in present net worth which estimates the cost today of activities that will take place over the next 30 years.

Table 4: Evaluation of Cleanup Alternatives for Ground Water

Remedial Alternatives for Ground Water

CRITERIA	NO ACTION	MINIMAL ACTION	GROUND-WATER ALTERNATIVE 1	GROUND-WATER ALTERNATIVE 2
1 Overall protection of human health and the environment	Not protective of human health and the environment. Contaminants would continue to move off site and into ground water.	Not protective of human health and the environment. Contaminants would continue to move off site and into ground water.	Future risk would be decreased by the collection and removal of contaminants from the ground water.	Future risk would be decreased by the collection and removal of contaminants from the ground water.
2 Compliance with ARARs	ARARs would not be met for ground water.	ARARs would not be met for ground water.	ARARs would met or exceeded.	ARARs would be met or exceeded.
3 Long-term effectiveness and permanence	Present future risks to human health and the environment would continue. Risks from future ground water ingestion would continue.	Would reduce risks from direct contact, ingestion, and inhalation. Risk from future ground-water ingestion would continue.	Reduce risks to public health by reducing ground-water concentrations provided source areas are remediated. Long-term monitoring required.	Reduce risks to public health by reducing ground-water concentrations provided source areas are remediated. Long-term monitoring required.
4 Reduction of Toxicity, Mobility, or Volume through Treatment	No reduction of toxicity, mobility or volume. Toxicity may increase if source of ground water contamination is not removed.	No reduction of toxicity, mobility or volume. Toxicity may increase if source of ground water contamination is not removed.	Toxicity would be reduced by ground-water treatment. Mobility would be reduced. Volume would be reduced provided source areas are removed.	Toxicity would be reduced by ground-water treatment. Mobility would be reduced. Volume would be reduced provided source areas are removed.
5 Short-term effectiveness	No risk to the public or workers during implementation.	No risk to the public during implementation. Workers would require protection. Two weeks to implement.	Measures would be required to protect the public and workers from dust and volatile emissions during trench construction. One to two months to implement.	Measures would be required to protect the public and workers from dust and volatile emissions during excavation and construction. One to two months to implement.
6 Implementability	Monitoring easily implemented using existing wells.	Fencing and long-term monitoring easily implemented.	Technologies are all demonstrated and commercially available. Some testing would be required.	Technologies are all demonstrated and commercially available. Some testing would be required.
7 Cost	\$332,992	\$348,192	\$3.1 million	\$1.8 million

* Costs are presented in present net worth which estimates the cost today of activities that will take place over the next 30 years.

Table 5: Evaluation of Cleanup Alternatives for Davy Creek and its Wetlands

Remedial Alternatives for Davy Creek and its Wetlands.

CRITERIA	NO ACTION	MINIMAL ACTION	EXCAVATION AND OFF-SITE DISPOSAL	EXCAVATION, AND OFF-SITE DISPOSAL
1 Overall protection of human health and the environment	Not protective of human health and the environment Contaminants would continue to move off site and into ground water	Not protective of human health and the environment Contaminants would continue to move off site and into ground water	Protection would be provided by removal of contaminated materials. Environment would be protected by contaminant removal; however, some wetlands destruction may result.	Protection would be provided by removal of contaminated materials. Environment would be protected by contaminant removal; however, some wetlands destruction may result.
2 Compliance with ARARS	ARARS would not be met for ground water.	ARARS would not be met for ground water.	ARARS would met or exceeded.	ARARS would be met or exceeded.
3 Long-term effectiveness and permanence	Present future risks to human health and the environment would continue. Source of ground-water contamination would remain	Would reduce risks from direct contact, ingestion, and inhalation. Risk from future ground-water ingestion would continue. Long-term monitoring and operations and maintenance required	Removes risks to human health and the environment associated with the contaminated sediment. No long-term monitoring or operations and maintenance required	Removes risks to human health and the environment associated with the contaminated sediment. No long-term monitoring or operations and maintenance required
4 Reduction of Toxicity, Mobility, or Volume through Treatment	No reduction of toxicity, mobility or volume. Toxicity may increase if source of ground water contamination is not removed	No reduction of toxicity, mobility or volume. Toxicity may increase if source of ground water contamination is not removed	Reduction of toxicity, mobility and volume would be achieved at the site	Reduction of toxicity, mobility and volume would be achieved at the site
5 Short-term effectiveness	No risk to the public or workers during implementation	No risk to the public during implementation. Two weeks to implement	Measures would be required to protect the public and workers from dust, volatile emissions and contaminant movement during excavation. Three months to implement.	Measures would be required to protect the public and workers from dust and volatile emissions during excavation and construction. One to two months to implement.
6 Implementability	Monitoring easily implemented using existing wells. Long-term coordination between U.S. EPA and State would be required.	Fencing and long-term monitoring easily implemented. Long-term coordination between U.S. EPA and State would be required.	Technologies are all demonstrated and commercially available. Permits and other documents required for offsite disposal would be needed.	Technologies are all demonstrated and commercially available. Long-term coordination between U.S. EPA and State would be required.
7 Cost	\$332,992	\$348,192	\$4.3 million	\$3.6 million

16

* Costs are presented in present net worth which estimates the cost today of activities that will take place over the next 30 years

Glossary

ARARs Applicable, or relevant and appropriate regulations pertinent to the hazardous substances found at a Superfund site

Acetone Acetone is a colorless, extremely flammable liquid used as a solvent in electroplating processes, in the production of lubricating oils, and in various pharmaceuticals and pesticides. Inhalation of acetone can cause headaches, fatigue, and bronchial irritation

Aquifer A layer of rock or soil below the surface of the earth where water collects. Aquifers are capable of collecting, storing, transmitting, and yielding water to wells, and are often a source of drinking water

Cadmium Cadmium is a bluish-white metal used in electroplating, batteries, fire protection systems, and power transmission wire. Inhalation of cadmium over long periods of time has been associated with kidney problems, high blood pressure, anemia, and lung, kidney, and prostate cancers.

Chromium Chromium is a metal used in electroplating, photography, and the production of paint pigments. Chromium exists in two forms: trivalent and hexavalent. Trivalent chromium is found naturally in the environment and is relatively harmless. Hexavalent chromium is a man-made material that, with prolonged contact, can cause lung and other respiratory cancers, ulcers, and dermatitis

Cyanide A group of inorganic compounds used to produce metal products and pharmaceutical compounds. Exposure to high levels of cyanide can prevent the flow of oxygen to body tissues and produce harmful effects on the liver, kidneys, skin, and central nervous system. Long-term exposure to cyanide has been associated with abdominal pains, muscular weakness, and shortness of breath

Dichloroethene A clear, colorless, liquid used in latexes, film coatings, lacquers, and certain fibers. Exposure to it can cause damage to the central nervous system, liver, and kidneys. Dichloroethene also is a known carcinogen.

Feasibility Study The second part of a two-part study, known as a Remedial Investigation-Feasibility Study, conducted at a Superfund site. The Feasibility Study is performed to identify and evaluate remedial alternatives for addressing contamination problems found during the Remedial Investigation

FOG A type of electroplating sludge hazardous waste.

Inorganic Compounds One of two classes of chemical compounds, inorganic and organic. Inorganic compounds are distinct from organic compounds because they do not contain carbon. Water, table salt, oxygen, and ammonia are examples of inorganic compounds. Inorganic compounds found at the site include cyanide, chromium, copper, and lead.

Leaching The process in which a fluid, such as water, dissolves materials in soil, carrying the materials through the soil as it travels. Leaching may result in hazardous substances entering the ground water as rain water trickles through contaminated soil.

Lead Lead is a metal used in electroplating processes, solder, foil, construction equipment, and as a gasoline additive. The use of lead in gasoline and paint has been sharply restricted or eliminated by federal regulations. Exposure to low levels of lead over long periods of time can lead to brain, bone, and neurological damage. Lead has also been linked to learning disabilities in children

Net Worth The term used for the total cost of a remedial alternative in terms of today's dollars

Nickel Nickel is a metal used in electroplating, electronic circuits, and coins. Nickel can enter the body through inhalation, ingestion, or absorption through the skin. Nickel is flammable and toxic as a dust or fume

Organic Compounds One of two classes of chemical compounds, organic and inorganic. Organic compounds are distinguished from inorganic compounds because they contain carbon. Examples of substances which contain organic compounds are petroleum, solvents, and pesticides. Organic compounds found at the site include methylene chloride, trichloroethene, and acetone

Remedial Investigation The first part of a two-part study called a Remedial Investigation and Feasibility Study. In a Remedial Investigation, information is collected and analyzed to define the nature and extent of contamination at a Superfund site

Remedial Response Unit A term which refers to a portion of a Superfund site where action is undertaken in incremental steps to remedy risks to human health or the environment. U.S. EPA identifies remedial response units to address problems at separate portions of a site.

Resource Conservation and Recovery Act (RCRA), Subtitle C A federal law that established a regulatory system to track hazardous substances from the time of generation to disposal. The law requires safe and secure procedures to be used in treating, transporting, storing, and disposing of hazardous waste sites. A Subtitle C landfill is a type of landfill that requires a multi-layer cap made of soil, a clay cap, and an impermeable liner

Scientific Notation In dealing with particularly large or small numbers, scientists and engineers have developed their own "short hand" means of expressing values. For example, 1,000,000 can be written as 1×10^6 , and 1:1,000,000 can be written as 1×10^{-7} .

Superfund The term commonly used to refer to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the United States Congress in 1986. The Superfund, which is administered by U.S. EPA, provides for the investigation and clean up of hazardous waste sites when the parties responsible for the problem are unable or unwilling to do so

Total Concentrate Leachate Procedure A test to determine if a stabilized material is safe to place in a RCRA Subtitle C landfill

Toxic A chemical is toxic if it damages living tissue, causes the central nervous system, or causes birth defects. Illness, or death when eaten, drunk, inhaled, or absorbed through the skin

Trichloroethene An organic compound primarily used as a solvent for oils, waxes, fats, and in electroplating processes. Short-term exposure to high concentrations of trichloroethene can irritate the eyes and mucous membranes, and can produce narcotic effects. Long-term exposure to this compound may cause cancer

Volatile Organic Compounds (VOCs) Volatile organic compounds are organic compounds that easily evaporate or vaporize. A quality standard set for all substances detected or having reasonable probability of entering into ground-water systems. Industrial solvents contain VOCs, and many VOCs are toxic

Wisconsin Preventative Action Limits Wisconsin ground water quality standards set for all substances detected or having reasonable probability of entering into ground-water systems

Zinc A metal used in electroplating, auto parts, fuses, tin and gutters. Zinc is an essential nutrient to plants and a High concentrations of zinc in water can be harmful to f

Available Information

Anyone desiring additional information about the Superfund process or the activities conducted by U.S. EPA at the Oconomowoc site is encouraged to visit the Information Repository which contains various documents that have been prepared for the site. Copies of documents including applicable laws, the Remedial Investigation Work Plan, the Remedial Investigation Report, the Feasibility Study Report, and other site-related documents are available in the Repository located at:

F & M Bank

N533 Highway 67
Ashippun, Wisconsin
(414) 474-4416

Hours:

Monday to Thursday	8 a.m. - 4 p.m.
Friday	8 a.m. - 6 p.m.
Saturday	8:30 a.m. - 11:30 a.m.
Sunday	Closed

An Administrative Record file containing additional documentation also has been established at the F & M Bank. For further information on the Oconomowoc site, please contact:

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