PROPOSED PLAN FOR THE OCONOMOWOC ELECTROPLATING COMPANY, INC. SITE

INTRODUCTION

The Oconomowoc Electroplating Company, Inc. (OECI) site is a 10-acre Superfund site located at 2573 Oak Street in Ashippun, Wisconsin. This Proposed Plan identifies the Preferred Alternative for restoring the contaminated groundwater at the OECI site pursuant to a Record of Decision (ROD) amendment. It provides the rationale for this preference, and includes summaries of other cleanup alternatives that were evaluated. This document is issued by the U.S. Environmental Protection Agency (EPA), the lead agency for site activities, and the Wisconsin Department on Natural Resources (WDNR), the support agency. EPA, in consultation with WDNR, will select a final remedy for the site after reviewing and considering all information submitted during the 30-day public comment period. EPA, in consultation with the WDNR, may modify the Preferred Alternative or select another response action presented in this Proposed Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all the alternatives presented in this Proposed Plan.

EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The Proposed Plan summarizes information that can be found in greater detail in the Focused Feasibility Study (FFS) report and other documents contained in the Administrative Record for this site. EPA and the State encourage the public to review these documents to gain a more comprehensive understanding of the site and Superfund activities that have been conducted to address the contamination. The Administrative Record for the OECI site can be found at the following locations:

Ashippun Town Hall
Oconomowoc Public Library
200 W South St.

EPA's Chicago office
77 W Jackson Blvd.
Chicago, IL 60604

And on the web at:
www.epa.gov/region5/sites/oconomowoc

EPA is evaluating five remedial options for the OECI site. These include:

1. No Action
2. Monitored Natural Attenuation (MNA)
3. Source Area Removal or In Situ Treatment and MNA
4. Source Area Removal or In Situ Treatment, Groundwater Extraction and Treatment, and Long-Term Monitoring
5. Source Area Removal or In Situ Treatment, Substrate Injection, MNA, and provisions for contingency actions

These remedial options are evaluated in detail with respect to nine evaluation criteria that the Agency has developed to address the statutory requirements and preferences of CERCLA. The alternatives are analyzed individually against each criterion and then compared against one another to determine their respective strengths and weaknesses and to identify the key trade-offs that must be balanced for the site. The results of the detailed analysis are summarized so that an appropriate remedy consistent with CERCLA can be selected.

The selection of a Preferred Alternative for the OECI site is currently being discussed with the WDNR.

SITE BACKGROUND

OECI began operation in 1957. Electroplating processes performed at the facility used nickel, chrome, zinc, copper, brass, cadmium, and tin. Process operations at OECI included chromate conversion, coating, and anodizing. OECI ceased operations in October 1990 due to financial hardship. The electroplating facility was demolished and removed in May 1992.

Wastewaters generated by OECI during operation included: 1) cyanide-bearing wastewater from zinc, copper, nickel, brass, and cadmium plating; 2) chromium-bearing wastewater from chrome conversion operations; and 3) acid-alkaline wastewater from cleaning, anodizing, and plating operations. Degreasing processes were also performed at OECI and contributed a number of Volatile Organic Compounds (VOCs) to the waste stream, including chloroform, 1-1-dichloroethane, 1-2 dichloroethane, 1,1-dichloroethylene, tetrachloroethylene, 1,1,1-trichloroethane, and trichloroethylene.

Improper storage and disposal of waste products from process operations resulted in the contamination of site soils, wetland sediments, and groundwater with heavy metals and VOCs. A Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) preliminary assessment was performed in May, 1983 by the USEPA Field Investigation Team (FIT). The site received a Hazard Ranking System score of 31.86 and was placed on the National Priorities List (NPL) on September 8, 1983. In a letter dated September 18, 1985, USEPA notified OECI that they had been identified as a Potentially Responsible Party (PRP) under CERCLA for the documented or threatened release of hazardous substances. No other responsible parties have been named to date. On October 9, 1985, OECI informed USEPA that they did not have the financial resources to conduct a Redial Investigation/Feasibility Study (RI/FS) and formally declined to participate in the CERCLA process.

During the summer of 1986, a Technical Assistance Team (TAT), a contractor to the USEPA Emergency Response Section, conducted a limited sediment sampling survey in the wetlands. The analytical results from these samples indicated high concentrations of metals and cyanide in the wetlands area immediately south of OECI. In March and April of 1987, the TAT sampled over 300 acres of wetlands along Davy Creek, the OECI sludge lagoons, and soils at the ballpark located southeast of OECI. The analytical results indicated that approximately 75,000 square feet of the wetlands adjacent to OECI and the sludge lagoons were contaminated with cadmium, chromium, nickel, copper, zinc, and cyanide associated with the facility's electroplating processes. The subsequent

Remedial Investigation concluded that metals along with volatile organic compounds had contaminated the soil and groundwater at the site and posed a risk to human health through dermal contact and ingestion.

The 1990 ROD identified four Operable Units (OUs) at the site: OU-1) surface water, metal hydroxide sludge and contaminated soils associated with the two RCRA Subtitle C lagoons located behind the OECI facility, OU-2) contaminated soil around the OECI facility not associated with the RCRA lagoons, OU-3) contaminated groundwater associated with the site, and OU-4) the most highly contaminated sediments in the Davy Creek/Wetlands area. A 1991 Explanation of Significant Differences (ESD) added a fifth operable unit (OU-5) to provide for dismantling the facility and disposing of associated debris, and a 1994 ESD addressed the final cleanup for the adjacent wetlands and Davy Creek.

The remedial action carried out under the ROD comprised multiple removal activities to eliminate the source of contamination from the site. These included:

- Excavation and disposal of the lagoon sludge and surrounding soils
- Excavation and disposal of non-lagoon contaminated soil and debris from the site
- Excavation and disposal of sediments contaminated with metals from the wetlands adjacent to Davy Creek

These source removal activities were successfully completed during the early to mid 1990's.

In addition to the removal activities, the ROD required the extraction and treatment of contaminated groundwater (OU-3) to restore subsurface conditions to Wisconsin groundwater quality standards. The OECI groundwater extraction and treatment system was built in 1996, and it ran until EPA authorized its shutdown in July 2004. Extraction and treatment was modified pursuant to the recommendations contained in a Remediation System Evaluation study, conducted in March 2000, and stopped completely after a February 2004 Hydrogeologic Investigation and Groundwater Extraction System Evaluation study found that "The high organic carbon content in the aquifer results in a large source of TCE sorbed to the soil, and limits both the migration of TCE away from source area and the ability to remediate the site through pumping and treating the groundwater."

The cessation of groundwater extraction and treatment fundamentally changes the 1990 remedy for OECI and necessitates a ROD Amendment. Contaminant concentrations in the groundwater beneath the site continue to be above remedial standards despite successful completion of removal activities and the operation of the groundwater extraction and treatment system from 1996 to 2004.

SITE CHARACTERISTICS

The site comprises 4 acres formerly occupied by the OECI facility and 6 acres of adjacent wetland. Davy Creek flows through the wetland approximately 500 feet south of the area once occupied by the treatment facility before discharging to the Rock River about a

mile to the west. The area immediately surrounding the OECI Site is a mixture of light industrial, commercial, municipal, and residential property. Residents and businesses in the town of Ashippun rely on groundwater for their drinking water. There is no municipal water supply. A map of the site is provided in Figure 1.

The removal actions completed during the early to mid 1990's and eight years of extracting and treating contaminated groundwater have effectively controlled potential exposures to contamination associated with the site above levels that constitute a risk to human health or the environment. Nevertheless, an area of residual contamination remains above remedial standards (Figure 2). In addition, after shutting down the treatment plant, routine groundwater monitoring revealed the low-level presence of VOCs in several nearby private wells. Contaminant concentrations in the private wells are currently below Wisconsin Enforcement standards, and EPA conducted a human health risk assessment in February 2010 to determine the potential effects of exposure to groundwater from the private wells, which concluded that the low level VOCs found in these private wells should not contribute to any detrimental health effects of those citizens using these wells for drinking or bathing purposes.

Contaminants of Concern:

- Tetrachloroethene (PCE)
- Trichloroethene (TCE)
- cis-1,2-Dichloroethene (CIS)
- Vinyl Chloride (VC)
- 1,1,1-Trichloroethane (TCA)
- methylene chloride

SCOPE AND ROLE OF THE ACTION

This action is an Amendment to the 1990 Record of Decision (ROD) for OECI, and will be the final action for the site. The decision to shut the treatment plant down in 2004 fundamentally altered the selected remedy, and a fundamental change in the selected remedy requires that EPA formally amend the ROD. EPA's strategy for completing the remedial action focuses on monitoring the groundwater to ensure that potential exposures remain under control, treating the source of the residual contamination, providing relief to proximal receptors, and reducing the time it takes to achieve remedial standards.

SUMMARY OF THE SITE RISKS

Human Health Risks

The 1990 Baseline Risk Assessment conducted for the Remedial Investigation found that the risk associated with potential groundwater ingestion of COCs at levels found in on-site monitoring wells had an excess cancer risk of 3.5×10^{-3} and a hazard index of 3.2. Nevertheless, chemical analyses of residential well water near the site at that time showed no concentrations above health-based regulatory limits. A change in laboratory detection

limits in 2004, however, documented the low-level presence of vinyl chloride in several nearby residences. These low-level detections exceed the Wisconsin Preventive Action Limit (PAL), which is 100 times lower than the federal Maximum Contaminant Level (MCL) for vinyl chloride. The MCL is the highest level of a contaminant that is allowed in drinking water by the Safe Drinking Water Act. The PAL is 10 times lower than the Wisconsin Enforcement Standard (ES), which is the lowest health based standard that requires a response action.

Because the Wisconsin PAL was exceeded in a few nearby private wells, a new human health risk assessment for residential well exposure was prepared by EPA in 2010. The assessment was based on the highest historical concentration of VOCs detected in the affected water supply wells. Ingestion of well water and inhalation of VOCs during daily showering were both evaluated in the assessment. Of the 10 residential water supply wells evaluated, 8 exceeded the WAC NR 140 PAL. Wells PW-04, PW-05, PW-07, PW-08, PW-09, and PW-11 had multiple historical exceedances of VC. Well PW-03 had multiple historical exceedances of TCE. Well PW-01 had a single exceedance of methylene chloride in April of 2007.

EPA determines the probability of a non-cancer adverse health effect by calculating a hazard index. The hazard index is a ratio of a single substance exposure level over a specified period of time to a reference dose of the same substance derived from a similar exposure period. It is recommended that the hazard index of an exposure to a chemical of concern (COC) be below or equal to 1, which is the level at which no adverse human health effects are expected to occur. For cancer risk, USEPA recommends a screening level that would be equal to or less than a one in a million ($1x10^{-6}$) chance of developing cancer from a lifelong exposure to a contaminant.

The results of the human health risk assessment indicate that all of the historical exceedances of the public wells are well below non-cancer risk screening levels. The lifetime cancer risk for these wells is either below or within the US EPA's acceptable cancer risk range. Therefore, based upon the historical data, the low levels VOCs found in these private wells should not contribute to any detrimental health effects of those citizens using these wells for drinking or bathing purposes.

Ecological Risks

An ecological risk assessment was conducted during the RI/FS to evaluate whether contaminants present at the site and surrounding areas represent a potential risk to exposed ecological receptors. The assessment determined that because the site is located in an area that has generally been developed with residential dwellings, commercial/industrial facilities, and recreational complexes, these areas are not significant habitats for any sensitive plant or animal populations. The only natural area of substantial size is the Davy Creek wetlands area southwest of the site.

Given the extent of residual contamination, there is a relatively insignificant migration of contaminants from the site occurring compared to the previous direct discharge of contaminants to the wetlands area. Although immediate risks to the Davy Creek wetlands area were not identified, horizontal transport of soluble organic contamination away from the site via the shallow groundwater was determined to be occurring and a

potential threat. The RI/FS recommended minimizing the quantity of site contamination that could migrate to the wetlands area during remediation efforts in order to minimize ecological impact.

REMEDIAL ACTION OBJECTIVES

EPA Guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites and the NCP define Remedial Action Objectives (RAOs) as medium-specific or site-specific goals for protecting human health and the environment that are established on the basis of the nature and extent of the contamination, the resources that are currently and potentially threatened, and the potential for human and environmental exposure.

The RAOs for remediation of groundwater at the Site include the following:

- Prevention of future residential exposure to groundwater that exceeds federal MCLs or Wisconsin State Enforcement Standards
- Restoration of groundwater exceeding federal MCLs and Wisconsin State Enforcement Standards in a reasonable timeframe given the site-specific circumstances

SUMMARY OF REMEDIAL ALTERNATIVES

Remedial alternatives for the OECI site are presented below. The alternatives are numbered to correspond with the numbers in the FFS report.

Alternative 1: No Further Action

The objective of the No Further Action alternative is to provide a baseline for comparison to other alternatives, as required by the NCP. Alternative 1 does not include any further remedial action for groundwater, nor does it include monitoring or other institutional controls.

- *Estimated Capital Cost: $0*
- *Estimated Annual O&M Cost: $0*
- *Estimated Present Worth Cost: $77,000*

Alternative 2: Monitored Natural Attenuation (MNA)

Alternative 2 would rely on natural attenuation for remediation of the groundwater plume along with regular compliance monitoring. Natural attenuation is the process by which contaminant concentrations are reduced by one or more inherent subsurface processes including volatilization, dispersion, adsorption, and biodegradation. The MNA alternative includes the ongoing analysis of natural attenuation parameters to ensure that the anaerobic conditions conducive to biological reductive dechlorination of the site VOCs are present in the groundwater, and assess the degree of natural attenuation that is occurring.

- *Estimated Capital Cost: $0*
- *Estimated Annual O&M Cost: $45,000/year*

- *Estimated Present Worth Cost: $1,300,000*
- *Estimated Construction Timeframe: 0*
- *Estimated Time to Achieve RAOs: 50 years*

Alternative 3: Source Area Removal or In Situ Treatment and MNA

Alternative 3 would target the source area by either excavation or in situ treatment via enhanced chemical reduction. In conjunction with one of these methods an MNA program, described in Alternative 2, would also be implemented. Under Alternative 3 source areas will first be delineated to characterize the vertical and horizontal extent of contamination in the southeast area of the site. The information gathered during delineation would then be used to select either excavation or in situ treatment to address the source area contamination. Source area removal includes excavation with readily available construction equipment followed by offsite disposal of excavated material. Source area in situ treatment includes chemical reduction using zero valent iron to promote abiotic in situ reduction of CVOCs in the source areas.

- *Estimated Capital Cost: $620,000*
- *Estimated Annual O&M Cost: $45,000/year*
- *Estimated Present Worth Cost: $1,200,000*
- *Estimated Construction Timeframe: 12 to 18 months*
- *Estimated Time to Achieve RAOs: 15 years*

Alternative 4: Source Area Removal or In Situ Treatment, Groundwater Extraction and Treatment, and Long Term Monitoring

Alternative 4 would target the source area by either excavation or in situ treatment via enhanced chemical reduction, as in Alternative 3, followed by ex-situ treatment of the VOC plume using groundwater extraction and treatment. A long term monitoring program that evaluates natural attenuation and ensures compliance would be implemented concurrent with the other components of this alternative.

- *Estimated Capital Cost: $870,000*
- *Estimated Annual O&M Cost: $280,000/year*
- *Estimated Present Worth Cost: $2,200,000*
- *Estimated Construction Timeframe: 12 to 18 months*
- *Estimated Time to Achieve RAOs: 5 years*

Alternative 5: Source Area Removal or In Situ Treatment, Substrate Injection, and MNA

Alternative 5 would target the source area by either excavation or in situ treatment via chemical reduction. The selected technology would be followed by biological in situ treatment of the VOC groundwater plume using enhanced reductive dechlorination. An MNA program that includes natural attenuation and compliance monitoring of the VOC

groundwater plume would be implemented concurrently with the other components of the alternative. An alternative water supply will be installed as a contingency action if concentrations of site-related contaminants in nearby water supply wells reach Wisconsin Enforcement Standards.

- *Estimated Capital Cost: $760,000*
- *Estimated Annual O&M Cost: $45,000/year*
- *Estimated Present Worth Cost: $980,000*
- *Estimated Construction Timeframe: 12 to 18 months*
- *Estimated Time to Achieve RAOs: 5 years*

EVALUATION OF ALTERNATIVES

Nine criteria are used to evaluate the different remediation alternatives individually and against other in order to select a remedy. This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration.

*1. **Overall Protection of Human Health and the Environment**: Protectiveness is the primary requirement that remedial actions must meet under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). A remedy is protective if it adequately eliminates, reduces, or controls current and potential risks posed by the site through each exposure pathway. The assessment with respect to this criterion describes how the alternative achieves and maintains protection of human health and the environment.*

The No Further Action Alternative is not considered protective of human health and the environment because it does not include groundwater or surface water monitoring. A potential for future risk above federal MCLs or Wisconsin State Enforcement Standards from residential exposure to groundwater onsite exists as a result of potential increasing concentrations in water supply wells.

The remaining four alternatives are considered protective of public health and the environment because they all include, at a minimum, groundwater monitoring for compliance and to verify natural attenuation. The differences between alternatives in how they achieve protectiveness are discussed under the balancing criteria.

*2. **Compliance with ARARs**: Compliance with ARARs is one of the statutory requirements of remedy selection. ARARs are cleanup standards, standards of control, and other substantive environmental statutes or regulations that are either "applicable" or "relevant and appropriate" to the CERCLA cleanup action (42 United States Code [USC] 9621(d)(2)). Applicable requirements address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances at a CERCLA site. Relevant and appropriate requirements are those that while not applicable, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to environmental or technical factors at a particular site.*

With the exception of the No Further Action Alternative, all remedial alternatives would meet ARARs. None of the alternatives are expected to reach the remedial objectives

during the active phase of the treatment process because of the adsorbed and dissolved phase chlorinated volatile organic compounds (CVOCs) in the residual plume. As a result, all rely on MNA to eventually reach the remedial objectives. The active treatment alternatives that include source area removal/in situ treatment (Alternatives 3, 4, and 5) are expected to reduce the mass of CVOCs in the aquifer much more rapidly than the MNA of Alternative 2.

Additionally, the alternatives must meet the substantive requirements for air pollution control during excavation or in situ treatment and Resource Conservation and Recovery Act of 1976 regulations for non-hazardous disposal of solid waste or characteristically hazardous waste, where applicable. For Alternatives 4 and 5, respectively, the substantive requirements for obtaining a discharge of treated groundwater permit or an injection permit would be met.

3. ***Long-term Effectiveness and Permanence****: This criterion reflects CERCLA's emphasis on implementing remedies that will ensure protection of human health and the environment in the long term as well as in the short term. The assessment of alternatives with respect to this criterion evaluates the residual risks at a site after completing a remedial action or enacting a no-action alternative and includes evaluation of the adequacy and reliability of controls.*

The long-term effectiveness and permanence of the active treatment alternatives that include source area removal/in situ treatment (Alternatives 3, 4, and 5) exceed the effectiveness and permanence of Alternative 2, which does not include active treatment of source area CVOCs contributing to the groundwater plume. Active treatment contributes to achieving the RAOs by reducing a continuing source of dissolved-phase CVOCs affecting the groundwater in the southeast portion of the site.

Alternative 3 has a somewhat lower long-term effectiveness compared to Alternatives 4 and 5 because it relies on MNA only after source area removal/in situ treatment for further reduction of CVOCs in the dissolved-phase groundwater plume. Under this alternative, the monitoring will be required to be in effect for an estimated 15 years to reach remedial standards.

Alternatives 4 and 5 have similar long-term effectiveness, each requiring about 5 years to reduce CVOC concentrations in the groundwater to remedial standards. Alternative 4 includes extraction and treatment of contaminated groundwater in the vicinity of the highest CVOC concentrations near the southeast portion of the site using three new wells designed to focus on residual concentrations.

Alternative 5 includes injection of biological amendments resulting in enhancement of the natural reductive dechlorination process of the adsorbed and dissolved phases CVOCs. The biological amendment is soluble and can be transported by groundwater to downgradient areas requiring treatment, though adequate distribution within areas of lower permeability is difficult to achieve, which could provide diminished effectiveness in those areas. Substrate injection will also increase concentrations of daughter products such as cis-1,2-DCE and vinyl chloride, which may increase in concentrations in Davy Creek. They are not expected to exceed standards, and surface water monitoring is included in the MNA program. This alternative also includes installation of new residential water supply wells in a deeper, uncontaminated aquifer as a contingency

response should any regulated VOC in the private wells reach the Wisconsin Enforcement Standard (ES).

No Further Action (Alternative 1) and MNA (Alternative 2) are similar in their long-term effectiveness and permanence; however, the adequacy of controls is higher for MNA. However, both alternatives are significantly less effective and permanent than Alternatives 3, 4, and 5 since natural processes are the only means relied on to reduce the concentrations of CVOCs, and these processes will take many decades to return groundwater to remedial standards.

4. ***Reduction of Toxicity, Mobility, or Volume (TMV) of Contaminants through Treatment****: This criterion addresses the statutory preference for remedies that employ treatment as a principal element. The assessment with respect to this criterion evaluates the anticipated performance of the specific treatment technologies an alternative may employ and is specific to evaluating how treatment reduces TMV.*

Alternatives 3, 4, and 5 provide the greatest and most immediate reduction of CVOC source area TMV. The excavation of the source area and subsequent treatment to meet land disposal restrictions is the preferred method of source area removal if contamination is relatively shallow. If excavation costs are particularly high because of the presence of deeper contamination, in situ treatment using zero-valent iron will be performed. In either case, based on review of historic site information, these alternatives are estimated to essentially eliminate the source area contributing to the groundwater plume. The mass of CVOCs in the source area is unknown at this time, but would be determined during a pre-design investigation.

While the mass of CVOCs in the source area is unknown at this time, 80 pounds of CVOCs are estimated to remain in the groundwater plume downgradient of the source area. Alternatives 4 and 5 reduce the volume and mass of CVOCs in the groundwater plume more immediately than Alternative 3, and are anticipated to require the least amount of time to achieve a measurable reduction in TMV. Nevertheless, Alternatives 3, 4, and 5 remove essentially all CVOC mass in the plume over time following source area removal/in situ treatment.

Alternative 2 relies on MNA only and the reduction of an unknown source-area CVOC mass in addition to the estimated 80 pounds of CVOCs in the groundwater plume. MNA of the source area and groundwater will take decades longer than Alternatives 3, 4, and 5.

Alternative 1 does not include treatment of the CVOC source area or groundwater plume and does not meet the statutory preference for treatment.

5. ***Short-term Effectiveness****: This criterion addresses short-term impacts of the alternatives. The assessment with respect to this criterion examines the effectiveness of alternatives in protecting human health and the environment during the construction and implementation of a remedy until the response objectives have been met.*

There are no additional risks to the workers, the community, or the environment during the remedial action of Alternative 1 (No Further Action) and Alternative 2 (MNA) because no remedial construction is undertaken.

Alternatives 3, 4, and 5 present minor risks to workers that can be mitigated through proper health and safety procedures. These risks stem from potential contaminant exposure by inhalation during excavation or potential generation and accumulation of hydrogen gas during in situ soil mixing. To mitigate the risks, proper health and safety procedures such as air monitoring and use of non-sparking tools near the mix areas will be included in the Health and Safety Plan for construction.

Alternatives 3, 4, and 5 present minimal risks to the community from general construction activities and dust emissions expected during excavation. Based on the location of the primary area for construction, to the southeast of the site away from the residential area, sufficient access to minimize risk should be available for general construction activities. For all alternatives, air monitoring and control measures would be implemented to control emissions and protect the community.

Alternatives 3, 4, and 5 have similar environmental impacts related to source area removal/in situ treatment coming from dust and erosion and elevated levels of iron and manganese in the groundwater as a result of reducing conditions generated by soil mixing. Impacts can be mitigated using dust suppressants and implementation of an erosion control plan. The addition of bentonite to the soil mix area would reduce permeability and limit the effect of elevated iron and manganese on the more permeable aquifer. Additional environmental impacts associated with Alternative 4 are due to the construction required for a temporary roadway and extraction well near the wetland area. For Alternative 5, injection of substrate into the aquifer results in reducing conditions that may elevate levels of iron and manganese and increase concentrations of daughter products such as cis-1,2-Dichloroethene and vinyl chloride. Nevertheless, the discharge of iron and daughter products is not expected to adversely impact aquatic life in Davy Creek.

The short-term effectiveness with respect to the time until the RAOs are achieved is shortest for the Alternatives 4 and 5 because these alternatives actively reduce the mass of CVOCs in the groundwater plume following source area removal/in situ treatment. For Alternatives 4 and 5, it is estimated that attainment of groundwater and surface water RAOs will require 5 years.

Alternative 3 relies on MNA only following source-area removal/in situ treatment and is estimated to take 15 years to achieve groundwater and surface water RAOs.

Alternatives 1 and 2 are estimated to require 50 years to attain groundwater and surface water RAOs.

6. ***Implementability****: The assessment with respect to this criterion evaluates the technical and administrative feasibility of the alternative and the availability of the goods and services needed to implement it.*

All alternatives can be implemented at the site, and no technical or administrative implementability problems are expected. For Alternatives 3, 4, and 5, the stabilized in situ soil mixed area (if applicable) should remain undisturbed until sampling results indicate the CVOCS have been fully degraded.

7. ***Cost****: Cost encompasses all engineering, construction, and operation and maintenance (O&M) costs incurred over the life of the project. The assessment with respect to this criterion is based on the estimated present worth of the costs for each alternative. Present worth is a method of evaluating expenditures such as construction and O&M that occur over different lengths of time. This allows costs for remedial alternatives to be compared by discounting all costs to the year that the alternative is implemented. The present worth of a project represents the amount of money, which if invested in the initial year of the remedy and disbursed as needed, would be sufficient to cover all costs associated with the remedial action.*

The level of detail required to analyze each alternative with respect to the cost criteria depends on the nature and complexity of the site, the types of technologies and alternatives being considered, and other project-specific considerations. The analysis is conducted in sufficient detail to understand the significant aspects of each alternative and to identify the uncertainties associated with the evaluation.

The cost estimates presented for each alternative have been developed strictly for comparing the alternatives. The final costs of the project and the resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, the implementation schedule, the firm selected for final engineering design, and other variables; therefore, final project costs will vary from the cost estimates. Because of these factors, project feasibility and funding needs must be reviewed carefully before specific financial decisions are made or project budgets are established to help ensure proper project evaluation and adequate funding.

The cost estimates are order-of-magnitude calculations having an intended accuracy range of plus 50 to minus 30 percent. The range applies only to the alternatives as they are described in Section 4 and does not account for changes in the scope of the alternatives. Selection of specific technologies or processes to configure remedial alternatives is intended not to limit flexibility during remedial design, but to provide a basis for preparing cost estimates. The specific details of remedial actions and cost estimates would be refined during final design.

The No Further Action Alternative has the least present worth cost, as the only task associated with this alternative is the 5-year review (assumed for 50 years). Alternative 2 (MNA), Alternative 3 (Source Area Removal and MNA), and Alternative 5 have similar present values. The costs for Alternative 2 include monitoring and the 5-year review (assumed for 50 years). The costs for Alternative 3 include the capital cost for implementation of the source area removal and MNA for an estimated 15 years. The costs for Alternative 5 include the capital cost for implementation of the source removal, substrate injection, and alternative water supply. The overall duration for Alternative 5 is less when compared to Alternatives 2 and 3, so the cost for monitoring and the 5-year review is less (assumed to be 5 years). The highest present value estimate is for Alternative 4 (Source Area Removal, Pump and Treat, and Long-Term Monitoring) because of the higher capital cost of refurbishing the extraction and treatment system and the operation and maintenance of the system (assumed to be 5 years).

8. ***State/Support Agency Acceptance****:*

9. ***Community Acceptance****:*

SUMMARY OF THE PREFERRED ALTERNATIVE

The selection of a Preferred Alternative for the OECI site is currently being discussed with the WDNR.

COMMUNITY PARTICIPATION