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ENVIRONMENTAL ASSESSMENT

TOXECON RETROFIT FOR MERCURY AND MULTI-POLLUTANT CONTROL

PRESQUE ISLE POWER PLANT
MARQUETTE, MICHIGAN

September 2003

U.S. DEPARTMENT OF ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY

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ABSTRACT

This EA evaluates environmental issues associated with constructing and operating an integrated emissions control system proposed by We Energies and its project partners with cost-shared funding support by DOE. The proposed project would be demonstrated at the existing 90-MW Units 7, 8, and 9 of We Energies' coal-fired Presque Isle Power Plant in Marquette, Michigan. The commercial-scale demonstration would allow utilities to make decisions regarding the integrated emissions control system as a viable commercial option. DOE's share of the funding for the 5-year demonstration project would be about $25 million, while $25 million would also be provided by We Energies and its project partners. This project was selected by DOE under the Clean Coal Power Initiative (CCPI) for negotiation of a cooperative agreement to demonstrate the integration of technologies to reduce emissions of mercury (Hg) and particulate matter, as well as potentially control sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and hydrochloric acid (HCl) emissions. DOE's decision is whether or not to fund the project.

The EA evaluates the principal environmental issues, including air quality, waste management, and traffic, that could result from construction and operation of the proposed project. The EA also considers two reasonably foreseeable scenarios that could result from the no-action alternative in which DOE would not provide cost-shared funding for the proposed project. Key findings include that potential air quality impacts resulting from the proposed project would generally be beneficial because plantwide air emissions would decrease or continue at the same level. The decrease in stack exit temperature would decrease the plume rise, which could result in increased downwind ground-level concentrations of those air pollutants experiencing little or no decrease in stack emissions. However, results of air dispersion modeling indicated that no major impacts would be expected relative to Prevention of Significant Deterioration increments and National Ambient Air Quality Standards.

During the 39-month testing period, about 2,800 to 3,400 yd^3 of TOXECON ash would be collected in the new baghouse filters. The project participants would investigate the feasibility of extracting Hg from this waste to reduce the disposal requirements and would try to identify beneficial uses for some or all of the TOXECON ash, but most or all of this material would probably require disposal. Disposal would be in the power plant's Landfills No. 2 and 3, which have been identified by the Michigan Department of Environmental Quality as being appropriate for this waste stream. The ash volume generated would be no more than about 1.2% of the remaining capacity in Landfill No. 2 and about 0.1% of the permitted total landfill capacity in Landfills No. 2 and 3. During construction, slightly over 100 workers' vehicles would enter the site per day during the peak period, which would be comparable to increases experienced during maintenance outage periods for the power plant. During peak construction delivery periods, about 20 truck deliveries per day, which would not be expected to result in discernible impacts to local roads, would occur.

PUBLIC PARTICIPATION

DOE encourages public participation in the NEPA process. A draft EA was distributed for public review and comment. Copies of the draft EA were placed for public review at the Peter White Public Library in Marquette, Michigan, and announcements were placed in The Mining Journal, which serves the area potentially impacted by the proposed project. The closing date for comments was set for August 1, 2003. Only one set of comments was received, and these are discussed in Appendix C.

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ACRONYMS AND ABBREVIATIONS

ADA-ES	ADA Environmental Solutions
ADT	average daily traffic
amsl	above mean sea level
Btu	British thermal unit
CAA	Clean Air Act
CCB	coal combustion byproducts
CCI	Cleveland-Cliffs Incorporated
CCPI	Clean Coal Power Initiative
CEM	Continuous Emissions Monitor
CEQ	Council on Environmental Quality
cfm	cubic feet per minute
CFR	*Code of Federal Regulations*
cfs	cubic feet per second
CO	carbon monoxide
CO_2	carbon dioxide
COE	U.S. Army Corps of Engineers
CWA	Clean Water Act
dB	decibels
dB(A)	decibels as measured on the A-weighted scale
DEQ	Michigan Department of Environmental Quality
DOE	U.S. Department of Energy
EA	Environmental Assessment
EEC	Environmental Elements Corporation
EIS	Environmental Impact Statement
EMF	electromagnetic fields
EPA	U.S. Environmental Protection Agency
EPRI	Electric Power Research Institute
°F	degrees Fahrenheit
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
FR	*Federal Register*
ft	feet
ft^2	square feet
ft^3	cubic feet
gal	gallon
gpd	gallons per day
gpm	gallons per minute
HCl	hydrochloric acid
Hg	mercury
hp	horsepower
in.	inch
lb	pound
µg	microgram
µg/L	micrograms per liter
µm	micrometer
m^3	cubic meter
mg	milligram
MGD	million gallons per day

MGY	million gallons per year
$mile^2$	square mile
min	minute
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1966
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
O_3	ozone
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety and Health Administration
Pb	lead
PCBs	polychlorinated biphenyls
PCPI	per capita personal income
pH	hydrogen-ion concentration notation
PM-10	particulate matter less than 10 μm in aerodynamic diameter
PM-2.5	particulate matter less than 2.5 μm in aerodynamic diameter
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
Pub. L.	Public Law
RCRA	Resource Conservation and Recovery Act
SCREEN3	a screening air dispersion model
SGLP	Synthetic Groundwater Leaching Procedure
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SPCCP	spill prevention, control, and countermeasures plan
SPL	Sound Pressure Level
TCLP	toxicity characteristic leaching procedure
TOXECON	an EPRI-patented process that removes air pollutants
TWA	time weighted average
USC	*United States Code*
USGS	U. S. Geological Survey
VOCs	volatile organic compounds
We Energies	Wisconsin Electric Power Company
yd	yard
yd^3	cubic yard

1.0 PURPOSE AND NEED FOR AGENCY ACTION

1.1 INTRODUCTION

This Environmental Assessment (EA) has been prepared by the U.S. Department of Energy (DOE), in compliance with the National Environmental Policy Act of 1969 (NEPA) as amended (42 USC 4321 et seq.), to evaluate the potential environmental impacts associated with constructing and operating an integrated emissions control system proposed by We Energies (also known as the Wisconsin Electric Power Company), ADA Environmental Solutions (ADA-ES), Cummins & Barnard, Environmental Elements Corporation (EEC), and the Electric Power Research Institute (EPRI). The EA will be used by DOE in making a decision on whether or not to provide cost-shared funding to design, construct, and demonstrate the proposed system for reducing emissions at the existing 90-MW Units 7, 8, and 9 of We Energies' coal-fired Presque Isle Power Plant in Marquette, Michigan. DOE's share of the funding for the 5-year demonstration project would be about $25 million, while $25 million would also be provided by We Energies and its project partners. This project was selected by DOE under the Clean Coal Power Initiative (CCPI) for negotiation of a cooperative agreement to demonstrate the integration of technologies to reduce emissions of mercury (Hg) and particulate matter, as well as potentially control sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and hydrochloric acid (HCl) emissions.

In Fiscal Year 2002, the U.S. Congress established the CCPI Program by providing $150 million in funding to accelerate commercial deployment of advanced coal-based technologies that can generate clean, reliable, and affordable electricity in the United States. To implement the program, Congress also provided $150 million in funding in Fiscal Year 2003 and directed DOE to include certain previously appropriated funds so that DOE could offer over $300 million in cost-shared funding for a first round of commercial-scale demonstration projects. Congress indicated that projects in the program should be industry projects assisted by the government and not government-directed demonstrations. The projects would be expected to showcase ways in which coal-fired power plants could continue to generate low-cost electricity with better performance and in compliance with more stringent environmental standards.

In the CCPI Program, the project participant (i.e., the non-federal-government participant or participants) must finance at least 50% of the total cost of the project. The government would assist the project participant by sharing in the project's cost, as detailed in a cooperative agreement negotiated between the participant and DOE. The government would also share in the rewards of successful projects. After completion of the demonstration, the participant would repay the government's financial contribution to ensure that taxpayers benefit from a successful project. Specifically, the government's investment would be repaid over a 20-year period, based on revenue from, for example, the demonstration project itself and/or royalties from sales and licensing of the technology in the United States and abroad. The CCPI cooperative agreements would require that at least 75% of the direct labor cost for the project, including subcontractor labor, be incurred in the United States unless

the participant could demonstrate that the U.S. economic interest would be better served through a greater percentage of the work being performed outside the United States. An example of the exception would be if the expertise to develop a proposed technology exists only outside the United States, but commercialization of the technology would result in substantial benefits to the United States, such as improved reliability of electricity, increased employment, and increased exports of U.S.-manufactured products.

The project participant would take primary responsibility for designing, constructing, and demonstrating the project. During project execution, the government would oversee project activities, provide technical advice, assess progress by periodically reviewing project performance with the participant, and participate in decision making at major project junctures. In this manner, the government would ensure that schedules are maintained, costs are controlled, project objectives are met, and the government's funds are repaid according to the terms in the cooperative agreements.

The CCPI solicitation, issued in March 2002, indicated that all selected projects must demonstrate advanced coal-based technologies and accelerate their deployment for commercial use. The solicitation was open to any technology advancement related to coal-based power generation that could result in efficiency, environmental, or economic improvement compared to currently available state-of-the-art alternatives. The solicitation was also open to technologies capable of producing any combination of heat, fuels, chemicals, or other useful byproducts in conjunction with power generation. Coal must be used in the demonstration projects for at least 75% of the fuel energy input for each selected project. This provision would ensure that multiple fuel concepts such as co-firing would not be excluded, while maintaining a focus on coal-based power generation. Additionally, projects must show the potential for rapid market penetration upon successful demonstration of the technology or concept.

In response to the solicitation, DOE received 36 proposals in August 2002 and selected 8 of the projects (including the proposed project) in January 2003 based on the following evaluation criteria: technical merit of the proposed technology (50%), potential for a successful demonstration of the technology (30%), and potential for the technology to be commercialized (20%). Along with the above evaluation criteria, DOE considered the participant's funding and financial proposal; DOE budget constraints; environmental, health, and safety implications; and program policy factors such as selecting projects that represent a diversity of technologies, utilize a broad range of U.S. coals, and represent a broad geographical cross-section of the United States.

Although specific funding levels would be determined during negotiations of cooperative agreements, DOE expects to provide approximately $316 million for the eight projects. Private sector sponsors are expected to contribute slightly over $1 billion, exceeding the 50% private sector cost-sharing mandated by Congress. The host sites for the eight selected projects are located in Colorado, North Dakota, Illinois, Michigan, Kentucky, West Virginia, and Pennsylvania.

1.2 PROPOSED ACTION

The proposed action is for DOE to provide cost-shared funding support for the design, construction, and demonstration of an integrated emissions control system at the existing 90-MW

Units 7, 8, and 9 of We Energies' coal-fired Presque Isle Power Plant in Marquette, Michigan. DOE's share of the funding for the 5-year demonstration project is expected to be approximately $25 million, while $25 million would also be provided by We Energies and its project partners. The commercial-scale demonstration would allow utilities to make decisions regarding the integrated emissions control system as a viable commercial option.

We Energies, ADA-ES, Cummins & Barnard, EEC, and EPRI conceived and proposed the technologies in response to the DOE solicitation. Because DOE's role would be limited to providing the cost-shared funding for the proposed project, DOE's decision is whether or not to fund the project. DOE's limited involvement constrains the range of alternatives considered in the EA (Section 2), and DOE will make its decision based on those alternatives.

1.3 PURPOSE

The purpose of the proposed project is to generate technical, environmental, and financial data from the design, construction, and operation of the emissions control system at a scale large enough to allow the power industry to assess the project's potential for further commercial application. The project would potentially remove 90% of all Hg species (i.e., elemental, oxidized, and particle-bound) from combustion flue gas by an EPRI-patented process (U.S. Patent 5,505,766) named TOXECON. In the process, sorbent injection is used with a new baghouse (a pollution control device that removes particulate emissions) that is installed downstream of an existing particulate collector. In the proposed project, powdered activated carbon would be injected upstream (in the flue gas) of the new baghouse installed downstream of an electrostatic precipitator. In addition to Hg and particulate control, the TOXECON process would also potentially control SO_2, NO_x, and HCl emissions by injecting sorbents capable of removing these specific air pollutants. The proposed project would represent the first commercial-scale application of TOXECON (including a new baghouse) to a coal-fired utility boiler. A successful demonstration would indicate that the performance and cost targets are achievable at the commercial scale. The proposed project would also include the development of continuous emissions monitoring for Hg in flue gas. In addition, methods to extract captured Hg from the TOXECON baghouse ash would be examined to identify opportunities for reducing the amount of material requiring disposal.

1.4 NEED

Coal combustion by electric utilities is an appreciable source of anthropogenic Hg emissions in the United States (EPA 1997), with annual emissions from all U.S. coal-fired power plants amounting to approximately 45 tons (EPRI 2000). Hg emissions to the atmosphere from coal-fired power plants pose a potential concern to public health (EPA 1998). Since the U.S. Environmental Protection Agency's (EPA's) determination in 2000 to regulate Hg emissions from coal-fired power plants, many U.S. utilities have increased their research and development of technologies that are capable of complying with these potential regulations (Laudal et al. 2003). However, utilities generally are reluctant to demonstrate technologies at an unproven scale on their own in the absence of strong economic incentives or firm legal requirements. The implementation of a technology demonstration program

with cost-shared funding from the federal government has been endorsed by Congress and industry as a mechanism to accelerate the commercialization of innovative technology to meet near-term environmental goals in the power industry and to reduce risk to an acceptable level through cost-shared funding.

As part of the CCPI Program, the proposed project would meet DOE's need to demonstrate the viability of a commercial-scale integrated system to reduce emissions of Hg and particulate matter, as well as potentially control SO_2, NO_x, and HCl emissions. The TOXECON system potentially represents a low-cost option to retrofit existing coal-fired units for 90% Hg control, especially for units such as those at the Presque Isle Power Plant that use low-sulfur western coal. Short-term, full-scale tests, which were conducted with DOE funding support using the TOXECON system at a coal-fired power plant in Gaston, Alabama, demonstrated that Hg emissions can be reduced by more than 90% by injecting powdered activated carbon upstream of an existing baghouse. However, the higher particulate loading of the activated carbon required increasing the bag cleaning frequency to unacceptable levels because the baghouse was not designed for use with powdered activated carbon injection. The proposed project would include a new baghouse designed for use with the TOXECON system.

The ability to show prospective domestic and overseas customers an operating system rather than a conceptual or engineering prototype would be a persuasive inducement to purchase American coal utilization technology. Data obtained on operational characteristics during the demonstration would allow prospective customers to assess the potential of the system for commercial application. Successful demonstration would enhance prospects for exporting the technology to other nations and may provide the single most important advantage that the United States could have in the global competition for new markets. DOE would work closely with the project participants to develop plans for technology transfer and commercialization to help further the technology and accelerate its commercialization.

1.5 NATIONAL ENVIRONMENTAL POLICY ACT STRATEGY

This EA has been prepared in compliance with NEPA for use by DOE decision makers in determining whether or not to provide cost-shared funding for the design, construction, and demonstration of the proposed project under the CCPI Program. DOE's policy is to comply fully with the letter and spirit of NEPA, which ensures that early consideration is given to environmental values and factors in federal planning and decision making. No action taken by DOE with regard to any proposal, including project selection or award, is considered a final decision prior to completion of the NEPA process.

An overall strategy for compliance with NEPA has been developed for the CCPI Program, consistent with the Council on Environmental Quality (CEQ) NEPA regulations (40 CFR Parts 1500-1508) and DOE regulations for compliance with NEPA (10 CFR Part 1021). The DOE strategy has two principal elements. The first element involved DOE preparation of project-specific environmental reviews (10 CFR 1021.216) prior to the selection of projects; the reviews were based on

environmental and technical information that was included in the proposals submitted to DOE. The reviews contained discussions of the site-specific environmental, health, safety, and socioeconomic issues associated with each project for use by DOE selection officials. The reviews analyzed the advantages and disadvantages of the proposed projects and reasonable alternatives (i.e., alternative sites and processes).

The second element would consist of preparing site-specific NEPA documents for each selected project. For this project, DOE has determined that an EA should be prepared to assess the significance of potential impacts resulting from the proposed action and reasonable alternatives. As part of the overall NEPA strategy for the CCPI Program, this EA considers the pre-selection environmental review. The purpose of this EA is to provide a sufficient basis for determining whether DOE should prepare an Environmental Impact Statement (EIS) or should issue a Finding of No Significant Impact (FONSI). Based on the findings of this EA, if DOE determines that providing cost-shared funding would constitute a major federal action because the proposed project may significantly affect the quality of the human environment, then an EIS will be prepared to assess the potential impacts in more detail. However, if DOE determines that providing cost-shared funding would not constitute a major federal action because the proposed project would not significantly affect the quality of the human environment, then DOE will issue a FONSI.

The Oak Ridge National Laboratory (ORNL) has assisted DOE in preparing this EA and supporting documents for the proposed project. In independently assessing the issues and preparing the EA, ORNL has utilized information provided by DOE; other federal, state, and local agencies; the project participant team; and others. DOE is responsible for the scope and content of the EA and supporting documents and has provided direction to ORNL, as appropriate, for preparation of the EA.

2.0 THE PROPOSED ACTION AND ALTERNATIVES

This section discusses the proposed action, the no-action alternative (including two scenarios that would reasonably be expected to result as a consequence of the no-action alternative), and alternatives dismissed from further consideration.

2.1 PROPOSED ACTION

The proposed action is for DOE to provide support through cost-shared funding for the design, construction, and demonstration of an integrated emissions control system at the existing 90-MW Units 7, 8, and 9 of We Energies' coal-fired Presque Isle Power Plant in Marquette, Michigan (Section 1.2). The proposed action described in the following sections is DOE's preferred alternative.

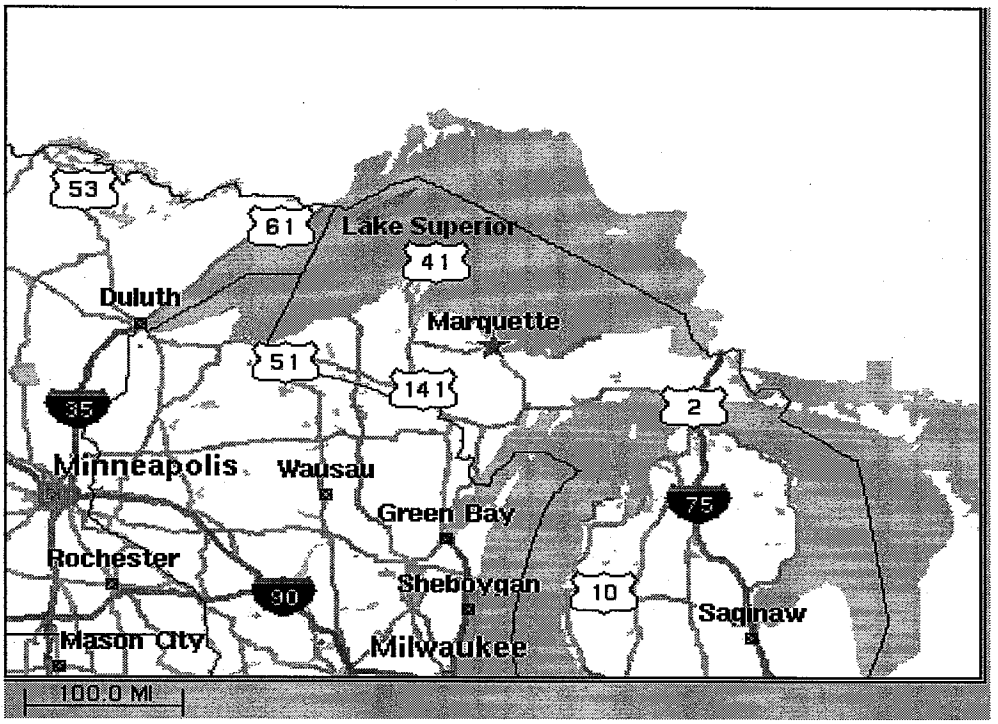
2.1.1 Project Location and Background

The site for the proposed project is located at the Presque Isle Power Plant in the northeastern portion of the city of Marquette, Michigan, along the shore of Lake Superior (Figure 2.1.1). The project would occupy about 1.1 acres of land to be used primarily for a new baghouse. The land currently serves as a paved parking lot adjacent to the existing powerhouse for Units 7, 8, and 9.

The 9-unit coal-fired power plant, which occupies a 65.5-acre site, generates approximately 625 MW of electricity (Figure 2.1.2). The plant is situated on a natural isthmus that joins Presque Isle, a 170-acre wooded granite and sandstone promontory, to the mainland. The isthmus is approximately 1,100 ft wide at its narrowest location, about 0.5 miles northeast of the power plant buildings. The plant site is bounded on the north and west by land belonging to the Lake Superior & Ishpeming Railroad; on the south by the mouth of the Dead River, which flows into Presque Isle Harbor on Lake Superior; and on the east by Lake Shore Drive along the shore of Lake Superior. The main entrance to the plant is from Lake Shore Drive. A mix of industrial, commercial, and residential land use exists in the vicinity. Additionally, We Energies owns 871 acres located within 5 miles of the power plant inland from Lake Superior, of which approximately 83 acres are zoned and permitted for disposal of coal combustion byproducts.

The Presque Isle Power Plant was developed by the Upper Peninsula Power Company, initially to meet the needs of the Cleveland-Cliffs Iron Company and other Upper Peninsula Power Company customers. Subsequently, the plant was expanded to serve the growing needs of the Cleveland-Cliffs Iron Company and other customers. The largest customer of the plant continues to be the iron company, which requires about 260 MW of electricity 24 hours per day to operate its iron ore mines located about 12 miles west of Marquette in the Ishpeming-Negaunee area. Units 1 through 9 were placed in service in 1955, 1962, 1964, 1965, 1974, 1975, 1978, 1978, and 1979, respectively. We Energies acquired the Presque Isle Power Plant from the Upper Peninsula Power Company in 1988. The plant employs 202 people, including 44 managers and supervisors.

Figure 2.1.1. Site for the proposed project located at the Presque Isle Power Plant in the northeastern portion of the city of Marquette, Michigan, along the shore of Lake Superior.



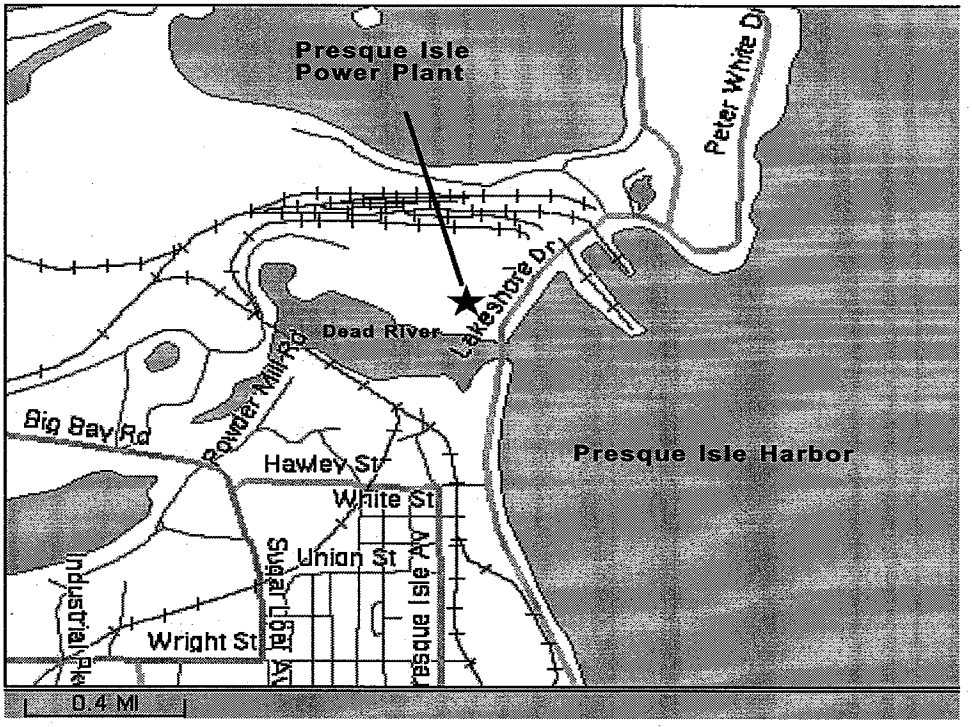
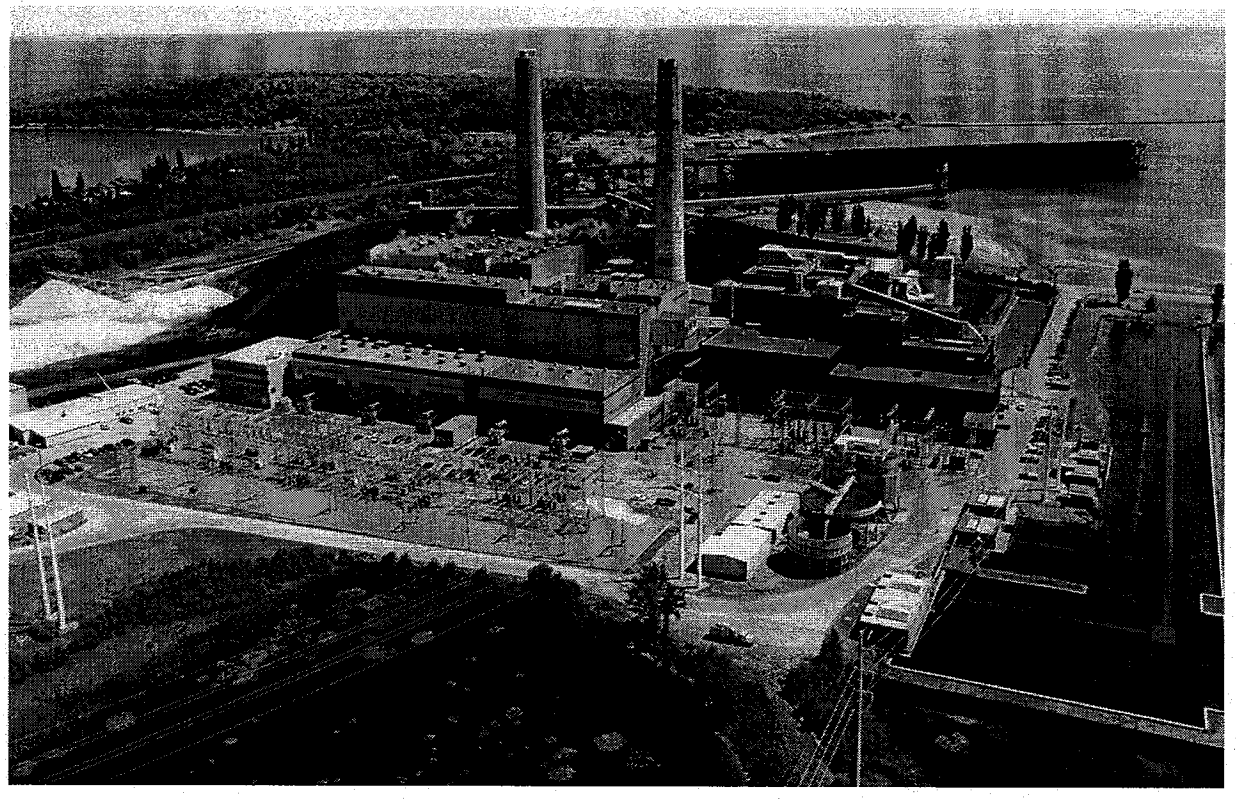


Figure 2.1.2. View to the east-northeast of the existing Presque Isle Power Plant.



Units 1 through 6 burn a mixture of approximately 90% bituminous Colorado coal blended with about 10% petroleum coke, while Units 7 through 9 burn subbituminous Powder River Basin coal. Units 1 through 4 use a baghouse for particulate control, while Units 5 through 9 use electrostatic precipitators for particulate control. More specifically, Units 7 through 9 use "hot side" (i.e., upstream of the air pre-heater) electrostatic precipitators. Units 3 through 6 also have low-NO_x burners to control NO_x emissions. All units use once-through cooling for noncontact condensing of the steam exhausted from the steam turbine generators. The water is drawn from and discharged to Lake Superior. Because there are no railroad facilities at the plant, lake boats and trucks are used to deliver materials to the plant (Section 2.1.5.3).

2.1.2 Technology and Project Description

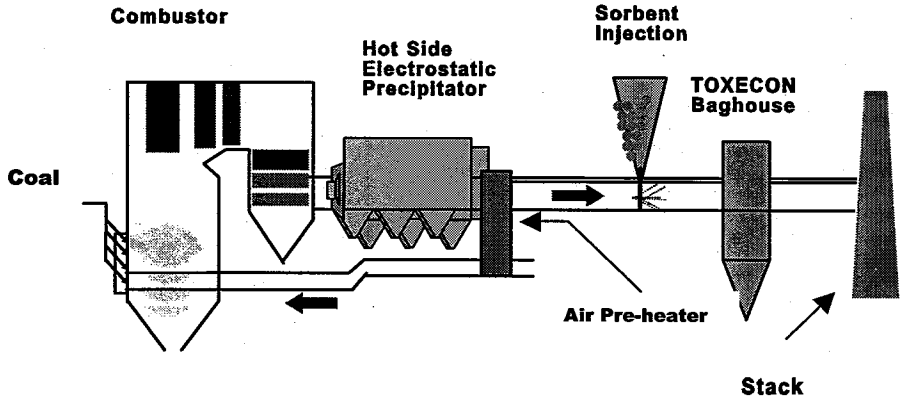
The proposed project would integrate two technologies: (1) sorbent injection into combustion flue gas to reduce emissions of air pollutants; and (2) particulate capture with a new baghouse downstream of existing particulate control equipment that already removes greater than 98% of the fly ash particles. The integration of these technologies has been successfully demonstrated in smaller scale (135 MW), pilot scale, and slipstream-sized tests at other sites. The proposed project would demonstrate the commercial-scale application of the integrated technologies using the TOXECON process. Powdered activated carbon would be injected into the flue gas of units firing Powder River Basin coal to achieve up to a 90% reduction in Hg emissions (for all species). Important characteristics of activated carbon include an extensive internal pore structure and a very large surface area that enhances Hg capture.

The TOXECON process was developed for air toxics control with the concept that multiple sorbents can be injected in the system, each removing a specific air pollutant. Although the primary pollutant targeted for control is Hg, short-term tests would demonstrate the effectiveness of other sorbents, such as sodium- and lime-based products, for SO_2, NO_x, and HCl control. Previous testing has indicated that sodium-based products may achieve from 30% to 70% SO_2 reduction. Sodium-based sorbents also may reduce NO_x emissions by 10% to 20%. HCl removal as high as 50% may be attained with sodium sesquicarbonate.

Sodium- and lime-based sorbents would be tested using temporary equipment transported to the site and operated solely during the demonstration period, rather than permanently installed feeders and silos. As with activated carbon injection, these sorbents would be injected upstream of the new baghouse. Based on previous testing, the sorbent injection rates would be no more than 1,000 lb per hour. A long-term decision on whether to design, build, install, and operate a system for control of acid gases (e.g., SO_2, NO_x, and HCl) would depend on the magnitude of the potential emission reductions compared to the costs, including sorbent costs and additional waste processing and disposal costs. A long-term system using permanent equipment for control of acid gases is beyond the scope of this 5-year proposed demonstration project.

Figure 2.1.3 presents a flow diagram of the TOXECON system downstream of an existing hot side electrostatic precipitator. Hot side electrostatic precipitators, which serve as the existing air pollution control equipment on Units 7, 8, and 9, would continue operating as a key component of the

Figure 2.1.3. Flow diagram of the TOXECON system downstream of an existing hot-side electrostatic precipitator.



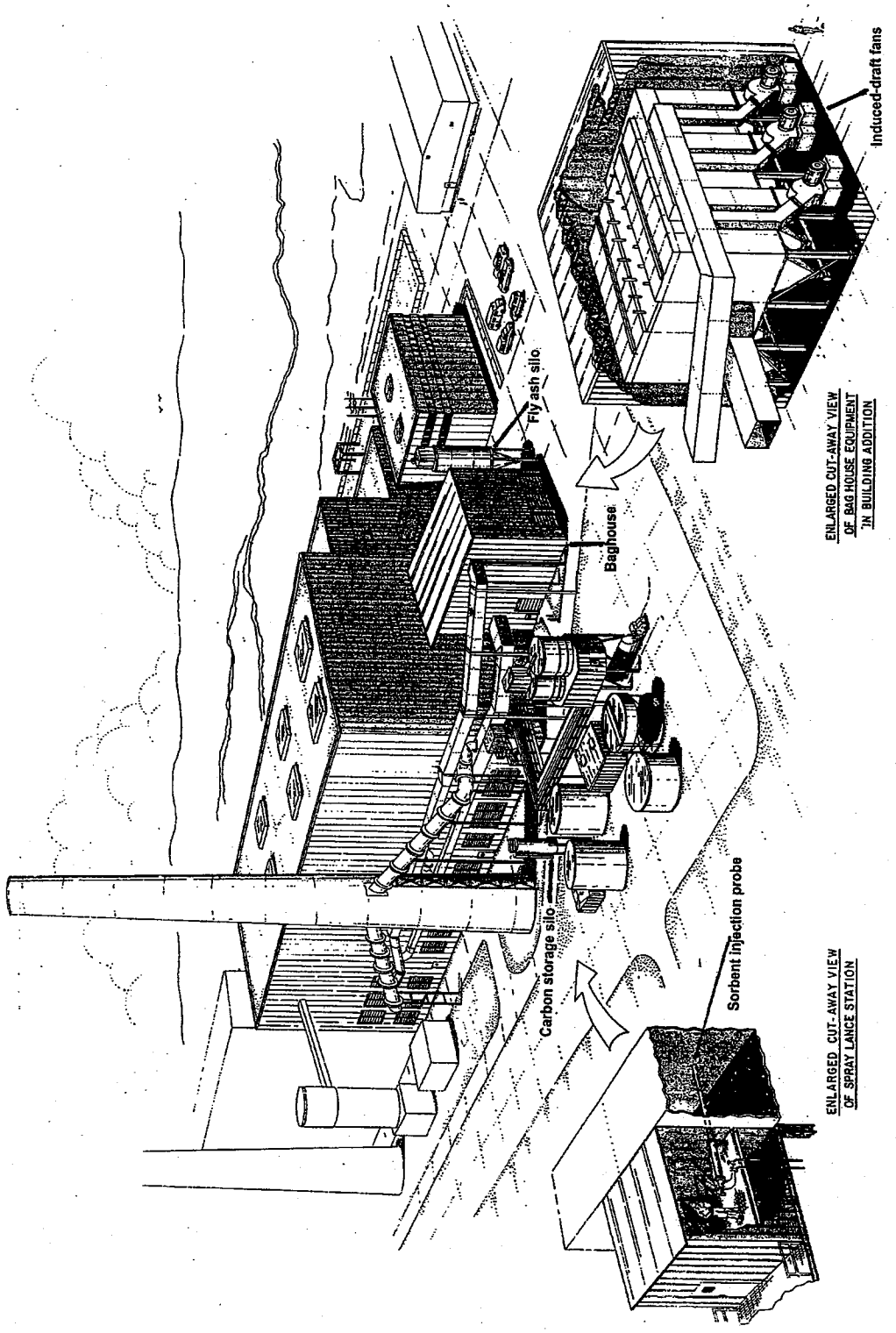
TOXECON process. The TOXECON system would depend on the existing upstream electrostatic precipitators to capture the majority of fly ash, thus reducing the size requirements of the new baghouse and the amount of activated carbon mixed waste. The existing three-flued, 400-ft stack that serves Units 7, 8, and 9 would continue to be used; however, rather than the flue gas remaining separate for each unit, flue gas exiting the new baghouse to the stack would be a mixture of the flue gases from the three units.

New equipment for the TOXECON system would include the activated carbon injection system, baghouse, induced-draft fans, bypass ductwork to and from the baghouse, and ash handling system, and a water injection spray cooling system may be included. Figure 2.1.4 presents an artist's conception of the Presque Isle Power Plant following installation of the new equipment for the proposed project.

The powdered activated carbon system would deliver the carbon to the flue gas at an injection rate estimated to be between 130 and 220 lb per hour. The system would include a storage silo, feed hoppers, feeders, blowers, and injection probes. Sorbents would be loaded into the silo with self-unloading pneumatic trucks. The exact location of the injection probes has not yet been finalized. One option would be to inject sorbent downstream of where the individual flue gas ducts for Units 7, 8 and 9 combine into one duct. An alternative placement would be to inject sorbent in the ductwork of each individual unit, upstream of where the ducts combine into one, which would allow for additional residence time and may improve the distribution of carbon.

The capacity of powdered activated carbon to capture Hg decreases as temperature increases; testing has indicated that the ideal flue gas temperature for HG capture is less than 350°F. Under current operating conditions, the stack exit temperature of Units 7, 8 and 9 is about 380°F. Planned upgrades to remedy a problem in controlling steam coils and increase the efficiency of Units 7, 8, and 9, which are independent of the proposed project, are expected to lower the flue gas temperature to 290°F and reduce NO_x emissions. If the upgrades are unsuccessful in reducing the temperature, a water injection spray cooling system would be designed and included as part of the proposed project to ensure

Figure 2.1.4. Artist's concept of the Presque Isle Power Plant following installation of the new equipment for the proposed project.



that the flue gas temperature would be lowered to 330°F. The water injection system would spray water into the flue gas duct immediately downstream of each unit's existing induced-draft fan. A dedicated air compressor would provide 500–1,000 ft^3 per min of air to the spray cooling system. Another air compressor would provide 150 ft^3 per min of air to the powdered activated carbon system, baghouse, and ash handling system.

The new baghouse would be divided into 14 compartments, each containing 540 bags. The finger-shaped bags would have a 6 in. diameter and a 20 ft length. The baghouse would be a pulse-jet type designed for off-line cleaning (i.e., one compartment could be isolated and cleaned while the others are operating on line).

The use of high-permeability filter fabric would be considered in designing the baghouse. Powder River Basin coal ash often has a higher percentage of fine particles (<6μm), especially if generated from coals with exceptionally high moisture content and volatile matter. Fine particles form a dustcake on a fabric surface with lower permeability, which causes a higher operating pressure drop. The high-permeability fabric is made with larger diameter fibers to allow about four times higher permeability than that of standard fabric (120 cfm/ft^2 versus 30 cfm/ft^2). The primary advantage of the high-permeability fabric is that the residual pressure drop of the fabric (pressure drop caused by ash that is not removed with standard cleaning or that has penetrated into the fabric) increases at a much slower rate resulting in a lower operating pressure drop. High-permeability fabric construction may allow a thicker dustcake to form at a lower pressure drop, thereby allowing longer exposure of the sorbent to Hg in the flue gas prior to cleaning. Potential benefits of this fabric include reducing the amount of sorbent required and increasing Hg removal efficiency.

Three new induced-draft fans with approximately 800-hp motors, located inside the new baghouse, would boost the flue gas pressure to overcome the additional pressure that the baghouse and bypass ductwork would create. Pressure would be controlled via control dampers on the outlet of the fans and by variable inlet vanes on the inlet of the fans. Each fan would be sized to handle the flue gas produced by one of the three boilers.

A new ash handling system would be installed to store the fly ash/carbon mixture that is collected in the baghouse. The system would be a pneumatic vacuum type with fly ash vacuum exhausters, silencers, and a dry ash storage silo. The ash/carbon mixture would be loaded into a truck for disposal. The ash handling system would be designed to handle approximately one ton per hour.

The proposed project would identify opportunities to minimize and beneficially use the mixture of coal ash and sorbent collected in the new baghouse, which would reduce the amount of material requiring disposal. Currently, the plan for management of this waste would provide for disposal at the lined landfill used for other ash generated at the power plant. Although the ash could potentially be used commercially if the sorbent and/or Hg contained on the sorbent were removed, this process has not been demonstrated commercially. During the proposed project, one or more technologies to extract captured Hg from the baghouse ash would be tested at a pilot scale.

Heating or energizing carbon-containing Hg to vaporize the Hg is common to all of the potential recovery technologies. Microwave applications appear promising because carbon particles

preferentially absorb microwave energy while typical fly ash constituents such as silica, alumina, and calcium do not. This technology uses airflow through the bed of ash material that is heated with microwaves. The carbon is preferentially heated and liberates the Hg as a vapor. The gases containing the vaporized Hg are then passed through a collection system to recover the Hg in a form that is much smaller in volume.

The proposed project would include the development of a Continuous Emissions Monitor (CEM) for Hg in combustion flue gas. While continuous emissions monitoring for SO_2, NO_x, and carbon monoxide (CO) in flue gas is commercially available, the technology is not commercially proven for Hg. Analyzers are commercially available for ambient and laboratory Hg measurements. However, the measurement of part-per-billion levels of Hg in flue gas is exacerbated by difficulties in extracting a sample from the duct, transporting the sample to the analyzer, and eliminating sampling artifacts due to loss of vapor phase Hg to particulate matter such as fly ash and carbon.

2.1.3 Construction Plans

Construction of the proposed project, including the laying of foundations, could begin in September 2003 and continue until late 2003, depending upon weather conditions. Severe weather conditions in Marquette could prevent continuing construction activities during winter 2003–2004. Construction activities, including erection of structural steel, the baghouse, and ductwork, would resume in the spring of 2004 and continue without interruption until completion in late 2004. An average of about 75 construction workers would be working at the site; approximately 150 workers would be required during the peak construction period.

Construction crews could work four 10-hour days (Monday through Thursday) with Friday being available for overtime or make-up due to inclement weather. During the winter with reduced daylight hours, the crews could work five 8-hour days, weather permitting.

Locally obtained construction materials would include crushed stone, sand, and lumber for the proposed facilities and temporary structures such as enclosures, forming, and scaffolding. Components of the facilities would include structural steel, concrete, piping, ductwork, insulation, and electrical cable.

During construction, major components and fabricated equipment would be delivered to the vicinity of the site by truck, rail, and/or barge, depending on the location of origin. Barge delivery would be viable if the baghouse and/or ductwork were constructed as prefabricated modules and shipped on no more than two barges each. Approximately 5 days would be required to unload each 2-barge shipment. Rail delivery of the fabricated steel for the baghouse and ductwork would be feasible, provided that arrangements could be made with the Lake Superior & Ishpeming Railroad to use a siding adjacent to the plant for at least 3 consecutive days to unload the materials. An average of 15 trucks would be expected to deliver materials daily, with a daily peak of about 20 deliveries.

Land requirements during construction and operation are discussed in Section 2.1.5.1.

2.1.4 Operational Plans

Demonstration of the proposed project would be conducted over a 5-year period, including a 39-month period of performance testing and monitoring from late 2004 until early 2008. Units 7, 8,

and 9 would be expected to operate at the same power level and percentage of time as under current conditions, maintaining at or near full load 24 hours per day throughout the year, except for scheduled outages for maintenance. In addition to the 202 existing employees at the Presque Isle Power Plant, 2 full-time engineers and 1 half-time technician would be on the site for testing and optimization of the new equipment during the demonstration. Periodically, larger crews would be on the site (e.g., 4 to 6 skilled test personnel and engineers would work on the site for 1 to 2 weeks during major testing periods).

If the demonstration is successful, commercial operation would follow immediately without change from the demonstration period (Section 5). The details of sorbent types, injection rates, and control levels would be determined during the demonstration. Long-term staffing would not be expected to change from existing levels. The facility would be designed for a lifetime of 15 to 20 years.

Operation of the proposed project would require about 3 MW of electricity. Because Units 7, 8, and 9 currently operate at or near full load for nearly the entire year, the loss of 3 MW to the electrical grid would likely be offset by a 3-MW increase in the electrical output from Units 1 through 6, which typically operate at less than their capacity. This increase in electrical generation would represent about 0.5% of the capacity of the 625-MW power plant.

2.1.5 Resource Requirements

Table 2.1.1 displays the operating characteristics, including resource requirements, for the existing Presque Isle Power Plant compared with the plant after implementation of the proposed project.

2.1.5.1 Land Area Requirements

Land that would be required temporarily during construction activities includes about 5 acres for equipment/material laydown, storage, assembly of site-fabricated components, staging of material, and facilities to be used by the construction workforce (i.e., offices and sanitary facilities). Staging and laydown of construction materials at the plant site would occur east of the two existing 5,000-ton fly ash storage silos on previously disturbed land that is currently used for contractor employee parking and miscellaneous storage, as needed. Other smaller vacant, cleared areas around the site would also be used as staging and/or fabrication areas.

The permanent structures for the proposed project would occupy a total of about 1.1 acres of previously disturbed land, primarily for the new baghouse. Limited site clearing and grading would be required because the land currently serves as a paved parking lot adjacent to the existing powerhouse for Units 7, 8, and 9. A trench drain crossing the parking lot would likely require relocation but would continue to function as a storm water drain for paved areas adjacent to the project site. A fire water main could also require minor relocation, depending on the exact location of the foundations for the proposed project. A new paved parking lot would likely be built on vacant, cleared land near the powerhouse to compensate for the loss of the existing lot.

Table 2.1.1. Presque Isle Power Plant major facility inputs and outputs

Operating characteristics	2001 Base year	Including the proposed project[a]
Generating capacity, MW	625	No change
Size of power plant site, acres	65.5	No change
Size of project site, acres	—	1.1
Bituminous coal consumption, tons/year	747,623	No change
Petroleum coke consumption, tons/year	47,721	No change
Subbituminous coal consumption, tons/year	988,078	No change
No. 2 fuel oil consumption, MGY	0.56	No change
Activated carbon, tons/year	0	450–780
Water use		
Noncontact cooling water, gpm	156,000	No change
Service water system, gpm	210	210–310
Potable water, gpm	7	No change
Effluents		
Noncontact cooling water, gpm	156,000	155,900–156,000
Treated wastewater to Lake Superior, gpm	210	No change
Solid waste		
Bottom ash, tons/year	25,704	No change
Fly ash, tons/year	112,989	114,449
Air emissions		
Sulfur dioxide (SO_2), tons/year	18,326	14,704–18,326
Oxides of nitrogen (NO_x), tons/year	12,117	11,212–12,117
Particulate matter, tons/year	237	182
Carbon monoxide (CO), tons/year	451	No change
Volatile organic compounds (VOCs), ton/year	63	No change
Mercury (Hg), lb/year	112	30
Carbon dioxide (CO_2), tons/year	4,620,000	4,621,406

[a]Does not include a slight increase (about 0.5% of the capacity of the power plant) in inputs and outputs associated with a 3-MW increase in the electrical output from Units 1 through 6 to offset the 3-MW use of electricity by the proposed project.

2.1.5.2 Water Requirements

Water would be used during construction of the proposed project for various purposes, including personal consumption and sanitation, concrete formulation and preparation of other mixtures needed to construct the facilities, equipment washdown, general cleaning, dust suppression, and fire protection. Potable water used during construction would be provided by the city of Marquette municipal water supply system, while service water would be drawn from the noncontact cooling water used to condense the steam exhausted from the steam turbine generators. Combined potable and service water use during construction would average about 1 gpm. Drinking water also would be provided using bottled water. Portable toilets would minimize requirements for additional sanitary water.

During the proposed project, water for the power plant would continue to be obtained primarily from Lake Superior and secondarily from Marquette's municipal water supply system. The total flow of once-through, noncontact cooling water required to operate all 9 units of the power plant at full load would continue to average 156,000 gpm. This water is drawn from Lake Superior and returned to the lake after passing through condensers. An intake bay area along the shores of the Dead River on the south side of the power plant serves as the central withdrawal point for Lake Superior water. Two 8-ft diameter intake pipes extend approximately 1,600 ft into the Presque Isle Harbor of Lake Superior, terminating on the bottom of Presque Isle Harbor in a submerged intake structure with a vertical velocity cap. Two sluice gates are also included in the bay area to provide an emergency water source from the Dead River.

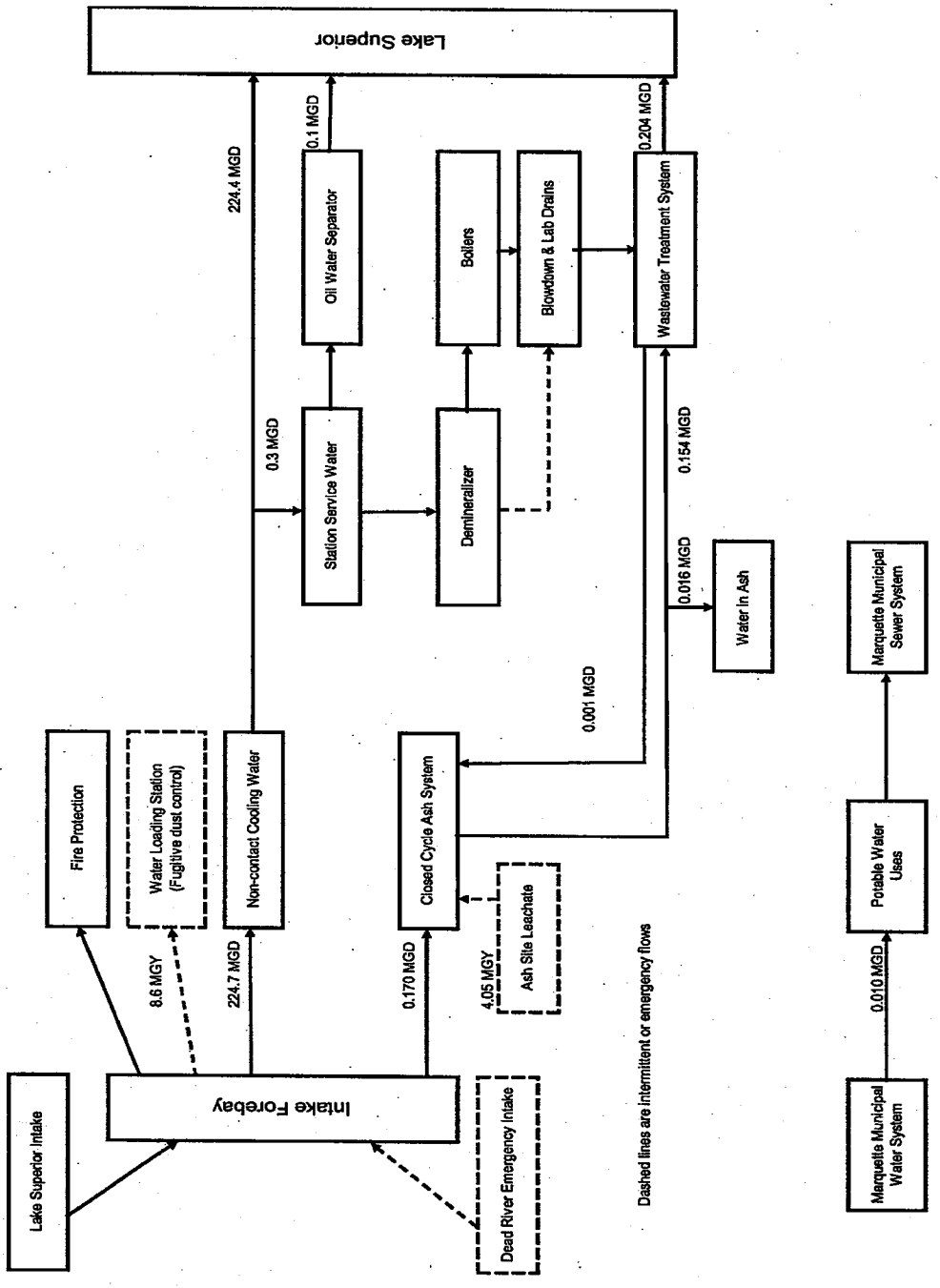
Station service water (i.e., water used for auxiliary equipment cooling, equipment washing, and demineralization) is drawn from the noncontact cooling water after the water has passed through the condensers. The plant currently requires about 210 gpm of station service water. Figure 2.1.5 is a simplified water flow diagram of the current configuration at the Presque Isle Power Plant.

A minor source of water supply for the power plant is leachate collected from the ash landfill (about 8 gpm). The ash landfill leachate is collected in underground storage tanks and trucked to the power plant for use in the closed cycle ash system. Water in the ash system is used to transport bottom ash to the ash handling facilities at the plant and also is mixed with both bottom and fly ash prior to disposal. Excess water from the closed cycle ash system is directed to the power plant's wastewater treatment facility along with other plant wastewaters.

Potable water needs for the power plant, which are provided by the city of Marquette municipal water supply system, would continue to be about 7 gpm.

The only appreciable change in plant water requirements associated with the proposed project would be for the proposed spray cooling system that would lower the temperature of the flue gas (Section 2.1.2). The spray cooling system, if installed, would use up to 100 gpm of water supplied by the service water system, which has sufficient design capacity to handle this requirement. Because the service water is withdrawn from the noncontact cooling water system downstream of the condensers, no additional water withdrawal from Lake Superior would be required to supply the spray cooling water. The consumptive use of 100 gpm of water by the spray cooling system would represent a 0.06% reduction from the 156,000 gpm of noncontact cooling water returned to Lake Superior.

Figure 2.1.5. Simplified water flow diagram of the current configuration at the Presque Isle Power Plant.



2.1.5.3 Fuel and Sorbent Requirements

The current fuel requirements of the Presque Isle Power Plant would continue at approximately the same level during the demonstration of the proposed project (except for the 0.5% increase discussed in Section 2.1.4). The plant burns two primary fuels, bituminous and subbituminous coal. Units 1 through 6 combust a mixture of approximately 90% bituminous coal blended with about 10% petroleum coke, while Units 7 through 9 burn subbituminous Powder River Basin coal. About 747,600 tons of bituminous coal are used annually, while about 988,100 tons of subbituminous coal are consumed per year. Table 2.1.2 presents an analysis of the composition of these fuels.

Table 2.1.2. Composition of bituminous and subbituminous coal consumed at the Presque Isle Power Plant

Characteristic	Bituminous coal typical value	Subbituminous coal typical value
Higher heating value, Btu/lb	12,025	9,052
Analysis, % by weight		
Moisture	7.86	25.85
Carbon	66.43	52.49
Hydrogen	4.59	3.65
Nitrogen	1.4	0.75
Sulfur	0.55	0.28
Ash	9.50	4.64
Oxygen	9.68	12.33
Chlorine	0.15	0.01

Currently, the bituminous coal is supplied by mines located in Colorado. The coal is shipped by rail to Chicago, Illinois, and loaded onto lake boats for delivery to the power plant. The Powder River Basin subbituminous coal is supplied by several mines in Wyoming and Montana (based on price). This coal is shipped by rail to Superior, Wisconsin, and loaded onto lake boats for delivery to the plant. Upon arrival, the lake boats are moored adjacent to the Cleveland-Cliffs Iron Company's ore dock. The solid fuel is discharged to the power plant's fuel receiving and handling system by using the ships' onboard unloading equipment.

Bottom ash from Units 1 through 6 is also used as a fuel in Units 7, 8, and 9 to recover the heating value of carbon remaining in the bottom ash and to increase the amount of marketed fly ash.

About 560,000 gal of No. 2 fuel oil are consumed annually at the plant for ignition and warm-up of the units. The fuel is delivered to the plant site by tanker trucks.

Annual consumption of powdered activated carbon injected into the flue gas during the demonstration, which would be determined by testing, would range between 450 and 780 tons.

Quantities of other sorbents used in short-term tests during the demonstration, while not known, would be much less than the amount of powdered activated carbon.

2.1.6 Outputs, Discharges, and Wastes

Table 2.1.1 includes a summary of discharges and wastes for the existing Presque Isle Power Plant compared with the plant after implementation of the proposed project.

2.1.6.1 Air Emissions

Air emissions from the Presque Isle Power Plant would generally decrease or continue at the same level during the demonstration of the proposed project. SO_2 emissions would decrease or stay the same, ranging from 14,704 to 18,326 tons per year compared with 18,326 tons per year currently. NO_x emissions would decrease or stay the same, ranging from 11,212 to 12,117 tons per year compared with 12,117 tons per year currently. The magnitude of reduction in SO_2 and NO_x emissions would depend on the effectiveness and test duration of other sorbents. Particulate emissions would decrease to about 182 tons per year compared with 237 tons per year currently, due to the addition of the new baghouse serving Units 7, 8, and 9. CO and volatile organic compound (VOC) emissions would remain at 451 and 63 tons per year, respectively. Plantwide Hg emissions would decrease from 112 lb per year currently to 30 lb per year because of the powdered activated carbon injected into the flue gas of Units 7, 8, and 9. Trace emissions of other pollutants would include beryllium, sulfuric acid mist, hydrochloric acid, hydrofluoric acid, benzene, arsenic, and various heavy metals. The testing of sodium-based sorbents would increase CO_2 emissions by up to 1,406 tons per year from the current level of 4,620,000 tons per year. Although CO_2 is not considered an air pollutant, CO_2 emissions contribute to the greenhouse effect that is suspected to cause global warming and climate change (Mitchell 1989).

2.1.6.2 Liquid Discharges

The Presque Isle Power Plant has several systems for disposal of wastewater. The total amount of treated wastewater discharged to Lake Superior is about 210 gpm. Floor drains and other collection sumps that could collect water potentially co-mingled with oil are directed to an oil/water separator. After oil separation, the water is directed to a clean water storage tank, discharged to the noncontact cooling water of Units 1 through 4, and returned to Lake Superior. Oil recovered by the oil/water separator is directed to a used oil storage tank and ultimately removed by a contractor.

Wastewater from plant operations is collected in sumps and pumped into one of two wastewater holding tanks. The pH is adjusted to between 6.5 and 9, and sodium hypochlorite is added, if necessary, to precipitate any iron. The water is then pumped to a clarifier. Chemicals are added to precipitate phosphate and to increase the precipitate particle size. The solids are collected by a combination of settling tubes and a coal/sand filter bed. Clarifier effluent goes to a "clear" water tank. Clarifier effluent meeting the standards of the plant National Pollutant Discharge Elimination System (NPDES) permit is discharged to the noncontact cooling water of Units 1 through 4 and returned to

Lake Superior. Effluent not meeting the standards is returned to a wastewater holding tank. Sludge and backwash wastes are pumped to the bottom ash system of Units 7, 8, and 9.

Other than the consumptive use of up to 100 gpm of water by the spray cooling system that, if installed, would reduce the 156,000 gpm of noncontact cooling water returned to Lake Superior by 0.06% (Section 2.1.5.2), the proposed project would not affect liquid discharges at the power plant.

2.1.6.3 Solid Wastes

Non-hazardous solid wastes generated at the Presque Isle Power Plant include used office materials, empty material containers, and coal combustion byproducts. Non-hazardous solid wastes, with the exception of coal combustion byproducts, are removed from the site by a waste management contractor at regular intervals and transported to the Marquette County municipal landfill or another authorized facility for disposal.

The power plant currently generates about 25,700 tons per year of bottom ash and 113,000 tons per year of fly ash. During the demonstration of the proposed project, the amount of bottom ash produced would not change and the quantity of fly ash collected would increase to a yearly maximum of 114,449 tons due to the addition of the new baghouse, which annually would capture about 860 tons of the fly ash/carbon mixture resulting from the powdered activated carbon injected into the flue gas of Units 7, 8, and 9. The yearly maximum also includes an estimated 600 tons of fly ash/sorbent mixture captured by the baghouse from a 2-month test of acid gas control.

Currently, some of the ash from Units 1 through 6 is landfilled, while all of the ash from Units 7 through 9 is being sold. Bottom ash is sold to contractors for use as a sand/gravel alternative material below pavements and building floor slabs. Some fly ash from Units 1 through 6 is being used as raw material at a Portland cement kiln. Fly ash from Units 7 through 9 is being sold for use in producing concrete. Due to the seasonal nature of the use of fly ash in concrete, two 5,000-ton silos at the power plant store fly ash from Units 7 through 9 during the winter for use during the construction season. While all of the fly ash captured by the existing hot side electrostatic precipitators serving Units 7, 8, and 9 would continue to be sold, fly ash from the new baghouse would be landfilled.

We Energies owns 3 landfills to receive coal combustion byproducts; the landfills are located within 5 miles of the power plant inland from Lake Superior. Landfill No. 1 began operation in 1977 as an unlined landfill. After testing in the early 1990s indicated groundwater contamination associated with the landfill, a cap was placed over the landfill to prevent infiltration of water, and subsequent testing has shown an improvement in groundwater quality. Landfill No. 1 is no longer active.

Landfill No. 2, which is active, is permitted by the Michigan Department of Environmental Quality (DEQ) for the disposal of coal combustion byproducts (DEQ License No. 8767, Facility ID 52-00041). The landfill, which is a Class III solid waste disposal facility, contains a liner and leachate collection system. The landfill has 5 cells, of which cells 4 and 5 have not yet been filled. Approximately 285,000 yd^3 of storage space are available. Landfill No. 2 currently receives unmarketable ash from Units 1 through 6 and coal combustion byproducts from the city of Marquette power plant under an annual contract.

The DEQ has also permitted Landfill No. 3. This landfill will have a capacity of 2,460,000 yd^3 and an 18-year lifetime when fully developed. The first cell of the No. 3 Landfill is currently under construction and is expected to be available in the fall of 2003. Landfill No. 3 will have a double composite liner and leachate collection system.

Ash materials transported to the landfill are conditioned with water to control dust and allow compaction. Ash is transported to the landfill site in covered trucks. Most of the private haul road is on We Energies property and the remainder of the road is on an easement from the city of Marquette.

2.1.6.4 Toxic and Hazardous Materials

The operation of the Presque Isle Power Plant involves potentially toxic or hazardous materials and wastes generated during operation, which include waste paints, solvents, oils, and empty material containers. Hazardous wastes generated during operation are removed from the site by a waste management contractor at regular intervals and transported to authorized facilities for disposal.

The power plant has in place a program to reduce, reuse, and recycle materials to the extent practicable. All light bulbs are treated as hazardous waste and disposed of in properly licensed facilities. The plant has a Spill Prevention, Control, and Countermeasures Plan (SPCCP) (40 CFR Part 112) that addresses the accidental release of materials to the environment.

The proposed project would not affect the power plant's generation of toxic and hazardous materials.

2.2 ALTERNATIVES

The goals of a Federal action establish the limits of reasonable alternatives under the NEPA process. Congress established the CCPI Program with a specific goal—to accelerate commercial deployment of advanced coal-based technologies that can generate clean, reliable, and affordable electricity in the United States. DOE's purpose in considering the proposed action (to provide cost-shared funding) is to demonstrate the viability of the proposed project (the integrated emissions control system) in achieving the program's goal. Reasonable alternatives to the proposed action must also be capable of meeting this purpose.

Congress directed DOE to meet the program's goal by providing partial funding for projects owned and controlled by nonfederal-government participants. This statutory requirement places DOE in a much more limited role than if the Federal government were the owner and operator of the project. In the latter situation, DOE would ordinarily be required to review a wide variety of reasonable alternatives to the proposed action. However, in dealing with a nonfederal applicant, the scope of alternatives is necessarily more restricted. In such cases, DOE gives substantial weight to the needs of the proposer in establishing reasonable alternatives to the proposed action. Moreover, under the CCPI Program, DOE's role is limited to approving or disapproving the project as proposed by the participant.

Thus, the only reasonable alternative to the proposed action is the no-action alternative, including two scenarios reasonably expected as a consequence of the no-action alternative (Section 2.2.1).

2.2.1 No-Action Alternative

Under the no-action alternative, DOE would not provide cost-shared funding to demonstrate the commercial-scale application of the integrated emissions control system, including the development of continuous emissions monitoring for Hg in flue gas and methods to extract captured Hg from baghouse ash. Without DOE participation, the proposed project would be canceled and would probably not be demonstrated elsewhere, at least in the short term, because of the absence of cost-shared funding. Consequently, commercialization of the integrated emissions control system could be delayed or might not occur. Utilities and industries tend to use known and demonstrated technologies rather than unproven technologies, but no technologies are commercially available for Hg control on boilers that fire Powder River Basin coal and use hot side electrostatic precipitators. At the site of the proposed project, two reasonably foreseeable scenarios could result, neither of which would contribute to the CCPI Program goal of accelerating commercial deployment of advanced coal-based technologies that can generate clean, reliable, and affordable electricity in the United States.

First, We Energies could do nothing related to the proposed project and continue operating the Presque Isle Power Plant without change. Under this scenario, no construction activities would be undertaken, and no employment would be provided for construction workers in the area. Operations would remain the same as for the existing plant. Resource requirements and discharges and wastes would remain the same. Existing environmental impacts would therefore not change.

Second, We Energies could test the integrated technologies in a slipstream-sized unit to gain data to allow future scale-up to a full-sized application, if needed. Because the integrated technologies have already been successfully demonstrated in pilot scale and slipstream-sized tests at other sites, such testing at the Presque Isle Power Plant would not accelerate commercial deployment of the technologies. Under this scenario, construction activities would be at a smaller scale compared to those of the proposed project. Operations would remain the same as for the existing plant. Resource requirements and discharges and wastes would generally be the same, except that air emissions would decrease very slightly because of the enhanced pollutant capture in the slipstream, and solid wastes would increase very slightly due to the captured fly ash/carbon mixture. Methods would likely be tested to extract Hg from the slipstream ash. The ash would be transported for disposal in the active landfill. Minimal change in current environmental conditions at the site would result, and the impacts would remain very similar to existing conditions.

Table 2.2.1 presents a comparison of potential impacts between the proposed project and the no-action alternative.

2.2.2 Alternatives Dismissed from Further Consideration

The following sections discuss alternatives, including sites and technologies, that were initially identified and considered by DOE or the project participant. The project as proposed meets the needs outlined in the CCPI solicitation that was issued by DOE in March 2002 (Section 1.1). Factors considered in DOE's project selection process included the desirability of projects that collectively represent a diversity of technologies, utilize a broad range of U.S. coals, and represent a broad

geographical cross-section of the United States. Otherwise, DOE did not constrain the proposals with regard to site or technology.

The proposals received project-specific environmental reviews by DOE prior to selection (Section 1.5). The reviews summarized the strengths and weaknesses of each project relative to environmental evaluation factors. To the maximum extent possible based upon the information provided in the proposals, the environmental evaluations included the following: (1) a discussion of alternative sites and technologies reasonably available; (2) a brief discussion of the potential environmental impacts; (3) necessary mitigative measures; and (4) a list of permits and licenses that would be required in implementing the proposals. Based on the evaluation criteria discussed in Section 1.1, eight projects, including the proposed project, were selected for possible cost-shared financial assistance.

Because DOE's role is to provide the cost-shared funding for the selected project, DOE is limited to either accepting or rejecting the project as proposed by the participant, including the proposed technology and site. As such, reasonable alternatives to the proposed project are narrowed and the following alternatives have been dismissed from further consideration.

2.2.2.1 Alternative Sites

No other sites were identified by We Energies and its project partners to host the proposed project. The site needed to provide the maximum benefit to the companies by closely meeting the project's technical needs and easily integrating with existing infrastructure. An existing plant site was essential because the cost associated with construction of the project and a new power plant at an undeveloped site would be much higher and the environmental impacts likely would be much greater than at an existing facility.

The participant's selection of the Presque Isle Power Plant as the site of the demonstration considered (1) minimization of technological risk and potential effects on electric generation; (2) availability of space for the project; and (3) economies of scale associated with the commercial demonstration of the TOXECON process. The plant would provide economies of scale due to the combining of three flue gas streams in a single baghouse that would be sized similar to that required by many other Powder River Basin coal-fired power plants. Based on the above considerations, other sites are not reasonable alternatives and are not evaluated in this EA.

2.2.2.2 Alternative Technologies

Other technologies have been dismissed as not reasonable. The proposed project was selected to demonstrate the operation of an integrated emissions control system on a coal-fired power plant. Other CCPI projects were selected to demonstrate other coal-based technologies. The pre-selection reviews included environmental comparisons of proposals. The projects selected for demonstration are not considered alternatives to each other.

The use of other technologies and approaches that are not applicable to coal (e.g., natural gas, wind power, solar energy, and conservation) would not contribute to the CCPI Program goal of

accelerating commercial deployment of advanced coal-based technologies that can generate clean, reliable, and affordable electricity in the United States.

2.2.2.3 Other Alternatives

Other alternatives, such as delaying or reducing the size of the proposed project, have been dismissed as not reasonable. Delaying the project would not result in any change of environmental impacts once the project were implemented but would adversely delay reductions in air emissions from the existing power plant and adversely affect the CCPI Program goal. The design size for the proposed combination of technologies was selected because it is similar to that required by many other Powder River Basin coal-fired power plants; the size is large enough to show utilities that the technology, once demonstrated at this scale, could be applied without further scale-up to many units of similar size. A successful demonstration would indicate that the performance and cost targets are achievable at this scale (Section 1.3). Therefore, other design scales were not evaluated further.

Table 2.2.1. A comparison of potential impacts between the proposed project and the no-action alternative

Resource	Impacts of the proposed project	Impacts of the no-action alternative	
		Continue operating the power plant without change	Conduct a slipstream-size test of the technologies
Aesthetics	Any portion of the proposed project that would be visible would blend into the existing industrial structures because of the similarity of the architecture and colors used in the roof and siding of the enclosure around the TOXECON baghouse. The visual impacts of the proposed project would be minimal.	Impacts would remain unchanged from existing conditions.	Impacts would be similar in nature to the proposed project but minimal in magnitude.
Land use	The proposed project would require about 1.1 acres of land for construction of the TOXECON baghouse, ash silo, and other facilities. All of these proposed facilities would occupy land that presently has a paved surface and is dedicated to industrial use.	Impacts would remain unchanged from existing conditions.	Impacts would be similar in nature to the proposed project but minimal in magnitude.
Atmospheric resources and air quality	During construction, temporary and localized increases in gaseous pollutants and fugitive dust would result from exhaust emissions, excavation, and earthwork. Sprinkling of exposed soils with water would be conducted as necessary to minimize fugitive dust emissions. During operations, potential air quality impacts would generally be beneficial because plantwide air emissions would decrease or continue at the same level. The decrease in stack exit temperature would decrease the plume rise, which could result in increased downwind ground-level concentrations of those air pollutants experiencing little or no decrease in stack emissions. No major impacts would be expected relative to Prevention of Significant Deterioration increments, National Ambient Air Quality Standards, or global climate change.	Impacts would remain unchanged from existing conditions.	Impacts would be similar in nature to the proposed project but minimal in magnitude.
Surface water resources	Construction of the proposed project would generate small amounts of solid and liquid wastes including solvents, paints, coatings, waste, fuel, adhesives, and empty containers. During operations, up to 100 gpm of service water could be required to supply a flue gas spray cooling water system, if needed. A maximum of 100 gpm of water would not return to Lake Superior (largely due to evaporative losses), which represents a net reduction in return flow of about 0.06%. Adverse impacts on water quality and quantity in Lake Superior would be negligible. The proposed project would not change the existing thermal discharge of the power plant.	Impacts would remain unchanged from existing conditions.	Impacts would be similar in nature to the proposed project but minimal in magnitude.

Table 2.2.1. A comparison of potential impacts between the proposed project and the no-action alternative

Resource	Impacts of the proposed project	Impacts of the no-action alternative	
		Continue operating the power plant without change	Conduct a slipstream-size test of the technologies
Floodplains and wetlands	Because the entire proposed project would be located outside the Dead River's 500-year floodplain, neither construction nor operation of the proposed project would have adverse impacts on the Dead River floodplain. Construction and operation of the proposed project would have no adverse effects on wetlands because none are present on or adjacent to the project site.	Impacts would remain unchanged from existing conditions.	Impacts would be similar in nature to the proposed project but minimal in magnitude.
Ecological resources, terrestrial	Because the proposed project would be located in an area that is already highly industrialized (including a parking lot) and that supports almost no native plant or animal communities, neither construction nor operation of the proposed facility would adversely affect terrestrial ecological resources.	Impacts would remain unchanged from existing conditions.	Impacts would be similar in nature to the proposed project but minimal in magnitude.
Ecological resources, aquatic	By implementing appropriate engineering practices for (1) preventing or minimizing runoff, erosion, and sedimentation from the project site to offsite surface waters, and (2) the prompt containment and clean-up of accidental spills, construction of the proposed project would have negligible impacts on the fish, birds, and wildlife of the Dead River and Lake Superior. During operations, Lake Superior's biota would be negligibly affected by the minuscule increase in discharge of treated wastewater and the potential reduction of return cooling water of up to 100 gpm.	Impacts would remain unchanged from existing conditions.	Impacts would be similar in nature to the proposed project but minimal in magnitude.
Ecological resources, threatened and endangered species	Threatened and endangered species are not likely to occur on the proposed project site. Any effects of the proposed project on threatened and endangered species would likely be marginally beneficial as a result of the expected reductions in Hg and particulate emissions and potential reductions in SO_2 and NO_x emissions.	Impacts would remain unchanged from existing conditions.	Impacts would be similar in nature to the proposed project but minimal in magnitude.
Transportation and traffic	During construction, about 54 workers' vehicles would enter the site on an average day, with 107 vehicles per day during the peak period. This increased traffic would be comparable to increases experienced during maintenance outage periods for the power plant. During peak construction delivery periods, about 20 truck	Impacts would remain unchanged from existing conditions.	Impacts would be similar in nature to the proposed project but minimal in magnitude.

Table 2.2.1. A comparison of potential impacts between the proposed project and the no-action alternative

Resource	Impacts of the proposed project	Impacts of the no-action alternative	
		Continue operating the power plant without change	Conduct a slipstream-size test of the technologies
	deliveries per day could occur, which would not be expected to result in discernible impacts to local roads. During operations, the proposed project would require about one 20-ton truckload of activated carbon every 7 to 9 days. The volume of waste material to be removed from the TOXECON fly ash silo would require about two truck loads per week. These additions to the use of local roads, including the road on the power plant property to the ash silo, would have a negligible impact on vehicular traffic.		
Waste management	Construction of the proposed project would generate solid wastes in types and amounts typical of construction projects. The Marquette County municipal landfill would easily accommodate construction waste quantities. During the 39-month testing period, about 2,800 to 3,400 yd^3 of TOXECON ash would be collected in the baghouse filters. The project participants would investigate the feasibility of extracting Hg from this waste to reduce the disposal requirements and would try to identify beneficial uses for some or all of the TOXECON ash, but most or all of this material would probably require disposal. Disposal would be in the power plant's Landfills No. 2 and 3, which have been identified by the DEQ as being appropriate for this waste stream. The ash volume generated would be no more than about 1.2% of the remaining capacity in Landfill No. 2 and about 0.1% of the permitted total landfill capacity in Landfills No. 2 and 3.	Impacts would remain unchanged from existing conditions.	Impacts would be similar in nature to the proposed project but minimal in magnitude.
Groundwater	The proposed project would not affect the availability or quality of groundwater. Groundwater would not be used as a water source for project construction or operation. Temporary dewatering of excavations might be necessary during construction activities, but no water users would be affected by any localized changes in the water table at the power plant site. No groundwater quality impacts would be expected from landfill disposal of TOXECON ash because these materials would be placed in an engineered landfill that is fully lined and equipped with a leachate collection system.	Impacts would remain unchanged from existing conditions.	Impacts would be similar in nature to the proposed project but minimal in magnitude.

Table 2.2.1. A comparison of potential impacts between the proposed project and the no-action alternative

Resource	Impacts of the proposed project	Impacts of the no-action alternative	
		Continue operating the power plant without change	Conduct a slipstream-size test of the technologies
Cultural resources	In compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, DOE has requested consultation with Michigan's State Historic Preservation Officer (SHPO) regarding potential impacts on any historic resources that may be listed in or eligible for the National Register of Historic Places or that may have local importance. The proposed project would require about 1.1 acres of previously disturbed land that presently has a paved surface and is dedicated to industrial use.	Impacts would remain unchanged from existing conditions.	Impacts would be similar in nature to the proposed project but minimal in magnitude.
Socioeconomic resources and environmental justice	The proposed project would result in small, beneficial impacts to population, employment, income, housing, local government revenues, and public services. The project would not result in adverse ecological or health effects in census tracts with proportions of low income or minority populations greater than for Marquette County or the state as a whole.	Impacts would remain unchanged from existing conditions.	Impacts would be similar in nature to the proposed project but minimal in magnitude.
Noise	During construction, the principal sources of noise would be from construction equipment and material handling. Due to planned noise attenuation measures, natural and man-made terrain features, and distance to the nearest residences, no perceptible change in noise associated with project construction or operation would be expected at the nearest residences or other offsite locations.	Impacts would remain unchanged from existing conditions.	Impacts would be similar in nature to the proposed project but minimal in magnitude.
Electromagnetic fields	No new sources of electromagnetic fields such as transmission lines would be required and, as a result, no major changes to existing electromagnetic field levels would occur. Public health impacts, if any, would be small.	Impacts would remain unchanged from existing conditions.	Impacts would be similar in nature to the proposed project but minimal in magnitude.
Human health and safety	Potential worker health impacts from construction are expected to be limited to normal hazards associated with construction. No substantial differences with respect to occupational safety or industrial hygiene would be expected between current operations and those of the proposed project. The proposed project would remove Hg and particulate matter from the flue gas of the coal-fired units and, consequently, would benefit the health of workers and the public. No health effects would	Impacts would remain unchanged from existing conditions.	Impacts would be similar in nature to the proposed project but minimal in magnitude.

Table 2.2.1. A comparison of potential impacts between the proposed project and the no-action alternative

Resource	Impacts of the proposed project	Impacts of the no-action alternative	
		Continue operating the power plant without change	Conduct a slipstream-size test of the technologies
	be associated with the sorbent materials used in the proposed project. Workers would be protected from Hg exposure during replacement of baghouse bags by wearing full-face respirators with dust filters, white paper suits, and gloves.		
Cumulative effects	Impacts of the proposed project in conjunction with other regional actions would not be adverse. The proposed project would generally reduce air emissions in the region and slightly decrease existing cumulative impacts. Continuing efforts by the project participants to increase beneficial reuse of coal ash and other residues from power plant operations would more than offset the additional ash generated by the proposed project.	Impacts would remain unchanged from existing conditions.	Impacts would be similar in nature to the proposed project but minimal in magnitude.

3.0 EXISTING ENVIRONMENT

3.1 SITE DESCRIPTION, AESTHETICS, AND LAND USE

The proposed project would be located at the Presque Isle Power Plant in the northeastern portion of Marquette, Michigan, along the shore of Lake Superior (Figure 2.1.1). The project would occupy about 1.1 acres of land, primarily for location of a new baghouse. The land currently serves as a paved parking lot adjacent to the existing powerhouse for Units 7, 8, and 9.

The Presque Isle Power Plant is situated on a natural isthmus that joins Presque Isle, a 170-acre wooded granite and sandstone promontory, to the mainland. The plant site is bounded on the north and west by land belonging to the Lake Superior & Ishpeming Railroad; on the south by the mouth of the Dead River, which flows into Presque Isle Harbor on Lake Superior; and on the east by Lake Shore Drive along the shore of Lake Superior.

The visual landscape of the Presque Isle Power Plant site and its surroundings is conspicuously marked with existing industrial facilities such as smokestacks, coal storage piles, a flyash storage silo, railroad facilities, and other associated infrastructure. The power plant is potentially visible from several vantage points. The first vantage point, northbound on North Lake Shore from the bridge across the Dead River, is adjacent to an area used for recreation. Along North Shore Boulevard the view of the power plant is partially obscured by existing vegetation and fuel storage piles. The Presque Isle Power Plant is also partially visible from the Presque Isle Marina and Presque Isle Park. From the marina and park, however, visibility of the Presque Isle Power Plant is limited by existing vegetation and the Lake Superior & Ishpeming Railroad trestle serving the Ore Dock.

Views of Lake Superior to the north and east are generally considered to be the most scenic vistas from the power plant site. No residences are located immediately to the south, east or west of the Presque Isle Power Plant, but there are some residences located north of the power plant.

The land directly adjacent to the proposed project is owned by project participants. The land adjacent to the Presque Isle Power Plant site is primarily industrial, with a small amount of residential use and recreation and conservation (City of Marquette 2002). Land uses include: residential development on the shore of Lake Superior (approximately 1,400 feet north of the proposed project site); the city of Marquette marina (approximately 2,500 feet northeast of the proposed project site); and residences (approximately 3,100 feet south of the proposed project site). Immediately north of the proposed project site is the Lake Superior & Ishpeming Railroad and east of the proposed project site is the Cleveland Cliffs Iron Company iron ore dock.

The city of Marquette's 2002 Zoning Map shows that the area just south of the Dead River and adjacent to North Lake Shore Drive is zoned for multiple family residential use (City of Marquette 2002). Land west of the multiple family residential use zone and south of the Dead River is zoned industrial and conservation and recreation north of Hawley Street.

The ash landfill used by Presque Isle Power Plant is located in Marquette Township. The land that the landfill occupies is zoned segregated business district, the designation used by the Township for this type of land use. Lands adjacent to the landfill are zoned resource production.

3.2 ATMOSPHERIC RESOURCES

3.2.1 Climate

The proximity of Lake Superior gives the city of Marquette a quasi-maritime type climate in spite of its mid-continent location and exerts a strong influence upon the weather of the area throughout the year. The water responds to seasonal temperature changes more slowly than the land, resulting in a retardation of both warm weather in the spring and cold weather in the fall. On warm summer days with light prevailing winds, a lake breeze often develops at the shoreline and moves inland during the day. At night, the wind shifts and blows from the land to the lake to create a land breeze.

Winters at Marquette are generally very cold and snowy, with an average of 11 days per year with temperatures below 0°F and an average snowfall of about 104 in. per year. Summers are pleasantly warm, with an average of 5 days per year with temperatures above 90°F. Annual precipitation averages about 32 in., with nearly 60% of this amount falling from May through October. Although wind data are not available for the city of Marquette, regional data indicate that prevailing winds are likely to be from the northeast and southwest, perpendicular to the northwest-southeast shoreline orientation.

3.2.2 Air Quality

Criteria pollutants, which are pollutants for which National Ambient Air Quality Standards (NAAQS) exist (Table 3.2.1), consist of sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), carbon monoxide (CO), lead (Pb), and particulate matter less than or equal to 10 μm in aerodynamic diameter, designated PM-10. The U.S. Environmental Protection Agency (EPA) has also promulgated NAAQS for particulate matter less than or equal to 2.5 μm in aerodynamic diameter (PM-2.5) (62 FR 38652), and a new 8-hour NAAQS for O_3 to replace the 1-hour O_3 standard (62 FR 38856).

The NAAQS are expressed as concentrations of pollutants in the ambient air; that is, in the outdoor air to which the general public has access [40 CFR Part 501(e)]. Primary NAAQS define levels of air quality that EPA deems necessary, with an adequate margin of safety, to protect human health. Secondary NAAQS are similarly designated to protect human welfare by safeguarding environmental resources (such as soils, water, plants, and animals) and manufactured materials. States may modify NAAQS to make them more stringent, or set standards for additional pollutants. Michigan has adopted the NAAQS as the state standards without modifications or additions.

The Upper Peninsula of Michigan, including Marquette, is in attainment with NAAQS for all pollutants (DEQ 2003a). Because the air quality is so good, few ambient air quality monitoring stations are located in the Upper Peninsula. An SO_2 monitoring station is located in an industrial area in Escanaba, about 60 miles south-southeast of Marquette, and two PM-2.5 monitoring stations are being operated at tribal sites located near Sault Ste. Marie, approximately 140 miles east of Marquette.

Table 3.2.1 National Ambient Air Quality Standards (NAAQS) for criteria pollutants

Pollutant	Primary (Health related)		Secondary (Welfare related)	
	Averaging period	Concentration	Averaging period	Concentration
CO	8-hour[a]	9 ppm (10 mg/m^3)	No secondary standard	
	1-hour[a]	35 ppm (40 mg/m^3)	No secondary standard	
Pb	Maximum quarterly average	1.5 μg/m^3	Same as primary standard	
NO_2	Annual arithmetic mean	0.053 ppm (100 μg/m^3)	Same as primary standard	
O_3	Maximum daily 1-hour average[b]	0.12 ppm (235 μg/m^3)	Same as primary standard	
	4th highest 8-hour daily maximum[c]	0.08 ppm (157 μg/m^3)	Same as primary standard	
PM-10	Annual arithmetic mean[d]	50 μg/m^3	Same as primary standard	
	24-hour[d]	150 μg/m^3	Same as primary standard	
PM-2.5	Annual arithmetic mean[e]	15 μg/m^3	Same as primary standard	
	98th percentile 24-hour[e]	65 μg/m^3	Same as primary standard	
SO_2	Annual arithmetic mean	80 μg/m^3 (0.03 ppm)	3-hour[a]	1300 μg/m^3 (0.50 ppm)
	24-hour[a]	365 μg/m^3 (0.14 ppm)		

[a]Not to be exceeded more than once per year.

[b]The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is equal to or less than 1, as determined according to Appendix H of the Ozone NAAQS.

[c]The 8-hour standard is met when the 3-year average of the annual 4th highest daily maximum 8-hour O_3 concentration is less than or equal to 0.08 ppm.

[d]The annual PM-10 standard is attained when the expected annual arithmetic mean concentration is less than or equal to 50 μ/m^3 (3-year average); the 24-hour standard is attained when the expected number of days above 150 μg/m^3 is less than or equal to 1 per year.

[e]The annual PM-2.5 standard is met when the annual average of the quarterly mean PM-2.5 concentrations is less than or equal to 15 μg/m^3, when averaged over 3 years. If spatial averaging is used, the annual averages from all monitors within the area may be averaged in the calculation of the 3-year mean. The 24-hour standard is met when the 98th percentile value, averaged over 3 years, is less than or equal to 65 μg/m^3.

In addition to ambient air quality standards, which represent an upper bound on allowable pollutant concentrations, national air quality standards exist for Prevention of Significant Deterioration (PSD) (40 CFR Part 51.166). The PSD standards differ from the NAAQS in that the NAAQS specify maximum allowable concentrations of pollutants, while PSD requirements provide maximum allowable increases in concentrations of pollutants for areas already in compliance with the NAAQS. PSD standards are therefore expressed as allowable increments in the atmospheric concentrations of specific pollutants. Allowable PSD increments currently exist for three pollutants (NO_2, SO_2, and PM-10). One set of allowable increments exists for Class II areas, which cover most of the United States, and a much more stringent set of allowable increments exists for Class I areas, which include many national parks and monuments, wilderness areas, and other areas as specified in 40 CFR Part 51.166(e). Allowable PSD increments for Class I and Class II areas are given in Table 3.2.2. The PSD Class I area nearest to the Presque Isle Power Plant is the Seney Wilderness Area, about 60 miles to the east-southeast. Michigan has adopted a policy of limiting the degradation allowed from a single facility during the PSD permitting process to 80% of the PSD Class II increments (Craig Fitzner, DEQ, personal communication to Robert Miller, ORNL, May 12, 2003).

Table 3.2.2. Allowable increments for Prevention of Significant Deterioration of air quality

Pollutant	Averaging period	Allowable increment ($\mu g/m^3$)	
		Class I[a]	Class II[a]
Sulfur dioxide (SO_2)	3-hour	25	512
	24-hour	5	91
	annual	2	20
Nitrogen dioxide (NO_2)	annual	2.5	25
Particulate matter less than 10 μm in aerodynamic diameter	24-hour	8	30
	annual	4	17

[a]Class I areas are specifically designated areas (e.g., national parks greater than 6,000 acres in area) in which the degradation of air quality is to be severely restricted. Class II areas (which include most of the United States) have a less stringent set of allowable increments.

Contaminants other than the criteria pollutants are present in the atmosphere in varying amounts that depend on the magnitude and characteristics of the sources, the distance from each source, and the residence time of each pollutant in the atmosphere. In the ambient air, many of these pollutants are present only in extremely small concentrations, requiring expensive state-of-the-art equipment for detection and measurement. Measurements of existing ambient air concentrations for many hazardous pollutants are, at best, sporadic. Regulation of these pollutants is attempted at the sources; emissions from specific source categories are regulated by the National Emissions Standards for Hazardous Air Pollutants (40 CFR Part 61; 40 CFR Part 63). However, electric utilities are not included among the specific source categories to which these regulations apply.

3.3 SURFACE WATER RESOURCES

3.3.1 Hydrology

At the U. S. Geological Survey (USGS) gauging station closest to the proposed project (approximately 4 miles to the west), streamflow in the Dead River averaged 170 cubic feet per second (cfs) in 2001, with a range of annual mean flows of 136 to 234 cfs over the last 10 years (USGS 2003). The average daily mean flows for the 13-year period of record ranged from 80 cfs (August) to 303 cfs (April). The hydrograph of the Dead River has been significantly altered by construction and operation of several hydroelectric power plants and dams.

Lake Superior is the largest freshwater lake in the world in terms of surface area (31,700 mile^2) and the third largest in volume (3×10^{15} gal—roughly 10% of the world's surface freshwater and more than all of the other Great Lakes combined) (Sea Grant Minnesota 2002). Given the size of Lake Superior, which has 1,826 miles of shoreline, its drainage basin is relatively small (49,300 mile^2). The lake receives about 2.5 ft of precipitation annually, and the equivalent of 2.0 ft more from streams and groundwater. Mean annual outflow to Lake Huron is 75,000 cfs (Sea Grant Minnesota 2002).

Lake Superior's surface elevation averages about 602 feet above mean sea level (amsl) (NOAA 2003), and its water retention or replacement time is estimated to be 191 years (Sea Grant Minnesota 2002). The lake's average annual temperature is 40 °F, and in winter 40–95% of the lake's surface freezes over.

3.3.2 Water Quality and Use

3.3.2.1 Water Quality

Lake Superior has the best water quality of all the Great Lakes—it is the coldest, cleanest, and, with 27-ft visibility, the clearest of the Great Lakes, thanks in part to "low concentrations of nutrients, suspended sediments, and organic material" (Sea Grant Minnesota 2002). Lake waters naturally tend to exhibit some turbidity near the mouths of tributaries, and the waters of Lake Superior near the mouth of the Dead River are no exception. Toxic pollutant levels in Lake Superior are also low compared to levels in the other Great Lakes, but potential contamination by polychlorinated biphenyls (PCBs), dioxins, and Hg is nevertheless a concern as reflected in recommendations and advisories for limiting the consumption of certain fish species by anglers. Dissolved oxygen occurs at saturation levels at all depths of Lake Superior.

3.3.2.2 Water Use

The Presque Isle Power Plant's noncontact cooling water requirements are met by the diversion of 224.7 million gallons per day (MGD) from Lake Superior via a pair of 1,468-ft long, 96-in. diameter intake pipes that connect a submerged, offshore intake structure with the intake forebay adjacent to the power plant. After the noncontact cooling water has passed through the condensers, about 210 gallons

per minute (gpm) (0.30 MGD) are used as service water. About 6.9 gpm (0.01 MGD) of potable water are supplied from Lake Superior to the Presque Isle Power Plant for both potable and sanitary needs by the city of Marquette Municipal Water System.

As of 1990, the Dead River and its tributaries supplied a total of 344 MGD to all users including public water supply, commercial, domestic, industrial, and agricultural users (USGS 1990). In an emergency, the Presque Isle Power Plant can withdraw water directly from the Dead River through an emergency intake structure between the river and the power plant's intake forebay.

3.3.3 Effluent Discharges

Units 5–9 of the Presque Isle Power Plant discharge their fraction of the total power plant's cooling water (224.4 MGD) back to Lake Superior through pipelines connected to submerged offshore diffusers. Units 1–4 discharge their cooling water and the entire Presque Isle Power Plant's treated wastewater (208 gpm or 0.300 MGD) through a surface discharge channel directly to Lake Superior. The wastewater effluent must be treated to meet the standards set forth in a NPDES permit before being discharged to Lake Superior. Potentially hazardous wastes are removed from the site by a waste management contractor for disposal at an authorized facility.

3.3.4 Thermal Discharge

According to the July 2002 discharge monitoring report for the Presque Isle Power Plant, the average intake water temperature was 68 °F and the average discharge temperatures were 78, 83, and 85 °F at the discharge points in Lake Superior. The maximum daily intake and discharge temperatures recorded during this period were 78 and 98 °F, respectively. Average thermal loading from all discharge points together was about 1.35×10^9 British thermal units (Btu) per hour. A thermal plume in Presque Isle Harbor results from this thermal loading.

The Dead River is typically 5 °F warmer than Lake Superior during fall, winter, and early spring, and about 20 °F warmer during summer.

3.4 GEOLOGICAL RESOURCES

3.4.1 Geology and Topography

The landscape of the region that includes the Presque Isle Power Plant was shaped by geologic processes in two widely separated divisions of geologic time. The region's bedrock geology is the result of episodic tectonic activity during the Precambrian Era, the earliest division of earth history. More than 1 billion years later during the Pleistocene Epoch, continental glaciers sculpted the topography and deposited the unconsolidated surficial materials. In the Marquette area the last glaciation ended about 10,000 years ago.

The Presque Isle Power Plant site is generally flat, with an average elevation of 606 ft amsl, about 4 ft higher than the level of Lake Superior. The surrounding area, including the site of the Presque Isle Power Plant landfill, has flat to rolling terrain controlled by the topography of the underlying bedrock.

Coarse crystalline metamorphic rocks of granitic composition underlie both the power plant and the ash landfill (Morey et al. 1982). At the power plant site the surficial material is glacial lake sediment consisting of sand to silty sand, with gravel and occasional cobbles and boulders. The surface material under much of the power plant's landfill site is glacial outwash sand and gravel. In other parts of the landfill site a thin layer of glacial till (unsorted sedimentary material deposited directly by a glacier) mantles the bedrock (Marquette County Community Information System). Portions of landfill units 2 and 3 (the active unit and the unit currently being built) have been constructed by blasting into bedrock.

The rock types found at the power plant site are characteristically strong and resistant to erosion. Soils formed in the glacial materials are generally high in permeability and low in fertility. No soil types in the area of the proposed project are classified as prime farmland (Marquette County Community Information System). Both the soil and bedrock can be expected to have little capacity to retard the transport of dissolved contaminants.

3.4.2 Geologic Hazards

There are no identifiable geologic hazards associated with the site of the proposed project. The local bedrock is not subject to dissolution or subsidence. There is no history of underground mining below the power plant or landfill sites, although there were underground mining operations several miles west of Marquette in the iron range area.

The Marquette area is classified among the most seismically stable regions of the United States. Faults present in area bedrock reflect tectonic activity in the geologically distant past and are not considered to be active. The only significant historical seismic activity in Michigan's upper peninsula was a series of three events in an underground mining area in the Keweenaw Peninsula (about 70 miles northwest of Marquette) in 1905, 1906, and 1909 (von Hake 1973). The first and largest of these events, which appeared to be a terrific explosion, caused chimneys to fall and plate glass to break (Mercalli intensity VII). It was felt as far away as Marquette. The second and third events were associated with the collapse of underground mines.

3.4.3 Groundwater

Groundwater is present at very shallow depths in the unconsolidated glacial deposits at both the Presque Isle Power Plant and landfill sites. Groundwater is also assumed to be present in interconnected fractures in the bedrock. However, because the rock matrix is essentially impermeable, the bedrock surface can be considered to form the base of the shallow groundwater system.

Soil borings at the power plant site encountered groundwater at an elevation between 602 and 603 ft amsl. This is similar to or slightly higher than the water levels in Lake Superior and the Dead River, toward which the site groundwater is assumed to flow and discharge.

Monitoring wells at the landfill site allow observations of water levels and quality both up- and down-gradient from the landfill units. Groundwater movement at this site follows the slope of the bedrock surface, resulting in multiple directions of flow. Groundwater probably discharges to surface water in Compeau Creek to the north and Dead River to the south.

The local groundwater resembles the local surface water in its natural chemical characteristics (Section 3.3.2.1), with low concentrations of dissolved solids.

Groundwater is not currently used in the vicinity of the power plant or the landfill site. City of Marquette municipal water, which comes from Lake Superior, is available throughout the area, but wells are used for domestic supply in some homes outside of the city. The wells nearest the Presque Isle Power Plant are almost 1 mile away. The well nearest the landfill site is about ½ mile to the east (Marquette County Community Information System).

3.5 FLOODPLAINS AND WETLANDS

3.5.1 Floodplains

According to the *Flood Insurance Rate Map* prepared by the Federal Emergency Management Agency (FEMA), the proposed project would be located outside the 500-year floodplain (FEMA 1994).

3.5.2 Wetlands

The proposed project would be located in an existing developed industrial site containing no wetlands. Very small wetland areas occur along the north shore of the Dead River immediately south and west of the Presque Isle Power Plant, but the nearest wetland area is located at least 160 yd from the proposed project (LIAA 2001). The nearest extensive wetland is located about 0.4 mile northwest of the proposed project.

3.6 ECOLOGICAL RESOURCES

3.6.1 Terrestrial Ecology

The proposed project would be located in the Northern Great Lakes Section (212H) of the Laurentian Mixed Forest Province (Ecological Subregion) of the United States (Bailey 1995; McNab and Avers 1994). This province is characterized by forest that is more or less transitional between broadleaf deciduous and boreal forest. The proposed project would occupy about 1.1 acres of developed industrial property at the 65.5-acre Presque Isle Power Plant. The proposed project site is characterized by an almost complete lack of natural ecological resources. Most of the forests west of the site are second-growth as a result of past tree harvesting practices (a few scattered remnants of old-growth forest can be found in the general area). Outside the Presque Isle Power Plant site, better-drained soils support northern hardwoods such as birch, elm, sugar maple, and aspen, and evergreens such as spruce, fir, white pine, and hemlock. Ash, alder, willow, and red maple are common in wetter upland areas further inland from Presque Isle Harbor.

Remaining woodlands and fields support a wide variety of wildlife including foxes, coyotes, black bear, white-tailed deer, skunks, porcupines, muskrat, ermine, red squirrels, chipmunks, and mice. An effort is currently underway to introduce the endangered gray wolf in the Huron Mountains about 20

miles northwest of the proposed project site. If successfully established, this would be the only wolf population in Michigan outside of Isle Royale in Lake Superior.

Song birds, birds of prey, and game birds are also well represented in the woodlands and fields to the west and south of the proposed project site. Some of the birds observed near the site in an ecological survey conducted for the U.S. Army Engineers District (1973) include black duck, scaup, bufflehead, green-winged teal, common merganser, mute swan, Canada goose, woodcock, herring gull, robin, crow, slate-colored junco, various sparrow species.

3.6.2 Aquatic Ecology

Because Lake Superior has very low levels of nutrients (i.e., ultra oligotrophic waters), its aquatic community, and its fishery in particular, are far less productive than those of the other Great Lakes. Moreover, as in the other Great Lakes, fish populations and species diversity have been seriously diminished by the deliberate or inadvertent introduction of exotic species such as the sea lamprey, Eurasian ruffe, round goby, zebra mussel, and European spiny water flea (Sea Grant Minnesota 2002). From the perspective of anglers, more desirable fish that have been deliberately introduced to the Lake Superior ecosystem include chinook, coho, and Atlantic salmon, rainbow trout, and brown trout. Among once abundant native species that have suffered significant losses are the lake trout, brook trout, and lake herring. Nevertheless, stocking, efforts to control sea lampreys, and natural resiliency of the lake trout have resulted in considerable recovery of lake trout populations (Sea Grant Minnesota 2002). The lake now supports a sport fishery and a limited commercial fishery. Salmonids, especially coho salmon, lake trout, and round whitefish, make up most of the sports catch (Peck 1992). Commercial harvests also include deepwater lake trout (siskowet), smelt, whitefish, chubs (deepwater ciscoes), and herring (Sea Grant Minnesota 2002). At least 78 species of fish are currently known to reside in Lake Superior.

In the Dead River, coho and chinook salmon are most commonly caught by sports fisherman (Peck 1992). Steelhead (rainbow trout) are also frequently caught from this river.

3.6.3 Threatened and Endangered Species

Marquette County hosts or potentially hosts four federally listed threatened and endangered species. One species, Kirtland's warbler (*Dendroica kirtlandii*), is listed as endangered, while the other three, the gray wolf (*Canis lupus*), the Canada lynx (*Lynx canadensis*) and the bald eagle (*Haliaeetus leucocephalus*), are listed as threatened (FWS 2001, 50 CFR Part 17, 68 FR 15804–15875). Because the proposed project site is already highly disturbed and offers virtually no viable habitat for any of these four species, they are unlikely to occur on or near the site, even as transients.

3.6.4 Biodiversity

The term "biodiversity" (biological diversity) has proven difficult to define succinctly and accurately. Biodiversity is often defined as the "variety and variability of life" or "the diversity of genes, species, and ecosystems" (CEQ 1993). These definitions, however, do not adequately communicate the importance of hierarchical and horizontal connectedness ("relationships and

interactions") in maintaining the environmental services (e.g., "nutrient cycling") of ecological organization. Thus, effects on biodiversity at one level (e.g., species diversity) will affect biodiversity at other levels in the system (e.g., regional ecosystem diversity).

The proposed project site is located within an area of the United States that exhibits what most ecologists would consider reasonably good biodiversity at the state and ecoregion scales. Numerous ecosystem types and, at lower levels of organization, plant, mammalian, and avian species richness contribute significantly to the overall biodiversity. Based on (a) the variety of habitats still surviving, and (b) the number of species in the more visible classes of plants and animals observed in the environs, the area within a few miles of the proposed project exhibits moderately high biodiversity. The proposed project site itself exhibits little biodiversity because previous industrial development has almost completely destroyed the native habitats that were once present, as well as the wildlife communities they supported.

3.7 CULTURAL RESOURCES

Although no sites within the Presque Isle Power Plant property are listed in the *National Register of Historic Places*, there are 26 such properties within Marquette County, including 12 properties in the city of Marquette (National Park Service 2003). These *National Register* properties include an historic district, houses, a lighthouse, a building at Northern Michigan University, and state and local government buildings.

3.8 SOCIOECONOMICS

This discussion of existing socioeconomic conditions focuses on Marquette County, in which the Presque Isle Power Plant and the proposed project site are located. In addition to being the site of the proposed construction and operations activities, Marquette County, which includes the cities of Marquette (the county seat), Ishpeming, and Negaunee and other smaller communities, would be expected to attract any workers that might move to the area as a result of the proposed project.

3.8.1 Population

Table 3.8.1 provides current population estimates for Marquette County and its principal incorporated areas. The bulk of the population of Marquette County is found in the cities of Marquette, Ispeming, and Negaunee. Marquette County experienced substantial growth until approximately 1980, but then started to decline in population through the remainder of the twentieth century. The decline in population within Marquette County is expected to continue in the first decades of the twenty-first century (Office of the State Demographer 1996).

Table 3.8.1. Current population and change over time for Marquette County, its municipalities, and Michigan

Location	1990 Population	2000 Population	Percent change 1990–2000	2001 population estimate	Percent change 2000–2001
Michigan	9,295,297	9,938,444	6.9	10,050,446	1.1
Marquette County	70,887	64,634	(8.8)	64,383	(0.4)
Marquette City	21,977	19,661	(10.5)	NA	—
Ishpeming	7,200	6,686	(7.1)	NA	—
Negaunee	4,741	4,576	(3.5)	NA	—

NA = not available.
Sources: U.S. Bureau of the Census, 1990 Census of Population and Housing, Census 2002, and Population Estimates Program.

3.8.2 Employment and Income

In 2000, Marquette County had a per capita personal income (PCPI) of $22,526 (U.S. Bureau of Economic Analysis, Regional Accounts Data). This PCPI ranked 39th in the state, and was 77% of the state average ($29,127) and 76% of the national average ($29,469). The 2000 PCPI reflected an increase of 4.1% from 1999. The 1999–2000 state change was 4.6% and the national change was 5.8%.

In 1999, the average size of Marquette County's resident labor force was approximately 33,000 (Table 3.8.2), with approximately one-third of these people having jobs in the city of Marquette. The unemployment rate in Marquette County was 5.7%, distinctly higher than the statewide rate of 3.8%.

Table 3.8.2. Employment and income for residents of Marquette County and Michigan in 2000

Location	Labor force	Number employed	Number unemployed	Unemployment rate (%)	Per-capita income ($)
Marquette County	32,710	30,639	2,014	6.2	18,070
Michigan	4,926,463	4,637,461	284,992	5.8	22,168

Source: U.S. Bureau of the Census, Census 2000.

Table 3.8.3 shows how employment within Marquette County and selected communities was distributed among key industries or economic sectors in 2000. The educational, health and social services sector, which accounted for nearly 26% of all Marquette County jobs, was by far the largest. Other important categories were retail trade (12.7%) and arts, entertainment, recreation, accommodation and food services (10%). The remaining economic sectors accounted for approximately 5–6% each of jobs in the labor force.

The Presque Isle Power Plant is one of the largest employers in Marquette County. In 2003, the power plant workforce included 202 full-time employees.

Table 3.8.3. Employment by industry or economic sector in Marquette County and selected communities in 2000

Industry or economic sector	Marquette County	Marquette City	Ishpeming	Negaunee
Total non-farm	32,710	10,681	1,784	1,519
Agriculture, forestry, fishing and hunting, and mining	1,612	96	189	107
Construction	1,737	383	61	98
Manufacturing	1,908	405	127	92
Wholesale trade	678	105	38	28
Retail trade	4,164	1,345	267	258
Transportation and warehousing, and utilities	1,585	412	103	86
Information	697	401	28	12
Finance, insurance, real estate, and rental and leasing	1,448	497	78	67
Professional, scientific, management, administrative, and waste management services	1,523	513	76	113
Educational, health, and social services	8,486	3,294	394	377
Arts, entertainment, recreation, accommodation and food services	3,274	1,496	160	62
Other services (except public administration)	1,647	580	71	74
Public administration	1,880	468	104	93

Source: U.S. Bureau of the Census, Census 2000.

3.8.3 Housing

As of 2000, there were almost 26,000 occupied housing units in Marquette County and more than 7,000 vacant units (Table 3.8.4). Approximately 50% of the occupied units were located within the city limits of Marquette, Ishpeming, and Negaunee. Approximately 70% of Marquette County's occupied units were owner-occupied and the remaining 30% were occupied by renters. Of the vacant units countywide, 390 were for sale and 743 were for rent. The median value of an owner-occupied unit within Marquette County was $77,200 in 2000.

3.8.4 Local Government Revenues

Marquette County received over $14 million in total revenues in calendar year 1998, with the largest share (52%) coming from taxes. Other important revenue sources were state sources (20%), charges for services (14.5%), licenses and permits (3.6%), federal grants (2%), and the broad category of other revenues (5.4%) (Harvey 1999).

Table 3.8.4. Housing data for Marquette, Ishpeming, Negaunee and Marquette County in 2000

	Marquette	Ishpeming	Negaunee	Marquette County
Number of occupied housing units	8,071	2,915	1,946	25,767
Number of units occupied by owner	4,026	1,892	1,349	17,985
Number of units occupied by renter	4,045	1,023	597	7,782
Number of vacant housing units	358	295	142	7,110
Number of units for sale	57	42	20	390
Number of units for rent	153	77	52	743
Median value owner-occupied unit, $	86,400	52,100	61,300	77,200

Source: U.S. Bureau of the Census, Census 2000.

Property taxes paid by the Presque Isle Power Plant in 2002 to taxing jurisdictions totaled approximately $5 million, including approximately $1.7 million for school operating, $1.3 million to the city of Marquette, $570,000 to state education, $530,000 to county operating, and $840,000 to other specific taxing entities (R. Svendsen, Emission Strategies, Inc., e-mail communication to S. Carnes, ORNL, May 12, 2003).

3.8.5 Public Services

3.8.5.1 Education

The Marquette Area Public School District covers an area of 123 miles^2 and serves a population of approximately 31,000. During 2001–2002, public education was provided to over 3,900 students in grades kindergarten through 12 with 232 teachers and other professionals (Marquette Area Public Schools 2002), resulting in a ratio of students to full-time equivalent teachers of 16.8. The educational sites for the 2001–2002 school year included six elementary schools, two middle schools, and one high school. Two elementary schools, Whitman and Silver Creek, closed in June 2002 and the buildings were sold, in accordance with the Board-adopted Focus 2005 Balanced Budget Plan. The action was also in response to declining enrollment, which most school districts in the Upper Peninsula have been experiencing.

3.8.5.2 Utilities

Electricity

The Marquette Board of Light and Power provides electric utility service to the city of Marquette and portions of the surrounding areas in Marquette County. The generation resources of the Marquette Board of Light and Power include hydrogeneration (3.9 MW), a combustion turbine (24 MW), and a three-unit coal-fired power plant (77.5 MW) .

Water

The city of Marquette obtains water from Lake Superior and provides municipal water service for potable and fire protection purposes. The system has a water treatment plant capacity of 7.0 MGD with average usage of 3.1 MGD and a peak usage of 5.5 MGD. The water treatment system consists of micro-strainers and a micro-filtration system followed by chlorination. Fluoride is added for prevention of dental cavities (City of Marquette Water Department 2003). Potable water needs for the Presque Isle Power Plant are provided by the city of Marquette municipal water supply system. The power plant uses on average 10,000 gpd of potable water.

Sewage Disposal

The Marquette Area Wastewater Treatment Facility provides secondary wastewater treatment for the city of Marquette and portions of Chocolay and Marquette Township (City of Marquette Water Department 2003). The publicly owned treatment works has a capacity of 5.6 MGD and an average use of 3.3 MGD. The treated effluent from this facility is discharged to the Carp River, which flows to Lake Superior.

Solid Waste

The city of Marquette provides collection of household refuse and recyclables from all residential properties within the city. Residential properties include single family homes, townhouses and apartments, not exceeding five units per building. In general, the city of Marquette does not provide solid waste collection services for commercial, institutional, and industrial properties. By paying a tipping fee, businesses may also dispose of rubbish, tires, construction and demolition debris, scrap metal, and most commercial wastes at the transfer station operated by the city of Marquette's solid waste contractor.

Businesses can also haul their wastes from the city of Marquette directly to the Marquette County Landfill after obtaining pre-authorization from the City Treasurer's Office and paying an annual fee for maintenance of a landfill account. The city of Marquette adds a surcharge to these fees to finance the bond payments associated with construction of the landfill (City of Marquette Public Works Department 2003).

3.8.5.3 Police and Fire Protection

The city of Marquette maintains 36 full-time sworn officers in its Police Department. Additionally, Northern Michigan University maintains a public safety department, and the Michigan Highway Patrol maintains a barracks in Marquette County.

Fire protection is provided by the city of Marquette. The fire department is staffed with 26 firefighters, many of whom are trained and certified as Emergency Medical Technicians.

3.8.5.4 Medical Infrastructure

Three hospitals are available in the city of Marquette—Peninsula Medical Center, Marquette General Hospital, and the Veterans Administration Hospital. In addition to in-patent treatment, the

Peninsula Medical Center provides a walk-in clinic for non-emergency treatment. Marquette General Hospital provides emergency medical services and is the provider of ambulance services. The Marquette Fire Department responds with the Marquette General Hospital ambulances to provide assistance if needed.

3.8.6 Environmental Justice

Percentages of minority and low-income populations living in Marquette County and Michigan are provided in Table 3.8.5. American Indians and Alaskan Natives and Blacks are the largest minority groups in Marquette County. Although the percentage of American Indians and Alaskan Natives is comparable to that for the state as a whole, the percentage of Blacks in the county is less than one-tenth as large as in the state as a whole. The proportions of all other minority populations, including Hispanics, are substantially less than for the state as a whole.

Table 3.8.6 provides data for minority and Hispanic populations from the 2000 census for census tracts immediately surrounding the proposed project site (i.e., census tracts 5, 6, and 14). For census tract 5, which is located south of the proposed project site, the proportion of Blacks is approximately twice as high as for Marquette County but still well below the state percentage. The other minority populations in census tract 5 are comparable to those of Marquette County and comparable to or less than those for the state as a whole. The Hispanic population proportion is more than twice that for Marquette County but almost half that for the state as a whole. For census tract 6, which encompasses the proposed project site, the American Indian and Alaskan Native proportion is approximately twice that for Marquette County and the state as a whole, but the proportions of other minority and Hispanic populations are comparable to or less than those of Marquette County and the state as a whole. For census tract 14, which is located west of the proposed project site, the American Indian and Alaskan Native proportion is somewhat larger than for Marquette County and the state as a whole, but the proportions of other minority and Hispanic populations are comparable to or less than those of Marquette County and the state as a whole.

Table 3.8.6 also provides data regarding the number and proportion of persons living in poverty from the 1990 census (the most recent year for which poverty data are available at the census tract level) for census tracts 5, 6, and 14. Although the proportions of persons living in poverty in census tracts 5 and 14 in 1990 are well below those for Marquette County and the state as a whole, the proportion of persons living in poverty in 1990 in census tract 6 (approximately 30%) is substantially larger than for Marquette County and the state as a whole.

Table 3.8.5. Minority and low-income population residing in Marquette County and Michigan in 2000[a]

Categories	Marquette County		Michigan	
	Number	Percent of total	Number	Percent of total
Total population	64,634	100.0	9,938,444	100.0
Black	853	1.3	1,412,742	14.2
American Indian and Alaskan Native	964	1.5	29,069	1.4
Asian	319	0.5	176,510	1.8
Native Hawaiian and other Pacific Islander	14	<0.1	2,692	<0.1
Some other race	160	0.2	129,552	1.3
Two or more races	846	1.3	192,416	1.9
Hispanic (all races)	444	0.7	323,877	3.3
Poverty status (1999)	6,592	10.9	1,021,605	10.5

[a]All data are for 2000, except for poverty status, which are based on a sample for 1999.
Source: U.S. Census Bureau, Census 2000 Summary File 1 and Summary File 3.

Table 3.8.6. Percent of minority and Hispanic populations in 2000, and persons in poverty residing in census tracts adjacent to the Presque Isle Power Plant site in 1990[a]

Categories	Census tract 5		Census tract 6		Census tract 14	
	Number	Percent of total	Number	Percent of total	Number	Percent of total
Total population	2,202	100.0	2,277	100.0	3,582	100.0
Black	60	2.7	28	1.2	3	<0.1
American Indian and Alaskan Native	27	1.2	67	2.9	72	2.0
Asian	18	0.8	17	0.7	24	0.7
Native Hawaiian and Other Pacific Islander	0	0	0	0	1	<0.1
Some other race	14	0.6	3	0.1	6	0.2
Two or more races	16	0.7	38	1.7	64	1.8
Hispanic (all races)	40	1.8	19	0.8	24	0.7
Total population (1990)	2,372	100.0	2,465	100.0	3,010	100.0
Poverty status (1989)	138	5.8	753	30.5	267	8.9

[a]The proportion of persons living in poverty is based on the most recently available data compiled at the census tract level (1989 data and the 1990 census).
Source: U.S. Census Bureau, Census 2000 Summary File 1 and Census 1990 Summary File 3.

3.9 TRANSPORTATION AND NOISE

3.9.1 Transportation

3.9.1.1 Roads

Lakeshore Boulevard, which runs north/south along the shore of Lake Superior, provides the entrance for vehicular traffic to the Presque Isle Power Plant. Lakeshore Boulevard, in turn, receives traffic from northwest of Marquette and from downtown Marquette from Hawley Street (running east/west from northwest of Marquette) and Pine Street and other local roadways feeding into Lakeshore Boulevard.

State Highways 41 and 553 are the only highways providing access to Marquette. Although statistics are not kept on average daily traffic (ADT) for Lakeshore Boulevard, the Michigan Department of Transportation measured traffic on major roadways in and around the city of Marquette in 2001. These measurements indicate a maximum of approximately 22,800 vehicles traveling on State Highway 41 from the south of Marquette and 30,800 vehicles from the west of Marquette, and 6,300 vehicles along State Highway 553 (Michigan Department of Transportation 2001).

Vehicular traffic to the residential area north of Presque Isle Power Plant and the city of Marquette Marina east of the power plant (Section 3.1) would travel on Lakeshore Boulevard north of the power plant, as would traffic to the city of Marquette's Presque Isle Park (located at the northern end of Lakeshore Boulevard). Visitors to the city of Marquette's LaBonte Park, just south of the Dead River on Lakeshore Boulevard, also use Lakeshore Boulevard.

The main entrance to the Presque Isle Power Plant is on Lakeshore Boulevard. The power plant receives on average three to five common carrier truck deliveries per day. Additionally, Federal Express and United Parcel Service make daily deliveries. In addition, No. 2 Fuel Oil for ignition and warm-up of the units is delivered to the site by tanker truck. Other consumable materials and supplies are delivered by truck.

The frequency and number of trucks needed to manage coal combustion byproducts (CCB) is highly dependent on the amount of electricity generated at the Presque Isle Power Plant and market conditions. Most recently, during the summer 10 truck loads per day of CCB were recycled while during the winter the number was reduced to 5. The movement of CCB over the landfill access road varies. During the most recent summer, twenty-two truck loads per day of CCB were moved to the landfill, while during recent winters the number varied between 3 and 11.

3.9.1.2 Rail

There are numerous rail lines in the vicinity of the Presque Isle Power Plant, mostly serving Cleveland-Cliffs Incorporated (CCI) transfers of taconite pellets between the open-pit mines and the ore dock north of Marquette on Lake Superior and immediately east of the Presque Isle Power Plant. CCI is the principal owner of the Lake Superior & Ishpeming Railroad.

3.9.1.3 Water

As noted in Section 3.9.1.2, taconite pellets are shipped by CCI to its customers from its ore dock north of Marquette and immediately east of the Presque Isle Power Plant. In addition, coal and petroleum coke are transported to the Presque Isle Power Plant by lake boats. The lake boats are moored adjacent to the ore dock and, using the ships' onboard unloading equipment, discharge the solid fuel to the fuel receiving and handling system.

3.9.2 Noise

Noise can be defined as unwanted sound. Noise becomes annoying when it is loud enough to be heard above the usual background sounds to which people have become accustomed. Background levels, in turn, vary with location and time of day. Sound levels are measured in decibels (dB); measured values are normally adjusted to account for the response of the human ear, in which case they are expressed as decibels as measured on the A-weighted scale [dB(A)].

Presque Isle Power Plant is bounded on the north by the old Lake Superior & Ishpeming Railroad trestle and iron ore dock. The property previously used for the railroad yard shop and roundhouse has been acquired by the Upper Peninsula Power Company. Presque Isle Harbor lies directly to the east of the Presque Isle Power Plant. Towards the south and west is the Dead River. The city of Marquette's diesel electric station is located approximately 1,700 ft southwest of Presque Isle Power Plant. Land masses to the west and south of Presque Isle Power Plant are relatively open or are occupied by industrial users. To the north of the power plant site, residential dwellings line the shores of Middle Bay about 2,100 ft away.

According to a survey by Goodfriend and Associates (1971), sound levels at Presque Isle Power Plant are similar to those at other industrial plants. The relatively simple sound pattern resulting from the Presque Isle Power Plant is complicated by the presence of other sound sources in the area, including vehicular traffic, nearby passing trains, recreational activities, and other industrial activities along Lake Shore Drive. Sound levels may exceed 100 dB(A) within 50 ft of a train passing on one of the nearby railroad tracks. Although the presence of Lake Superior precludes stationary noise sources to the east of Presque Isle Power Plant, motorboats using the lake generate noise. Even though the presence of the Dead River to the south and west is conducive to the transmission of sound, the river is 1/3-mile wide and the opposite shore is abandoned industrial land. These areas are minimally affected by the Presque Isle Power Plant and other sources of noise.

The Marquette City Code, Title IV, Chapter 26, Section 26.12, addresses noise as a nuisance abatement item and has no objective or quantitative standards for noise emissions. The city of Marquette prohibits any person to make or continue to cause any excessive, unnecessary, or unusually loud noise that endangers the comfort, repose, health, peace, or safety of others. No documented, noise-related complaints associated with Presque Isle Power Plant have been identified. Construction activities during installation of the baghouse serving Units 1 through 4 did not generate noise that triggered enforcement under the City Code.

In addition to the guideline level of 55 dB(A) given by the Environmental Protection Agency (EPA), a level of 90 dB(A) is specified by the Occupational Safety and Health Administration (OSHA) (29 CFR Part 1910.95) as the maximum occupational exposure during an 8-hour period for protection against hearing loss. When worker noise exposure levels equal or exceed an 8-hour time weighted average (TWA) of 85 dB(A), the employer is required to administer a continuing effective hearing conservation program. This 85 dB(A) represents an action level. Presque Isle Power Plant has a hearing conservation program in place for all workers.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT

4.1.1 Land Use and Aesthetics

4.1.1.1 Land Use

On the Presque Isle Power Plant site, the proposed project would require about 1.1 acres of land for construction of the TOXECON baghouse, ash silo, and other facilities (Figure 2.1.4). All of these proposed facilities would occupy land that presently has a paved surface and is dedicated to industrial use. The site proposed for the baghouse and ash silo is currently occupied by a parking area and office trailers. The proposed facilities would not disrupt traffic movement on the property. However, the project participants probably would replace the lost parking space by paving an equivalent area of land on another part of the plant site (R. Johnson, We Energies, e-mail communication to R. Miller, ORNL, April 24, 2003). The new parking area would be located on land that is already disturbed and dedicated to industrial use.

Disposal of TOXECON ash would be in a licensed landfill facility on property that is already dedicated to waste disposal use and designated for "Segregated Business" under Marquette Township zoning (Section 4.1.7).

The proposed project would not alter the pattern of land use in Marquette County because it would be confined to the Presque Isle Power Plant site. The proposed project would be consistent with existing land use plans and local zoning. Furthermore, any in-migration of workers that might occur during project construction and operations would not be large enough to increase the amount of land required for residential purposes (Section 4.1.9.3) or public service facilities (Section 4.1.9.5). Although some indirect and induced jobs would be created as a result of direct employment at the project site (Section 4.1.9), any increase in the amount of land devoted to commercial purposes in Marquette County would be extremely small.

4.1.1.2 Aesthetics

The Presque Isle Power Plant is visible and the proposed project would be potentially visible from several vantage points. The first vantage point is northbound on North Lake Shore Boulevard from the bridge across the Dead River near the entrance to the facility. The proposed project would not be visible from this vantage point because it would be located on the north side of the existing Presque Isle Power Plant structures (i.e., Units 1–9). The proposed TOXECON baghouse and associated equipment would be totally hidden from this viewpoint by existing structures.

The TOXECON baghouse and associated equipment would also not be visible from other vantage points along North Lake Shore Boulevard due to existing vegetation and the existing coal storage piles.

The Presque Isle Power Plant is partially visible from the Presque Isle Marina and Presque Isle Park. From the marina and park, visibility of the Presque Isle Power Plant is limited due to existing vegetation and the Lake Superior & Ishpeming Railroad trestle serving the ore dock. From the marina and park, the proposed project would probably be obscured by the taller, existing power plant structures. Any portion of the proposed project that would be visible would blend into the existing industrial structures because of the similarity of the architecture and colors used in the roof and siding of the enclosure around the TOXECON baghouse. Existing vegetation, the Lake Superior & Ishpeming Railroad trestle, and coal piles would all contribute to the visual screening of the proposed project.

In short, the visual landscape of the Presque Isle Power Plant is conspicuously marked with existing industrial facilities such as power plant stacks, a railroad trestle, coal storage piles, and an ash storage silo. The visual impacts of the proposed project would be minimal.

4.1.2 Atmospheric Resources and Air Quality

This section evaluates potential impacts to atmospheric resources that may result from construction or operation of the proposed facility. Section 4.1.2.1 discusses effects of construction, including fugitive dust associated with earthwork and excavation. Section 4.1.2.2 discusses operational effects, particularly with regard to changes from existing operations.

4.1.2.1 Construction

During construction of the proposed facility, temporary and localized increases in atmospheric concentrations of NO_x, CO, SO_2, VOCs, and particulate matter would result from exhaust emissions of workers' vehicles, heavy construction vehicles, diesel generators, and other machinery and tools. Construction vehicles and machinery would be equipped with standard pollution-control devices to minimize emissions. These emissions would be very small compared to regulatory thresholds typically used to determine whether further air quality impact analysis is necessary.

Fugitive dust would result from excavation and earthwork. The proposed project would use a total of about 1.1 acres of previously disturbed land, primarily for the new baghouse. Limited site clearing and grading would be required because the land currently serves as a paved parking lot adjacent to the existing powerhouse for Units 7, 8, and 9. A new paved parking lot would likely be built near the powerhouse to compensate for the loss of the existing lot. The temporary impacts of fugitive dust on offsite ambient air concentrations of particulate matter less than 10 μm in aerodynamic diameter (PM-10) would be localized because of the small construction area, the limited amount of clearing and grading, and the relatively rapid settling of fugitive dust due to its relatively large size. Sprinkling of exposed soils with water would be conducted as necessary to minimize fugitive dust emissions.

4.1.2.2 Operation

Potential air quality impacts resulting from changes at the Presque Isle Power Plant during demonstration of the proposed project would generally be beneficial because plantwide air emissions would decrease or continue at the same level (Section 2.1.6.1). Hg emissions would be expected to

decrease from 112 lb per year currently to 30 lb per year because of the injection of powdered activated carbon. Plantwide particulate emissions would decrease from 237 tons per year to 182 tons per year due to the addition of the new baghouse serving Units 7, 8, and 9. The magnitude of reduction in SO_2 and NO_x emissions would depend on the effectiveness and test duration of injected sorbents other than powdered activated carbon.

The existing three-flued, 400-ft stack that serves Units 7, 8, and 9 would continue to be used; however, rather than the flue gas remaining separate for each unit, flue gas exiting the new baghouse would be a mixture of the flue gas from the three units, which would be discharged to each of the three flues (Section 2.1.2). While most of the source terms associated with this stack would remain the same during the demonstration (i.e., stack height, flue diameter, exit velocity), the exit temperature would decrease because testing has indicated that the ideal flue gas temperature for using powdered activated carbon is less than 350°F. Planned upgrades to Units 7, 8, and 9, which are independent of the proposed project, are expected to lower the flue gas temperature to 290°F. If the upgrades are unsuccessful in reducing the temperature, a water injection spray cooling system would be designed and included as part of the proposed project to ensure that the flue gas temperature would be lowered to 330°F (Section 2.1.2). In comparison, the average stack exit temperature of Units 7, 8, and 9 is 379°F under current operating conditions. Consequently, the decreased exit temperature during the demonstration would decrease the plume rise, which could result in increased downwind ground-level concentrations of those air pollutants experiencing little or no decrease in stack emissions.

An analysis of the magnitude of the changes in ground-level pollutant concentrations was conducted using the EPA-approved SCREEN3 air dispersion model (EPA 1995) because wind data required by more detailed models are not available for the city of Marquette and because the SCREEN3 results are conservative (forming an upper bound) using a full range of potential meteorological conditions. Even though the proposed project would only require a flue gas temperature of less than 350°F, the exit temperature was conservatively assumed to decrease from 379°F to 290°F because of the independent planned improvements, which would maximize the potential increase in ground-level concentrations. Because the height of the stack is 2.5 times the height of the adjacent powerhouse (i.e., Good Engineering Practice stack height), wake effects from building downwash were not considered. Locations representative of elevated terrain inland from the power plant were selected for use in the model. The model considered shoreline fumigation, in which pollutants emitted into a stable layer over Lake Superior could be dispersed more vigorously down to the ground upon traveling into a more unstable layer over land.

The results from the model were applied to SO_2 and NO_x emissions from Units 7, 8, and 9, conservatively assuming that no reduction in emissions resulting from the proposed project would occur. The maximum allowable hourly emissions were conservatively used; actual hourly emissions are considerably smaller. Conversion factors were used to adjust the maximum 1-hour concentrations predicted by SCREEN3 to 3-hour, 24-hour, and annual averages (EPA 1992), as required for comparison with applicable standards.

The maximum predicted SO_2 and NO_x ground-level concentrations resulting from a decrease in stack exit temperature from 379°F to 290°F were compared with the applicable NAAQS and 80% of the PSD Class II increments (Section 3.2.2). These comparisons are not regulatory requirements but are used as metrics in this analysis to evaluate the potential significance of the increases. The maximum increases were predicted to occur about 2.3 miles from the stack as a result of shoreline fumigation. Maximum increases not associated with shoreline fumigation were about a factor of 3 lower. Maximum increases in modeled concentrations were added to corresponding estimates of existing concentrations, and the totals (maximum ambient concentrations) are compared to NAAQS in Table 4.1.1. Although the nearest operating air monitoring station is about 60 miles from Marquette (Section 3.2.2), conservative estimates were obtained of existing concentrations in the ambient air at Marquette, including the existing Presque Isle Power Plant (Neal Conatser, DEQ, personal communication to Robert Miller, ORNL, May 19, 2003). The maximum ambient concentrations are predicted to be no more than 25% of the NAAQS for all averaging times of both pollutants (Table 4.1.1). Because of the conservative assumptions used in the analysis, actual percentages would be less.

Maximum increases in modeled concentrations are compared directly with 80% of the PSD Class II increments in Table 4.1.2. The maximum increase is predicted to be less than 90% of the metric for all averaging times of both pollutants. Again, actual percentages would be less because of the conservative assumptions. No modeling was performed at the Seney Wilderness Area (the nearest PSD Class I area about 60 miles to the east-southeast) where the change in plume height would have a negligible effect.

Because particulate emissions from Units 7, 8, and 9 would decrease by 35% during the demonstration while the maximum increase in downwind concentrations was predicted to be 26% as a result of the decreased plume height, downwind particulate concentrations would be less during the demonstration than under existing operating conditions. Similarly, the potentially large reduction in Hg emissions would more than offset the increase associated with a lower plume height. Because power plants are not large emitters of CO and VOCs (Table 2.1.1) and because there would be no change in emissions associated with the demonstration, these pollutants were not evaluated further.

The testing of sodium-based sorbents would increase CO_2 emissions by up to 1,406 tons per year, which would be a 0.03% increase over existing plantwide emissions of 4,620,000 tons per year. The estimate of 1,406 tons per year forms an upper bound based on 12 months of testing; a more likely range would be 115 to 230 tons per year based on 1 to 2 months of testing. Both the magnitude and percentage of the increase would be small.

Operation of the proposed project would require about 3 MW of electricity. Because Units 7, 8, and 9 currently operate at or near full load for nearly the entire year, the loss of 3 MW to the electrical grid would likely be offset by a 3-MW increase in the electrical output from Units 1 through 6 (Section 2.1.4). This increase would be about 0.5% of the capacity of the 625-MW power plant, which would result in a negligible impact from increased air emissions.

Table 4.1.1. Ambient air quality standards impact analysis associated with decreased plume height of emissions from Units 7, 8, and 9 for an exit temperature decrease from 379°F to 290°F

Pollutant[a]	Averaging period	NAAQS[b] ($\mu g/m^3$)	Maximum modeled increase ($\mu g/m^3$)	Ambient background concentration[c] ($\mu g/m^3$)	Maximum ambient concentration[d] ($\mu g/m^3$)	Maximum ambient concentration (% of NAAQS[e])
SO_2	3-hour	1,300	146	122	268	21
	24-hour	365	65	27	92	25
	Annual	80	13	5	18	23
NO_2	Annual	100	8	8	16	16

[a]SO_2 = sulfur dioxide; NO_2 = nitrogen dioxide.

[b]The National Ambient Air Quality Standards (NAAQS) are established in accordance with the Clean Air Act to protect public health and welfare with an adequate margin of safety.

[c]Conservative (upper-bound) estimates obtained from Neal Conatser, Michigan Department of Environmental Quality, May 19, 2003.

[d]The sum of the maximum modeled increase and the ambient background concentration.

[e]Comparison is not a regulatory requirement but is used as a metric to evaluate the significance of the maximum modeled increase.

Table 4.1.2. Prevention of Significant Deterioration (PSD) impact analysis associated with decreased plume height of emissions from Units 7, 8, and 9 for an exit temperature decrease from 379°F to 290°F

Pollutant[a]	Averaging period	80% of PSD Class II increment[b] ($\mu g/m^3$)	Maximum modeled increase ($\mu g/m^3$)	Percentage of 80% of PSD Class II increment[c]
SO_2	3-hour	410	146	36
	24-hour	73	65	89
	Annual	16	13	81
NO_2	Annual	20	8	38

[a]SO_2 = sulfur dioxide; NO_2 = nitrogen dioxide.

[b]PSD increments are standards established in accordance with the Clean Air Act provisions to limit the degradation of ambient air quality in areas in attainment of the National Ambient Air Quality Standards. Michigan has adopted a policy of limiting the degradation allowed from a single facility during the PSD permitting process to 80% of the PSD Class II increments.

[c]Comparison is not a regulatory requirement but is used as a metric to evaluate the significance of the maximum modeled increase.

4.1.3 Surface Water Resources

4.1.3.1 Construction

Construction activities for the proposed project would be limited to the industrial grounds of the Presque Isle Power Plant, which are already fully developed and, therefore, ecologically highly disturbed. Construction of the proposed project would generate small amounts of both solid and liquid wastes including solvents, paints, coatings, waste, fuel, adhesives, and empty containers. Although project construction is not likely to have appreciable adverse effects on area surface waters, the project participants would implement the following measures to avoid or minimize impacts:

1. standard engineering practices for the prevention or minimization of runoff, erosion, and sedimentation from the construction site to offsite surface waters (e.g., silt fences, berms, liners, and cover materials as necessary); and
2. prompt containment and clean-up of accidental spills of construction materials such as solvents, paints, oil and grease, and hazardous substances in accordance with an appropriate spill prevention, control, and countermeasure plan and best management practices plan.

Existing facilities for containment and treatment of runoff and spills on the power plant site could be engaged to help prevent adverse effects on offsite surface waters.

4.1.3.2 Operation

The proposed project would require up to 100 gpm of water from the Presque Isle Power Plant service water system to supply the proposed flue gas spray cooling water system, depending on whether spray cooling of flue gases is necessary for optimal Hg capture. The service water system draws water from Lake Superior, and the maximum of 100 gpm (144,000 gpd) spray cooling water fraction of the total noncontact cooling water withdrawal would not return to the lake (largely due to evaporative losses). This water use represents a net reduction in return flow to Lake Superior of about 0.06% of the 224.4 MGD of noncontact water currently returned to the lake. Thus, adverse impacts on water quality and quantity in Lake Superior would be negligible.

Wastewater effluents must be treated to meet the standards set forth in an NPDES permit before being discharged to Lake Superior. Potentially hazardous wastes are removed from the site by a waste management contractor for disposal at an authorized facility.

The Hg CEM system, a critical component of the proposed project, would produce about 2 gallons of liquid waste per day, consisting mostly of distilled water. This small waste stream would be treated in the Presque Isle Power Plant wastewater treatment system before discharge to Lake Superior. The CEM wastewater represents only 0.001% of the total wastewater volume generated by the Presque Isle Power Plant. No measurable effects on the water quality of Lake Superior would be expected.

With respect to toxic Hg, particulates, NO_x and SO_2 (the latter two often associated with acid rain), the proposed project would have a beneficial effect on area surface waters. Hg emissions in particular would be reduced by as much as 260 lb over the demonstration period.

The proposed project would not change the existing thermal discharge of the power plant.

4.1.4 Geological Resources

4.1.4.1 Rock and Soils

The proposed project would not affect bedrock geologic resources and would have only minor effects on soil resources. TOXECON facility construction would include excavation of an estimated 7,400 yd^3 of soil on the power plant site. No excavation of bedrock would be expected. No prime farmland soils would be affected. All but about 1,500 yd^3 of the excavated soil would be used during construction as backfill. The excess soil volume (which would form a layer slightly less than 1 foot thick if spread over an acre of land) could be used for other projects at the Presque Isle Power Plant. Erosion of exposed surfaces and soil stockpiles would be limited through standard management practices, such as use of silt fencing and placement of hay bales in drainage swales.

4.1.4.2 Groundwater

The proposed project would not affect either the availability or the quality of groundwater. Groundwater would not be used as a water source for project construction or operation. Temporary dewatering of excavations might be necessary during construction activities for the proposed project, but no water users would be affected by any localized changes in the water table at the power plant site.

No groundwater quality impacts would be expected from landfill disposal of TOXECON ash (Section 4.1.7) because these materials would be placed in an engineered landfill that is fully lined and equipped with a leachate collection system. Some groundwater contamination did occur as a result of coal ash disposal in Presque Isle Power Plant Landfill No. 1, which was not lined. Ash disposal at Landfill No. 1 began in 1980, and in 1989 groundwater monitoring detected elevated levels of boron, chromium, molybdenum, selenium, and sulfate, all of which are found in coal ash. Concentrations of all of these substances except chromium exceeded state groundwater criteria before an engineered cap placed over the landfill in 1993 and 1994 succeeded in limiting further leachate generation and migration (EPRI 2002). Landfill No. 1 is now closed. Existing Landfill No. 2 is lined and equipped with a leachate collection system, and Landfill No. 3, which is currently under construction, will have a double liner and a leachate collection system. These engineered features should prevent leachate from leaking into groundwater. If leachate were to reach groundwater (for example, due to a leak in a landfill liner), periodic sampling of groundwater monitoring wells downgradient from the landfill would detect the contaminants, and remedial measures could be implemented in time to prevent contaminants from reaching groundwater users or surface waters.

4.1.4.3 Geologic Hazards

Because no identifiable geologic hazards are associated with the proposed project site (Section 3.4.2), geologic conditions would be unlikely to contribute to adverse impacts from or to the proposed project.

4.1.5 Floodplains and Wetlands

4.1.5.1 Floodplains

The entire proposed project would be located outside the Dead River's 500-year floodplain. Therefore, neither construction nor operation of the proposed project would have adverse impacts on the Dead River floodplain.

4.1.5.2 Wetlands

Construction and operation of the proposed project would have no adverse effects on wetlands because none are present on or adjacent to the project site. Even so, standard construction practices, such as the use of silt fencing and the placement of hay bales in drainage swales, would be used to minimize erosion and sediment transport. To ensure that runoff and spills from the site do not enter nearby remnants of wetlands along the Dead River, all runoff would be directed to settling basins before discharge.

Because operation of the proposed project would reduce Hg emissions from Units 7, 8, and 9 by up to 90%, a clear benefit to area wetlands would be provided by reducing Hg deposition and potential build-up of Hg levels in wetlands and the ecological communities they support.

4.1.6 Ecological Resources

4.1.6.1 Terrestrial Ecology

Because the proposed project would be located in an area that is already highly industrialized (including a parking lot) and that supports almost no native plant or animal communities, neither construction nor operation of the proposed facility would adversely affect terrestrial ecological resources.

Because operation of the proposed project would reduce Hg emissions from Units 7, 8, and 9 by up to 90%, a clear benefit to terrestrial ecosystems in the area would be provided by reducing Hg deposition and potential build-up of Hg levels in soils and water.

4.1.6.2 Aquatic Ecology

As long as the appropriate engineering practices for (1) preventing or minimizing runoff, erosion, and sedimentation from the project site to offsite surface waters, and (2) the prompt containment and clean-up of accidental spills are implemented, construction of the proposed project would have negligible impacts on the fish, birds, and wildlife of the Dead River and Lake Superior (Section 4.1.3).

During operation of the proposed project, Lake Superior's biota would be negligibly affected by the minuscule increase in discharge of treated wastewater and the potential reduction of return cooling water of up to 100 gpm.

The reduction of Hg emissions from Units 7, 8, and 9 by up to 90% would provide a clear benefit to aquatic ecosystems in the area by reducing Hg deposition and potential build-up of Hg levels in sediments and water.

4.1.6.3 Threatened and Endangered Species

Federally listed threatened and endangered species are not likely to occur on the proposed project site, although a transient bald eagle or Canada lynx, both listed as threatened, may occasionally be found in woodlands or wetlands of the Upper Peninsula or Marquette County. Any effects of the proposed project on threatened and endangered species would likely be marginally beneficial as a result of the expected reductions in Hg and particulate emissions and potential reductions in SO_2 and NO_x emissions. In compliance with Section 7 of the Endangered Species Act of 1973, as amended, DOE has requested consultation with the U.S. Fish and Wildlife Service regarding potential impacts of the proposed project on threatened and endangered species (Appendix A).

4.1.6.4 Biodiversity

Given adequate collection and treatment of runoff during construction and operation of the proposed project, neither of these activities would adversely affect biodiversity of the surrounding ecosystems. Both local and far-field biological diversity may realize a net beneficial, but probably unmeasurable, effect as a result of expected reductions in Hg and particulate emissions and potential reductions in SO_2 and NO_x emissions.

4.1.7 Waste Management

4.1.7.1 Construction

Construction of the proposed project would generate solid wastes in types and amounts typical of construction projects. Wastes would include packaging from materials transported to the site, scrap materials, and demolition debris from removal of the existing parking lot surface. Recyclable materials such as cardboard and metals would be recycled through the existing Presque Isle Power Plant recycling program, while concrete rubble and other nonputrescible (i.e., not liable to become putrid) debris would be used on the site as fill material. The remaining solid wastes would be transported for disposal in the Marquette County municipal landfill, which is permitted by the state of Michigan as a Type II waste disposal facility. Quantities disposed would be small in comparison with the total waste volume handled at this landfill, which received 174,000 yd^3 over a 12-month period ending September 30, 2002 (DEQ 2003b). The small amount of additional waste would not measurably affect the county landfill's remaining operating life, which in 1999 was estimated as more than 50 years (Bradof et al. 2000).

4.1.7.2 Operation

TOXECON Ash

The principal solid waste generated by operation of the proposed project would be the material collected in the baghouse filters, consisting of a mixture of fly ash and sorbent materials. During the 39-month testing period, operations would generate about 2,800 to 3,400 yd^3 (1 yd^3 = 1 ton) of this waste material, which is referred to here as TOXECON ash.

The project participants would investigate the feasibility of extracting Hg from this waste to reduce the disposal requirements (Section 2.1.7.3) and would try to identify beneficial uses for some or all of the TOXECON ash (for example, as a construction material), but most or all of this material would probably require disposal. Disposal would be in Presque Isle Power Plant Landfills No. 2 and 3, which are licensed by the DEQ as Type III solid waste disposal facilities and have been identified by the DEQ as being appropriate for this waste stream (LeGrand 2002). The TOXECON ash waste volume generated during the 39-month project would be small compared to the landfill capacity (the upper-bound estimate of 3,400 yd^3 represents about 1.2% of the remaining capacity in Landfill No. 2 and about 0.1% of the permitted total landfill capacity in Landfills No. 2 and 3). The TOXECON ash waste volume would also be small compared to the annual waste volume received (according to DEQ 2003b, during the year that ended September 30, 2002, Landfill No. 2 received a total of almost 148,000 yd^3 of coal ash, including ash from a power plant operated by the Marquette Board of Light and Power).

TOXECON ash would be a mixture of mineral fly ash (similar to that currently generated by the Presque Isle Power Plant), powdered activated carbon, and other sorbent materials tested during the project. The ash would also include Hg and other substances removed from flue gas by the sorbent materials. Leaching tests of the ash would be performed periodically to evaluate the stability of the contained contaminants and to verify that the material is not a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA).

Leaching behavior of the TOXECON ash cannot be predicted reliably. Mobility of Hg and other contaminants captured in the ash-sorbent mixture would depend on the physical and chemical mechanisms by which the contaminants are captured, as well as on the characteristics of the disposal setting. For example, Hg adsorbed as mercuric sulfide, a relatively insoluble form, would be less likely to leach than if it were adsorbed in a more soluble form, such as elemental Hg or mercuric chloride. The capture mechanisms involved in acid gas control are reasonably well understood (Section 2.1.2), but generalizations cannot be established about the mechanisms that could be involved in capturing Hg. Because of the variability of fuel compositions and process conditions among coal-fired power plants, each installation must be considered unique in terms of Hg control mechanisms and performance.

Most contaminants in leachate generated in the Presque Isle Power Plant landfills are retained in the disposal facility because collected leachate is used in the landfill to aid compaction and dust control. However, because excess leachate is treated at the power plant and discharged to Lake

Superior with other wastewater, some fraction of any contaminants that leach from the ash could be discharged to the lake in treated effluent.

Leachability testing of ash from three other projects that demonstrated the use of activated carbon injection for Hg control found variable but low rates of Hg release (Senior et al. 2003). Hg concentrations in waste extracts generated with the Toxicity Characteristic Leaching Procedure (TCLP), which is prescribed in regulations under RCRA and is designed to mimic leaching conditions in a municipal solid waste landfill, ranged from undetectable (less than 0.01 μg/L, or 0.01 ppb) up to 0.07 μg/L (0.07 ppb). Values obtained with the Synthetic Groundwater Leaching Procedure (SGLP), which is more representative of conditions in a coal ash landfill such as the Presque Isle Power Plant landfills, ranged from undetectable (less than 0.01 μg/L, or 0.01 ppb) up to 0.05 μg/L (0.05 ppb). All reported Hg concentrations were well below potentially applicable criteria, including the primary drinking water standard of 2 μg/L, water quality criteria for protection of aquatic life (1.4 μg/L for acute exposure and 0.77 μg/L for chronic exposure; EPA 2002), and the threshold for identifying a material as a hazardous waste (200 μg/L). Only one ash source in this study produced extracts with detectable Hg concentrations. That ash had total Hg concentrations ranging from 0.2 to more than 0.5 μg/g (200 to more than 500 ppb). Given these values and the 20-fold dilutions used in the leachability tests, the highest measured extract concentrations indicate release of somewhere between one-five-hundredth and one-fourteenth of the Hg in the ash. If treated effluents containing similar leachates were discharged to Lake Superior, no violation of water quality standards would result, but a small fraction of the Hg captured by the TOXECON project would be lost to the environment. Total Hg release would, however, still be lower than occurs under current conditions, and leach testing of the TOXECON ash prior to disposal would provide opportunities to modify the waste form to limit potential Hg release.

The alternative sorbents for Hg that might be tested during the proposed project would also be carbon-based, so the potential impacts of managing the resulting residues would be the same as described for activated carbon. Residues from the testing of sorbents for acid gas control (for example, sodium bicarbonate and sodium sesquicarbonate) would be expected to include uncreated sorbents plus highly soluble but relatively nontoxic chemical compounds such as sodium chloride and sodium sulfate. Acid gas control testing during the proposed project could contribute as much as 600 yd^3 of the total estimated volume for the TOXECON ash waste stream (S. Glesmann and R. Svendsen, Emission Strategies, Inc., e-mail communications to R. Miller, and E. Smith, ORNL, May 14–16, 2003). The small amounts of soluble residues that would be incorporated into the TOXECON ash would not interfere with disposal. These substances would be readily leached from ash after disposal in the ash landfill and thus could be included in effluents treated and discharged by the power plant, but discharge of effluents containing small amounts of these substances would not measurably affect water quality.

Residues from Hg Recovery

Test treatments of the TOXECON ash to separate or concentrate the Hg component would yield two byproducts: a Hg residue and a relatively clean ash-sorbent mixture.

The Hg residue would be in the form of either a Hg condensate or a small volume of sorbent containing a relatively high loading of Hg (projected to be somewhat less than 1 mg of Hg per gram sorbent). A Hg condensate could be sold as a commodity. If the Hg residue were captured in a sorbent, the Hg-bearing sorbent could be sent to a commercial Hg processor for separation of the Hg or landfilled following TCLP testing to verify that the material was not a hazardous waste under RCRA. Waste management impacts of landfill disposal of sorbent would be similar to those for landfilling TOXECON ash, but waste management impacts would be reduced somewhat by the sale of separated Hg.

After concentration of the Hg component, the cleaned ash-sorbent mixture would either be beneficially reused or landfilled. Impacts of its disposal would be similar to those for disposal of TOXECON ash, except there would be no potential for Hg release into leachate.

Discarded Baghouse Filter Bags

Another potential source of solid waste from project operations would be the replacement of fabric filter bags used in the TOXECON baghouse. The service life of these baghouse filter bags has not been determined. During the demonstration of the TOXECON process, some or all of the bags might become worn or damaged and require replacement. Upon removal, the discarded baghouse bags would be placed in plastic bags to prevent fugitive dust emissions during handling and disposal. The bags removed from baghouse service would probably not require management as hazardous waste, but this would be verified prior to disposal by characterizing a representative sample of bags using the TCLP test. Disposal would be in a municipal solid waste landfill licensed by Michigan or Wisconsin.

Replacement of all 7,560 baghouse bags would generate less than 600 yd^3 of waste (S. Glesmann, Emission Strategies, Inc., e-mail communication to E. Smith, ORNL, May 8, 2003). This disposal volume would be small relative to the total capacity of the Marquette County municipal landfill and the waste volume normally handled there (Section 4.1.7.1).

4.1.7.3 Hazardous Waste

With the possible exception of the concentrated Hg waste stream discussed in Section 4.1.7.2, construction and operation of the proposed project would not introduce any new hazardous wastes that are not already generated by operation of the Presque Isle Power Plant. However, the proposed project probably would cause a small increase in the amounts of paint, solvents, and lubricants used, recycled or disposed of by the power plant. Existing Presque Isle Power Plant hazardous waste handling and disposal procedures would be employed for the proposed project.

4.1.8 Cultural Resources

In compliance with Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, DOE has requested consultation with Michigan's State Historic Preservation Officer (SHPO) regarding the determination of potential for impacts associated with the proposed project on any historic resources that may be listed in or eligible for the *National Register of Historic Places* or that may have local importance (Appendix B). The project participants also initiated consultation with the SHPO and the State Archaeologist and requested their comments on the proposed project. A search

of the Michigan state records of historic places failed to indicate the presence of any properties that would be affected by the proposed project, and the planned installation of the required equipment on previously disturbed and paved land would further indicate minimal likelihood that resources of historic or cultural significance would be present or affected by the proposed project.

4.1.9 Socioeconomic Resources

Construction of the proposed project would be accomplished in approximately 18 months (from the initiation of construction through pre-operational testing of equipment) and would involve an average workforce of 75 and a peak workforce of 150. The project participants have characterized the construction workforce to include many different crafts, including boilermakers, carpenters/millwrights, electrical workers, insulators, iron workers, laborers, operating engineers, pipefitters, painters, sheet metal workers, and teamsters.

In addition to the jobs that would result directly from project construction, a number of indirect and induced jobs would be created as a result of the purchases of goods and services by the project participants and the construction workers. According to the RIMS II multipliers developed by the U.S. Bureau of Economic Analysis (1997), each direct job in new construction in Michigan leads, on average, to the creation of 1.6 indirect and induced jobs, for a total of 240 new jobs during the peak construction period (in addition to the 150 construction jobs).

Because of the relatively small size of the expected construction workforce, the availability of local craftsmen (*Environmental Information Volume*, Vol. 1, Table 1—Craftworker Work Hours), and the project participants' intent to use workers from the local area (Michigan Upper Peninsula and northeastern Wisconsin), all or most of the workers needed for the proposed project would come from the local area. However, to reflect the possibility that some local shortage of particular crafts could exist at the time of construction, this analysis assumes that up to 25% of the direct workforce (38 workers at peak) could move to Marquette County during the construction period. The actual number of in-migrating construction workers would probably be substantially less than 38, but that number is used throughout this analysis as a reasonable upper bound.

Past experience (USNRC 1996) indicates that approximately 60% of inmovers (i.e., 23 workers) would be accompanied by families, while the remaining 40% (15 workers) would not be accompanied by family. If the inmoving construction workers have an average household size of 2.35 [the average for Marquette County (U.S. Census Bureau 2000)], the local population would increase by approximately 70 residents in 38 households as a result of direct employment.

Indirect jobs are generally less specialized than direct jobs and would be even more likely to be filled by existing area residents. Accordingly, no more than 10% of the indirect workforce (i.e., 15 workers at peak) is assumed to move to the impact area during the construction period. Once again assuming that 60% of in movers (nine workers) would bring families and that their average family size would be 2.35, an upper bound of 28 new residents in 15 households would result from indirect employment during the peak construction period.

Combining direct and indirect construction-period in-migration yields a total of 98 new residents in 53 households as an upper bound. Based on 32 new families (23 direct and 9 indirect) and the

Marquette County average of 0.28 school age children per family (U.S. Census Bureau 2000; accessed on the internet at: http://factfinder.census.gov/) in 2000, about nine additional children would be added to the local schools.

Following construction of the proposed project, a demonstration period would ensue. Although some personnel would visit the plant on a periodic basis to examine the monitoring data for the TOXECON project, only 2 full-time engineers and 1 half-time technician (i.e., beyond the approximately 200 employees already working at the Presque Isle Power Plant) would be required for the demonstration. Therefore, the increased employment resulting from construction would not be sustained.

4.1.9.1 Population

The majority of any in-migrating workers would probably settle in the city of Marquette because of its proximity to the Presque Isle Power Plant and the abundance of available housing and services. The 98 new construction-period residents assumed in this analysis as an upper bound would represent an increase of only 0.5% to the population of the city of Marquette in 2000. During the demonstration period, those construction-period residents would leave the city of Marquette; because only 2.5 additional workers would be needed during the demonstration period, the increase in population would be marginal.

4.1.9.2 Employment and Income

During peak construction activity, the 390 jobs (150 direct employees plus 240 indirect jobs) that would be generated by the proposed project would represent 1.2% of the total number of jobs in Marquette County in 2000. Only 2.5 workers (above those already employed at Presque Isle Power Plant) would be required during the demonstration period. Accordingly, construction of the proposed project would have a small positive effect on local employment, but that small net gain would largely be lost when the demonstration period commences.

Because the skilled craftspeople required during plant construction would probably earn more than the average worker in Marquette County, mean income in the county could experience a slight increase. That increase would disappear when the construction period ends and the demonstration period begins.

4.1.9.3 Housing

The 53 new construction-period households assumed as an upper bound in this analysis would represent approximately 25.2% of the vacant housing units that were for sale or rent in the city of Marquette, or 4.7% of those for sale or rent in Marquette County, in 2000. This potential demand on the housing market would not be expected to result in an adverse impact on the local housing market and could, in fact, enhance the condition of that market.

During the demonstration period, those construction workers assumed to have migrated to the city of Marquette or elsewhere in Marquette County would leave, resulting in those housing units being vacant again.

4.1.9.4 Local Government Revenues

Pollution control equipment is exempt from property taxation in Michigan (R. Svendsen, Emission Strategies, Inc., e-mail communication to S. Carnes, ORNL, May 12, 2003). Therefore, new pollution control equipment added to the Presque Isle Power Plant (such as TOXECON) would not increase the annual property tax liability.

Local purchases of materials needed during project construction and demonstration would result in additional sales tax receipts for the communities in which the purchases are made. The overall effect of these revenue increases, while positive, would be minor.

4.1.9.5 Public Services

Education

The addition of nine new school-age children during the construction period would increase enrollment in the Marquette Area Public School District by approximately 0.2% (Section 4.1.9). Such an increase in school enrollment would not be expected to adversely affect existing student-teacher ratios in local schools. Accordingly, impacts to education would be very small. The impacts during the construction period, if any, would disappear during the demonstration period when no additional employees would be required at Presque Isle Power Plant.

Utilities

The relatively small number of new households and residents that would come to Marquette County as a result of construction and demonstration of the proposed project would not affect the ability of local water and sewer systems to provide adequate services. Therefore, any impacts to local utilities would be very small.

No increase in the amount of water withdrawn from Lake Superior would be required for operation of the Presque Isle Power Plant due to the proposed project. Also, no increase in discharges from the power plant would result from the proposed project.

Water for the proposed flue gas spray cooling system would be supplied from the existing service water system. The service water system has sufficient design capacity to handle the flow requirement of up to 100 gpm. Because the service water system is supplied by water from the noncontact cooling water system (downstream of the condensers), no additional water withdrawal from Lake Superior would be required to supply the spray cooling water. The use of spray cooling water would require a maximum consumptive water use of 144,000 gpd, thus reducing the noncontact cooling water return to Lake Superior to 224.3 MGD, a 0.06% decrease.

The addition of the TOXECON project and demonstration of Hg CEM technology would have a minimal impact on the plant's wastewater. Water used in the spray cooling of flue gases would be evaporated and discharged up the stack with the flue gas. The Hg CEM system would produce less than 2 gpd of liquid waste that would consist principally of distilled water. The Hg CEM liquid waste would undergo disposal in the plant's chemical laboratory and be directed to the wastewater treatment

system with other laboratory liquid wastes. The CEM liquid waste represents less than 0.001% of the plant's wastewater effluents treated by the wastewater treatment system on a daily basis.

Police and Fire Protection

Local police and fire protection capabilities (Section 3.8.5.3) would not be strained by the very small number of new residents that would move to Marquette County as a result of the proposed project. Accordingly, any impacts would be very small.

4.1.9.6 Environmental Justice

Section 3.8.6 indicates that the proportions of all minority populations in Marquette County are comparable to or less than those for the state as a whole. Of the three census tracts immediately surrounding the proposed project site (i.e., census tracts 5, 6, and 14), census tracts 5 and 6 have minority populations that exceed the Marquette County proportions. For census tract 5, the proportion of Blacks exceeds the Marquette County proportion (2.7% for the census tract compared to 1.3% for the county), as does the proportion of Hispanics (1.8% for the census tract compared to 0.7% for the county). For census tract 6, the proportion of American Indians and Alaskan Natives exceeds the Marquette County proportion (2.9% for the census tract compared to 1.5% for the county). Therefore, adverse impacts resulting from construction and demonstration of the proposed project could possibly be distributed disproportionately to members of these minorities. However, the project would not result in adverse ecological effects (Section 4.1.6) or adverse health effects (Section 4.1.12) in census tracts 5 or 6.

Section 3.8.6 indicates that the proportion of people living below the poverty level in 1999 was marginally higher in Marquette County than in all of Michigan (10.9% compared to 10.5%). Section 3.8.6 also indicates that the percentages of persons living in poverty in 1990 in two of the census tracts immediately adjacent to the Presque Isle Power Plant (i.e., census tracts 5 and 14) were less than either the county or state average. For census tract 6, because the proportion of the population living in poverty was approximately three times larger than for Marquette County or the state as a whole, adverse impacts resulting from construction and demonstration of the proposed project could be distributed disproportionately to these residents. However, the project would not result in adverse ecological effects (Section 4.1.6) or adverse health effects (Section 4.1.12) in this census tract.

4.1.10 Transportation and Noise

4.1.10.1 Transportation

Roads

The 75 (average) to 150 (peak) construction workers expected during the construction period would enter the project site from an unnamed private road off of Hawley Street west of the bridge over the Dead River. Assuming, conservatively, one daily round-trip per construction worker, an average of 75 trips per day could occur along Lakeshore Boulevard, with 150 trips per day during the peak

construction period. Due to the anticipated use of Upper Peninsula and northeast Wisconsin contractors, some construction workers would very likely carpool to the project site. Assuming 1.4 occupants per vehicle, about 54 vehicles (75 vehicles divided by 1.4) would enter the site on an average day, with 107 vehicles (150 vehicles divided by 1.4) per day during the peak construction period.

As noted in Section 3.9.1.1, no measurements of the ADT exist on this section of roadway, so the percentage increase that this traffic would represent is impossible to quantify. To put the workforce and commuting trips in perspective, however, the Presque Isle Power Plant currently averages about 20 to 25 contract maintenance personnel per day or about 100 personnel during maintenance outage periods. Thus, the increase in traffic resulting from construction of the proposed project would be approximately 2–4 times larger than the plant currently experiences on average or comparable to traffic increases experienced during maintenance outage periods.

In addition to using local roadways for the movement of construction workers, deliveries of materials and supplies would be brought to the project site by truck. For a bounding analysis, if truck delivery is assumed for all materials and supplies for the construction of the proposed project, an average of 10 dedicated and 5 non-dedicated truck deliveries per day during the projected Monday through Thursday work week would be required. The non-dedicated trucks would likely be the same trucks currently delivering materials and supplies to the Presque Isle Power Plant and not additional trucks. During peak delivery periods, a total of 20 truck deliveries per day could occur. This movement of construction materials would not be expected to result in discernible impacts to local roads.

During operation, the proposed project would require about one 20-ton truckload of activated carbon every 7 to 9 days. The volume of waste material to be removed from the TOXECON fly ash silo would require about two truck loads per week. These additions to the use of local roads, including the road on the power plant property to the ash silo, would have a negligible impact on vehicular traffic.

Rail

If rail were used during construction to deliver fabricated steel (Section 2.1.3), impacts would be temporary and minimal. No impacts to the rail system would be expected during the demonstration of the proposed project because no rail shipments would be required.

Water

If barges were used during construction to deliver prefabricated modules (Section 2.1.3), impacts would be temporary and minimal. No impacts to the barge or lake boat system would be expected during the demonstration of the proposed project because the amount of coal delivered would not change.

4.1.10.2 Noise

Noise levels are related to the magnitude of air pressure fluctuations that cause the eardrum to oscillate, thereby stimulating the auditory system. The magnitude of these pressure fluctuations is

typically expressed as the Sound Pressure Level (SPL), which is measured in dB. By definition, the threshold of human hearing is 0 dB. Background levels at a recording studio are as low as 15 dB, conversational speech at the location of the listener is around 60–65 dB, and a jet takeoff is in the range of 120 dB at a distance of about 100 ft from the runway. The human threshold of pain, where the brain receives a signal to reduce the SPL or risk damage to the auditory system, begins at around 130 dB for most individuals. SPL is reduced by about 6 dB for each doubling of distance from an individual source.

Sound typically occurs over a wide spectrum of frequencies. For most applications, dB levels are determined by weighting the frequencies (i.e., some frequencies count more than others). The so-called "A weighting," which was developed to approximate the way in which the human ear responds to the various frequencies, is typically expressed as dB(A).

EPA (1974) recommends a day-night level of 55 dB(A) or less to protect the public from activity interference and annoyance in typically quiet outdoor and residential areas. Maintaining relatively continuous noise below this level also protects against hearing loss, although less stringent requirements are typically set for that purpose. From about 10:00 p.m. to 7:00 a.m., background noise is typically reduced due to the absence of the usual noise sources during daytime hours (e.g., vehicular traffic, lawn mowers, work activities, and recreational activities); consequently, noise at around 50 dB(A) becomes more noticeable and can be annoying. Therefore, 45 dB(A) is the level for potential activity interference and annoyance during the nighttime hours specified above.

During construction of the proposed project, the principal sources of noise would be from construction equipment and material handling. The amount and type of construction equipment would vary depending on the specific construction activity occurring at that time. Construction activity would primarily occur in the area adjacent to Unit 9 and the Administration Building, with some equipment assembly occurring near the Fly Ash Storage Silos near the western edge of the Presque Isle Power Plant property.

Other small fabrication areas would be located in areas adjacent to the Presque Isle Power Plant; however, all of these areas would be expected to be located between the existing structures and fuel storage areas and not located in proximity to sensitive noise receptors. The main construction, staging, and fabrication areas would be adjacent to other industrial properties (i.e., Lake Superior & Ishpeming Railroad) and fuel-handling operations, and would not be adjacent to potentially sensitive noise receptors.

To mitigate the impacts of construction noise, employees and contractors would be responsible for ensuring that exhaust mufflers and engine enclosures are in place and in good working order. All construction equipment would be properly maintained.

During operation of the proposed project, the principal interior sound sources would be three induced-draft fans, spray water injection pumps, and a pulse-jet baghouse air compressor. The building enclosing the TOXECON baghouse would also enclose the induced-draft fans and would be acoustically insulated. Noise sources within the building would be fitted with sound-attenuating

enclosures or other noise dampening measures that would meet all federal regulations and We Energies' noise standards.

Presque Isle Power Plant has been a developed industrial site for many years. The proposed project would occupy only 1.1 acres within the existing 65.5-acre power plant site. Due to planned noise attenuation measures, natural and man-made terrain features, and distance to the nearest residences, no perceptible change in noise associated with the proposed project would be expected. Therefore, the proposed project would be unlikely to increase noise levels perceptibly at the nearest residences or other offsite locations.

4.1.11 Electromagnetic Fields

Over the past two decades, some members of the scientific community and the public have expressed concern regarding human health effects from electromagnetic fields (EMF) during the transmission of electrical current from power plants. Despite efforts by the scientific community and research funding from governmental agencies and private organizations, the issue is still clouded with much uncertainty. The scientific evidence suggesting that EMF exposures pose any health risk is weak. The strongest evidence for health effects comes from associations observed in human populations with two forms of cancer, childhood leukemia and chronic lymphocytic leukemia in occupationally exposed adults (NIEHS 1999). EMF exposure cannot be recognized as entirely safe because of this evidence, even though the evidence does not clearly demonstrate a cause and effect relationship between EMFs and human health effects. Virtually everyone in the United States uses electricity and is exposed to EMFs; therefore, a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures is prudent.

For the proposed project, no sources of EMF such as transmission lines would be required and, as a result, no major changes to existing EMF levels would occur. Consequently, EMF-related health effects, if present, would be small (NRC 1997).

4.1.12 Human Health and Safety

The proposed project would be subject to the OSHA General Industry Standards (29 CFR Part 1910) and the OSHA Construction Industry Standards (29 CFR Part 1926). During construction and operation of the proposed project, risks would be minimized by the Presque Isle Power Plant's adherence to procedures and policies required by OSHA, the state of Michigan, and We Energies. These standards establish practices, chemical and physical exposure limits, and equipment specifications to preserve employee health and safety.

Potential health impacts to the public from the proposed project would include fugitive dust emissions typical of construction sites (Section 4.1.2.1), operational combustion emissions from the proposed project (Section 4.1.2.2), and electromagnetic fields (Section 4.1.11). Programs in place at the Presque Isle Power Plant would minimize public and employee health and safety risks during project construction and operation.

Construction activities would comply with OSHA Construction Industry Standards (29 CFR Part 1926). Construction permits and safety inspections would be employed in an effort to minimize

the frequency of accidents and further ensure worker safety. Construction equipment would be required to meet all applicable safety design and inspection requirements, and personal protective equipment would meet regulatory and consensus standards.

Potential health impacts to workers during construction of the proposed project would be limited to normal hazards associated with construction (i.e., no unusual situations would be anticipated that would make the proposed construction activities more hazardous than normal for a major industrial construction project). Most accidents in the construction industry result from overexertion, falls, or being struck by equipment (NSC 1994). Construction-related illnesses would also be possible (e.g., exposure to chemical substances from spills).

Following construction of the proposed project, the total number of permanent employees (202) needed to operate the facilities would not change (Section 2.1.4). To maximize worker safety, operations would be managed from a control room. All instruments and controls would be designed to ensure safe start-up, operation, and shut down. The control system would also monitor operating parameters and perform reporting functions. Control stations would be placed at remote locations at which operator attention would be required. Therefore, the overall design, layout, and operation of the facilities would minimize human hazards. Compliance with the Federal Occupational Safety and Health Standards, as well as safety standards specified by the state of Michigan and We Energies, would help maintain occupational safety at the Presque Isle Power Plant. No substantial differences with respect to occupational safety or industrial hygiene would be expected between current operations and those of the proposed project. Thus, the occupational safety and health experience would not be expected to change as a result of the proposed operations.

Presque Isle Power Plant and We Energies would develop supplemental detailed procedures for inclusion in the plant's Occupational Safety and Health Program to assure compliance with OSHA and EPA regulations and serve as a guide for providing a safe and healthy environment for employees, contractors, visitors, and the community. These procedures would include job procedures describing proper and safe manners of working within the facilities (e.g., procedures for handling/disposal of baghouse bags). The manual would be used as a reference and training source and would include accident reporting and investigation procedures, emergency response procedures, gas rescue plan procedures, hazard communication program provisions, material safety data sheets, medical program requirements, and initial and refresher training requirements. In addition, supplemental provisions would be added to the plant's Contingency Plan for Hazardous Waste, Spill Prevention Control and Countermeasures Plan, Hazard Substances Response Procedures, and Air Pollution Emergency Episode Plan.

The proposed project would remove Hg and particulate matter from the flue gas of the coal-fired units and, consequently, would benefit the health of workers and the public. No health effects would be associated with the sorbent materials used in the proposed project. Workers would be protected from Hg exposure during replacement of baghouse bags by wearing full-face respirators with dust filters, white paper suits, and gloves. Dirty filter bags would be handled carefully to minimize dust and would immediately be placed in garbage bags. Workers would also use ear plugs for protection from

noise in the baghouse. The dirty filter bags including the collected particles would meet the criteria for nonhazardous ash disposal at the existing landfill.

With regard to potential health impacts from the CEM, the Hg concentration of the calibration gas would be 0.012 mg/m^3, which is less than exposure limits specified by OSHA, the National Institute for Occupational Safety and Health, and the American Conference of Governmental Industrial Hygienists. In addition, the Hg concentration inside the CEM building would be checked regularly to ensure operator safety. This design and operating procedure would prevent operator exposure to the calibration gas.

4.2 POLLUTION PREVENTION MEASURES

Table 4.2.1 lists the pollution prevention measures that the project participants would provide during construction and operation of the proposed project.

4.3 ENVIRONMENTAL IMPACTS OF NO ACTION

Under the first scenario of the no-action alternative, in which the Presque Isle Power Plant would continue operating under current conditions, no impacts to onsite or offsite land use would be expected. Also, no impacts to aesthetics would result because the existing or baseline visual landscape would remain unchanged. Air quality effects would either remain unchanged or vary based on any future actions taken by We Energies, in consultation with DEQ, independent of DOE involvement. The small adverse effects on local waters from the potential consumption of up to 100 gpm from Lake Superior by the proposed project would not occur. However, the potential benefits to area waters of removing much of the Hg and particulate matter and some of the NO_x and SO_2 currently emitted by Units 7, 8, and 9 would not be realized. Similarly, the potential benefits to area soils, plants, fish, and wildlife of removing much of the Hg and particulate matter and some of the NO_x and SO_2 would not be realized. No impacts to cultural, historical, or archaeological resources would occur. Under this scenario, the socioeconomic impacts expected with construction and demonstration of the proposed project would be avoided. As indicated in Section 4.9, these socioeconomic impacts would be minor, but beneficial, for the local communities. The minor but adverse traffic impacts associated with construction of the proposed project would be prevented. No change in existing noise levels at the Presque Isle Power Plant would be experienced.

Under the second scenario of the no-action alternative, in which the project participants would test the integrated technologies in a slipstream-sized unit, impacts would be similar in nature to the proposed project but minimal in magnitude.

Table 4.2.1. Pollution prevention measures developed for the proposed project at Presque Isle Power Plant

Environmental Issue	Pollution prevention measure
Water quality	Follow standard engineering practices to prevent or minimize runoff, erosion, and sedimentation on and near the construction site (e.g., silt fences, berms, liners and cover materials as necessary). Ensure prompt containment and clean-up of accidental spills of construction materials such as solvents, paints, oil and grease, and hazardous substances in accordance with an appropriate spill, prevention, control, and countermeasure plan and best management practices plan.
Waste disposal	Conduct leach testing of the TOXECON ash prior to disposal to provide opportunities to modify the waste form to limit the potential release of contained Hg.
Noise	Ensure that all construction equipment (e.g., exhaust mufflers, engine enclosures, etc.) is in good working order, properly maintained and lubricated. Use air inlet silencers on the project's small blower units. Fit the ash handling system exhauster with an exhaust silencer (i.e., muffler) and operate the system intermittently. Equip delivery trucks with properly maintained mufflers. Acoustically insulate the building enclosing the proposed TOXECON baghouse and its associated equipment, as well as all doors, windows, and vent louvers. Fit all noise sources within the proposed TOXECON building with sound attenuating enclosures or other noise dampening measures.
Fugitive dust	Sprinkle exposed soils with water during construction.

5.0 IMPACTS OF COMMERCIAL OPERATION

At the end of the 5-year demonstration period, two scenarios are reasonably foreseeable: (1) a successful demonstration followed immediately by commercial operation of the project at the same power level using the new baghouse and other equipment from the demonstration; and (2) an unsuccessful demonstration followed by operation of Units 7, 8, and 9 at the same power level using the baghouse without sorbent injection in conjunction with the existing electrostatic precipitators for particulate control.

Under the first scenario, the level of short-term impacts during commercial operation would not change from those described for the demonstration in Section 4 because the proposed project would continue as a baseload power plant operating 24 hours per day with the same operating characteristics. For long-term effects, the level of impacts would be nearly identical to those discussed in Section 4, except for impacts that accumulate with time (i.e., ash disposal).

The waste management impacts of commercial operation would depend on which elements of the demonstration project were selected for long-term implementation. Continued operation of the TOXECON process for Hg removal at Units 7, 8, and 9 would generate an estimated 860 yd^3 per year of TOXECON ash. Impacts of managing this material would continue as described in Section 4.7.1.2. Landfill disposal of TOXECON ash from 20 years of commercial operation would use only 0.6% of the planned capacity of Presque Isle Power Plant's Landfill No. 3, and thus would not substantially affect the operating life of the landfill.

The additional processes tested during the proposed project, including treatment of the ash residue to separate Hg and use of TOXECON for acid gas treatment, could be considered for commercial implementation following the demonstration period. Long-term commercial implementation of these processes would require the design, procurement, and installation of additional equipment.

The impacts of managing residues from possible commercial operation of the Hg separation step would be as described in Section 4.7.1.2.

The volume and characteristics of residues from long-term use of TOXECON for acid gas treatment would be among the factors evaluated during the test implementation of this process. A preliminary upper-bound estimate of the waste volume from acid gas treatment is 3,600 yd^3 per year, but the actual volume would probably be lower, and waste generation would be one of the factors considered in deciding whether to implement this process commercially (S. Glesmann, Emission Strategies, Inc., e-mail communication to E. Smith, ORNL, May 16, 2003). Twenty years of waste generation at the upper-bound rate of 3,600 yd^3 per year would use almost 3% of the planned capacity of Landfill No. 3. However, the amount of residue requiring disposal possibly could be reduced by regenerating sorbents or by finding beneficial uses for the residues, for example as soil amendments, fertilizers, or industrial raw materials (Mortson and Telesz 2001; Solvay 2003).

Impacts associated with operations under the second scenario (an unsuccessful demonstration followed by operation of Units 7, 8, and 9 at the same power level using the baghouse without sorbent

injection) would be similar to existing operations at the power plant except that more fly ash would be captured by the baghouse downstream of the existing electrostatic precipitators. Consequently, a small beneficial effect to the atmospheric environment would be experienced compared to existing operations. The additional captured fly ash would probably be sold or else require disposal in one of the power plant's landfills, which could easily accommodate this incremental amount.

6.0 CUMULATIVE EFFECTS

This section discusses potential impacts resulting from other facilities, operations, and activities that in combination with potential impacts from the proposed project may contribute to cumulative impacts. Cumulative impacts are impacts on the environment that result from the incremental impact of the proposed project when added to other past, present, and reasonably foreseeable future actions regardless of the agency (federal or non-federal) or person that undertakes such other actions (40 CFR Part 1508.7). An inherent part of the cumulative effects analysis is the uncertainty surrounding actions that have not yet been fully developed. The CEQ regulations provide for the inclusion of uncertainties in the analysis, and state that "(w)hen an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an EIS and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking" (40 CFR Part 1502.22). The CEQ regulations do not say that the analysis cannot be performed if the information is lacking. Consequently, the analysis contained in this section includes what could be reasonably anticipated to occur given the uncertainty created by the lack of detailed investigations to support all cause and effect linkages that may result from the proposed project, and the indirect effects related to construction and long-term operation of the facility.

Because cumulative impacts accrue to resources, the analysis of impacts must focus on specific resources or impact areas as opposed to merely aggregating all of the actions occurring in and around the proposed facility and attempting to form some conclusions regarding the effects of the many unrelated actions. Narrowing the scope of the analysis to resources that would be expected to experience a reasonable likelihood of accrued foreseeable impacts supports the intent of the NEPA process, which is "to reduce paperwork and the accumulation of extraneous background data; and to emphasize real environmental issues and alternatives" [40 CFR Part 1500.2(b)]. Each resource analyzed has its own spatial (geographic) boundary, although the temporal boundaries (time frame) can generally be assumed to equal the life expectancy of the proposed project.

The proposed project would generally reduce air emissions in the region and slightly decrease existing cumulative impacts. Major sources of air emissions within 30 miles of the Presque Isle Power Plant include facilities operated by the Marquette Board of Light and Power, Tilden, Empire, Louisiana-Pacific, Robbins, and Taystee Bakery. The additional CO_2 emissions resulting from the proposed project would contribute negligibly to cumulative impacts.

The proposed project would contribute very little to cumulative impacts on surface waters in the region. In terms of beneficial effects, the proposed project's potential reduction in Hg and particulate emissions and, to a lesser extent, NO_x and SO_2 emissions, could have a substantial positive effect by reducing the total input of these pollutants to surface water, wetlands, and ecological resources at the local and, quite possibly, regional scales.

Continuing efforts by the project participants to increase beneficial reuse of coal ash and other residues from operations at the Presque Isle Power Plant would contribute to a cumulative reduction in

demand for waste disposal capacity. Early in 2002, two concrete silos were installed to provide storage for 10,000 tons (10,000 yd^3) of fly ash. This allows the concrete-quality fly ash generated by Units 7, 8, and 9 to be stored during the winter months for sale during the construction season, and thus reduces the need for disposal. Since 2002, bottom ash from Units 1 through 6 has been used as a supplemental fuel in Units 7, 8, and 9. Due to these and other measures, beneficial reuse of Presque Isle Power Plant coal ash increased from 36% in 2001 to 57% in 2002, and is projected to approach 100% in the future (R. Meidl, We Energies, e-mail communications to R. Johnson, We Energies, March 12 and 13, 2003). The additional ash requiring landfill during the demonstration (6,400 yds^3) would be easily accommodated by this reduction.

After consulting plans by the city of Marquette and the Michigan Department of Transportation, few new facilities, operations, or activities that could result in cumulative impacts to offsite land use, aesthetics, socioeconomic resources, or transportation resources are anticipated for the vicinity of the Presque Isle Power Plant in the same time frame as the proposed project. No known existing or planned facilities, operations, or activities have been identified that could result, in concert with the proposed project, in cumulative impacts to cultural resources.

The city of Marquette was consulted regarding the multifamily zoned property to the south of the Dead River. Over the last 10 years, several planned unit developments have been proposed and approved by the planning commission, but none of these developments has come to fruition. The city manager reports that no pending development plans exist for land south of the Dead River and speculates that eventually the existing adjacent business park will expand into the multifamily zoned area because this use would be more consistent with adjacent land uses.

The planner for Marquette Township reports no plans for development in the vicinity of the ash landfill. Most of the land surrounding the landfill is zoned as a resource production district. The capital outlay plan for the city of Marquette (City of Marquette 2003) identifies the following capital projects for Fiscal Year 2002–2003, none of which would be expected to contribute significantly to cumulative impacts:

- Lakeshore Boulevard (300 Block)
- Iron Bay Business Park (construction scheduled to begin in 2003)
- Shoreline Erosion, Picnic Rocks, Hawley Street (construction scheduled in the indefinite future)
- Wright Street (connecting Presque Isle to Lakeshore Boulevard at Wright Street)
- Wright Street Outlet (connecting Pine Street to Lakeshore Boulevard and Wright Street to Lakeshore Boulevard)
- Lakeshore Boulevard culvert replacement (construction scheduled to begin in 2003).

7.0 REGULATORY COMPLIANCE AND PERMIT REQUIREMENTS

This section lists federal, state, and local regulatory compliance and permit requirements for the proposed project.

Under Section 7 of the Endangered Species Act of 1973 (Pub. L. 93-205, as amended), DOE must consult with the U.S. Fish and Wildlife Service to ensure that proposed actions are not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of the critical habitat of such species (Appendix A).

Under Section 106 of the National Historic Preservation Act (Pub. L. 89-665, as amended), DOE must consult with Michigan's State Historic Preservation Officer to ensure compliance with the act (Appendix B).

7.1 FEDERAL REQUIREMENTS

CLEAN AIR ACT (CAA)

- Enacted by Pub. L. 90-148, Air Quality Act of 1967 (42 USC 7401 et seq.)
- Amended by Pub. L. 101-549, Clean Air Act Amendments of 1990
- Comprised of Titles I through VI
- Applicable titles
  - — Title I—Air Pollution Prevention and Control. This Title is the basis for air quality and emission limitations, PSD permitting program, State Implementation Plans, New Source Performance Standards, and National Emissions Standards for Hazardous Air Pollutants. The PSD permitting program serves as the basis for PSD Construction Permits which are required by this Title of the Act.
  - — Title IV—Acid Deposition Control. This Title establishes limitations on sulfur dioxide and nitrogen oxide emissions, permitting requirements, monitoring programs, reporting and record keeping requirements, and compliance plans for emission sources. This Title requires that emissions of sulfur dioxide from utility sources be limited to the amounts of allowances held by the sources.
  - — Title V—Permitting. This Title provides the basis for the Operating Permit Program and establishes permit conditions, including monitoring and analysis, inspections, certification, and reporting.
- Regulations implementing the CAA are found in 40 CFR Parts 50–95.

FEDERAL WATER POLLUTION CONTROL ACT

- Enacted by Pub. L. 92-500 (33 USC 1251 et seq.)
- Amended by Pub. L. 95-217, Clean Water Act of 1977 (CWA) and Pub. L. 100-4, Water Quality Act of 1987
- Comprised of Titles I through IV
- Applicable titles
  - — Title III—Standards and Enforcement

    Section 316—Thermal Discharges. Section 316 (a) addresses the permitting of thermal discharges that can allow alternative thermal effluent limitations that are less stringent than the limitations under Section 402(a) of the CWA. This section states that, if an owner of a discharge subject to Section 301 (Effluent Limitations) or Section 306 (National Standards of Performance) can demonstrate that an effluent limitation is ". . . more stringent than necessary to assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is to be made. . .", then another effluent limitation may be imposed ". . .with respect to the thermal component of such discharge. . ."

    Section 316 (b) addresses the permitting of water intake structures and requires that "Any standard established pursuant to Section 301 or Section 306 of this Act and applicable to a point source shall require that the location, design, construction, and capacity of cooling water intake structures reflect best technology available for minimizing adverse environmental impact."
  - — Title IV—Permits and Licenses

    Section 402, National Pollutant Discharge Elimination System (NPDES). This section regulates the discharge of pollutants to surface waters. Regulations implementing the NPDES program are found in 40 CFR Part 122.

    Section 404, Permits for Dredged or Fill Material. This section regulates the discharge of dredged or fill material in the jurisdictional wetlands and waters of the United States. The COE has been delegated the responsibility for authorizing these actions.
- Regulations implementing the CWA are found in 40 CFR Parts 104–140. Regulations which affect the permitting of this project include
  - — 40 CFR Part 112—Oil Pollution Prevention. This regulation requires the preparation of a Spill Prevention, Control, and Countermeasure Plan.
  - — 40 CFR Part 122—NPDES. This regulation requires the permitting and monitoring of any discharges to waters of the United States.

EXECUTIVE ORDERS 11988 AND 11990

Executive Order 11988, Floodplain Management, directs federal agencies to establish procedures to ensure that they consider potential effects of flood hazards and floodplain management for any action undertaken. Agencies are to avoid impacts to floodplains to the extent practical. Executive Order 11990, Protection of Wetlands, requires federal agencies to avoid short- and long-term impacts to wetlands if a practical alternative exists. DOE regulation 10 CFR Part 1022 establishes procedures for compliance with these Executive Orders. Where no practical alternatives exist to development in floodplain and wetlands, DOE is required to prepare a floodplain and wetlands assessment discussing the effects on the floodplain and wetlands, and consideration of alternatives. In addition, these regulations require DOE to design or modify its actions to minimize potential damage in floodplains or harm to wetlands. DOE is also required to provide opportunity for public review of any plans or proposals for actions in floodplains (and new construction in wetlands).

The floodplain and wetlands effects anticipated from this proposed project are provided in the following sections of the EA: Section 3.5.1 (Floodplains—Existing Environment), Section 3.5.2 (Wetlands—Existing Environment), Section 4.1.5.1 (Floodplains— Environmental Consequences), and Section 4.1.5.2 (Wetlands—Environmental Consequences).

RIVERS AND HARBORS ACT OF 1889

- Enacted by Chapter 425, March 3, 1889 (33 USC 401 et seq.)
- Regulations implementing this Act are found in 33 CFR Parts 320–338. The following regulations are applicable to this project:
  - 33 CFR Part 322—Permits for Structures or Work In or Affecting Navigable Water of the United States. Addresses permitting of construction activities in or over navigable waters, pursuant to the Act in Section 10, "Obstruction of excavations and filling in of navigable waters generally; wharves, piers, etc."
  - 33 CFR Part 330—Nationwide Permit Program. Nationwide permits are issued by the COE to regulate, with little delay or paperwork, activities having minimal impact. One of the categories of activities regulated by the Nationwide Permit Program is the release of "Return Water from Upland Contained Disposal Areas."

RESOURCE CONSERVATION AND RECOVERY ACT OF 1976

- Enacted by Pub. L. 94-580 (42 USC 6901 et seq.)
- Amended by Pub. L. 98-616, Hazardous and Solid Waste Amendments of 1984 and Pub. L. 99-499, Superfund Amendments and Reauthorization Act of 1986
- Applicable title
  - Title II—Solid Waste Disposal (known as the Solid Waste Disposal Act) regulates the disposal of solid wastes. Under Title II, Subtitle D—State or Regional Solid Waste Plans,

allows each state to develop a comprehensive plan for managing and permitting the disposal of solid wastes.

- Project participants would be required to identify any residues that require management as hazardous waste under RCRA (40 CFR Part 261). For some waste streams, this includes testing waste samples using the TCLP or other procedures that measure hazardous waste characteristics.

ENDANGERED SPECIES ACT OF 1973

- Enacted by Pub. L. 93-205 (16 USC 1531 et seq.)
  - — Section 7, "Interagency Cooperation," requires any federal agency authorizing, funding, or carrying out any action to ensure that the action is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat of such species. Consequently, the U.S. Fish and Wildlife Service will conduct a consultation, in compliance with Subsection (a)(2) of Section 7 of the Act, with regard to the impacts of the proposed project on threatened and endangered species listed by the Service and any critical habitat of such species in the vicinity of the project.

COASTAL ZONE MANAGEMENT ACT OF 1972

- Enacted by Pub. L. 92-583 (16 USC 1451 et seq.)
- This Act encourages states to develop comprehensive management programs that ensure the beneficial use, protection, and management of coastal resources and requires that all activities conducted by or on behalf of a federal agency, funded by a federal agency, or conducted pursuant to an Outer Continental Shelf Lands Act exploration lease, be consistent with the coastal zone management program established by the state in which the project is located.
- Regulations implementing this Act are found in 15 CFR Part 930.50.

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

- OSHA General Industry Standards (29 CFR Part 1910)
- Authority: Sections. 4, 6, 8, Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order Numbers 12-71 (36 FR 8754), 8-76 (41 FR 25059), 9-83 (48 FR 35736), 1-90 (55 FR 9033), or 6-96 (62 FR 111), as applicable.
- Amended by 58 FR 35308, June 30, 1993; 61 FR 5507, Feb. 13, 1996; 61 FR 9227, March 7, 1996; 62 FR 29668, June 2, 1997; 62 FR 42666, Aug. 8, 1997; 62 FR 65203, Dec. 11, 1997; 63 FR 13338, March 19, 1998; 63 FR 17093, April 8, 1998; 64 FR 13908, March 23, 1998; 65 FR 46818 , July 31, 2000
- Subparts A through Z.
- OSHA Construction Industry Standards (29 CFR Part 1926)

- Authority: 44 FR 8577, Feb. 9, 1979; 44 FR 20940, Apr. 6, 1979
- Amended by 55 FR 42328, Oct. 18, 1990; 55 FR 47687, Nov. 14, 1990; 58 FR 26627, May 4, 1993; 58 FR 35077, June 30, 1993; 59 FR 215, Jan. 3, 1994; 59 FR 36695, July 19, 1994; 59 FR 40729, Aug. 9, 1994; 59 FR 40964, Aug. 10, 1994; 60 FR 5131, Jan. 26, 1995; 60 FR 39254, Aug. 2, 1995; 61 FR 5507; Feb. 13, 1996; 61 FR 9227, March 7, 1996; 61 FR 31427, June 20, 1996; 61 FR 46025, Aug. 30, 1996; 62 FR 1493, Jan. 10, 1997; 63 FR 1152, Jan. 8, 1998; 63 FR 1919, Jan. 13, 1998; 63 FR 3813, Jan. 27, 1998; 63 FR 13338, March 19, 1998; 63 FR 17093, April 8, 1998; 63 FR 20098, April 23, 1998; 63 FR 33450, June 18, 1998; 63 FR 35137, June 29, 1998; 64 FR 18810, April 16, 1999; 66 FR 5265, Jan. 18, 2001

7.2 STATE REQUIREMENTS

- National Pollutant Discharge Elimination System Permit MI0006106—Michigan Department of Environmental Quality.
- Facilities used for disposal of solid waste must be licensed by Michigan Department of Environmental Quality. Construction and operation of these facilities must conform with requirements established as a condition of licensing. Disposal of coal ash would be in Presque Isle Power Plant Landfills No. 2 and 3 under Class III solid waste disposal licenses. Other solid waste disposal would be in facilities licensed for the appropriate waste types.

7.3 LOCAL REQUIREMENTS

- Marquette City Code, Title IV—Police Department, Chapter 26—Nuisance—Police, Section 26.12 Noises.

8.0 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

For the proposed project, some of the resource commitments would be irreversible and irretrievable; that is, the resources would be neither renewable nor recoverable for future use. Resources that would be irreversibly or irretrievably committed by construction and demonstration of the proposed project include construction materials that could not be recovered or recycled and fuel and sorbent consumed or reduced to unrecoverable forms of waste.

Resources used during construction of the proposed project would include crushed stone, sand, water, diesel fuel, gasoline, and iron ore used to produce steel. Resources used during the demonstration would include coal, No. 2 fuel oil, powdered activated carbon, sodium- and lime-based products, and water. None of these resources is in short supply relative to the size and location of the proposed project.

The proposed project requires a commitment of human and financial resources that could threaten or jeopardize the use of these resources for alternative projects or federal activities. However, the commitment is consistent with the purpose and need for the proposed project (Section 1).

9.0 THE RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

The proposed project would occupy about 1.1 acres of the Presque Isle Power Plant site and consume resources (either individually or as part of the power plant) including coal, No. 2 fuel oil, powdered activated carbon, sodium- and lime-based products, and water. The proposed project (either individually or as part of the power plant) would generate liquid effluents and solid wastes (unless all of the combustion ash were sold). Air emissions would be unaffected or reduced.

The long-term benefit of the proposed project would be to demonstrate an environmentally sound and innovative technology for the utilization of coal. The proposed project would integrate the following technologies: (1) sorbent injection into combustion flue gas to reduce emissions of air pollutants; and (2) particulate capture with a new baghouse downstream of existing particulate control equipment that already removes greater than 98% of the fly ash particles. These integrated technologies have been successfully demonstrated in smaller scale (135 MW), pilot scale, and slipstream-sized tests at other sites. The proposed project would demonstrate the commercial-scale application of the integrated technologies using the TOXECON process. Powdered activated carbon would be injected into the flue gas of units firing Powder River Basin coal to achieve up to a 90% reduction in Hg emissions. Although the primary pollutant targeted for control is Hg, short-term tests also would demonstrate the effectiveness of other sorbents, such as sodium- and lime-based products, for SO_2, NO_x, and HCl control. Previous testing has indicated that sodium-based products may achieve from 30% to 70% SO_2 reduction. Sodium-based sorbents also may reduce NO_x emissions by 10% to 20%. HCl removal as high as 50% may be attained with sodium sesquicarbonate.

The design size for the proposed project was selected to establish performance results at a scale that would convince utilities that the integrated technologies, once demonstrated at this scale, could be commercialized using similar sized or larger applications without further scale-up to verify operational or economic performance. Therefore, although the proposed project would consume resources and generate effluents and solid wastes, the project would demonstrate integrated technologies that, once commercialized, would generally reduce air emissions both domestically and abroad compared with conventional coal technologies.

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11.0 LIST OF AGENCIES AND INDIVIDUALS CONTACTED

Craig Fitzner, Michigan Department of Environmental Quality, Air Quality Division, Lansing, Michigan

Robert Schmeling II, Michigan Department of Environmental Quality, Gwinn, Michigan

Ron Raisanen, Michigan Department of Environmental Quality, Air Quality Division, Upper Peninsula District, Gwinn, Michigan

APPENDIX A

CONSULTATION LETTERS UNDER SECTION 7 OF THE ENDANGERED SPECIES ACT

U.S. Department of Energy

National Energy Technology Laboratory

June 6, 2003

Mr. T.J. Miller, Chief
Endangered Species and Habit Conservation
U.S. Fish and Wildlife Service
Bishop Henry Federal Building
One Federal Drive
Ft. Snelling, Minnesota 55111-4056

Dear Mr. Miller:

The United States Department of Energy (DOE) is considering participation, through a five year cooperative agreement with We Energies, in a project for Retrofit for Mercury and Multi-Pollutant Control on Three 90 MW Coal-Fired Boilers. Under the cooperative agreement, We Energies would design, install, operate, and evaluate the TOXECON process for integrated control of mercury, particulate matter, SO_2, and NO_x emissions at Wisconsin Electric Power Company's Presque Isle Power Plant in Marquette, Michigan.

A letter dated February 27, 2003, to the Chief, Ecological Services Operations from Richard E. Johnson, Principal Engineer Air Quality for We Energies, previously notified you of this proposed project. No response has yet been received from your office.

The TOXECON unit would be installed on the combined flue gas stream of Presque Isle Power Plant units 7, 8, and 9, which have a total capacity of 270 MWe. In the TOXECON process, sorbents that include powdered activated carbon for mercury and other air toxic emissions control would be injected into a new pulse-jet baghouse installed downstream of the existing particulate control device. The key objectives of the project would be to (1) achieve very high levels mercury removal, (2) increase collection efficiency of particulate matter, and (3) determine viability of sorbent injection for additional SO_2 and NO_x control, while maximizing the use of coal combustion by-products. A description of the proposed project including graphics depicting its location is provided as an enclosure. The project location is clearly labeled as "Powerplant" on the topographical map enclosure.

As part of our coordination and consultation responsibilities, and to comply with both Section 7 of the Endangered Species Act of 1973, as amended, and provisions of the Fish & Wildlife Coordination Act, we would appreciate receiving any information you have on wildlife resources, including endangered and threatened species or critical habitat, in the project area. Your thoughts on the potential impacts associated with the proposed project would also be appreciated.

3610 Collins Ferry Road, P.O. Box 880, Morgantown, WV 26507-0880 ❖ 626 Cochrans Mill Road, P.O. Box 10940, Pittsburgh, PA 15236-0940
REPLY TO: Morgantown Office • ted.mcmahon@netl.doe.gov • Voice (304) 285-4865 • Fax (304) 285-4403 • www.netl.doe.gov

Based on the scope of the proposed project, DOE plans to initiate preparation of an Environmental Assessment (EA), in accordance with requirements of the National Environmental Policy Act, to analyze, document, and disseminate information on the potential environmental consequences of the project. Information that you provide will be incorporated and appropriately addressed in the EA. If your initial review concludes that no endangered or threatened species (or their habitat) are present in the project area, and that neither protected species nor their habitat would be affected by the proposed action, a written acknowledgement of that conclusion would be appreciated. In any case, the information that you provide will be considered in preparing the final EA. The draft EA will be available for review in June 2003. A copy of the EA will be sent to you.

Should you require additional information, please contact me by telephone at (304) 285-4865 or by e-mail at 'ted.mcmahon@netl.doe.gov.'

Sincerely,

Ted McMahon
Project Manager

Enclosure

cc: Richard Johnson, We Energies
Robert L. Miller, Oak Ridge National Laboratory

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Bishop Henry Whipple Federal Building
1 Federal Drive
Fort Snelling, MN 55111-4056

IN REPLY REFER TO:

FWS/AES-TE

JUN 19 2003

Mr. Ted McMahon
Project Manager
U.S. Department of Energy
3610 Collins Ferry Road
P.O. Box 880
Morgantown, West Virginia 26507-0880

Dear Mr. McMahon:

We received your letter dated June 6, 2003, requesting a response from us regarding a We Energies TOXECON project for integrated control of mercury, particulate matter, SO_2 and NO_x emissions at the Presque Isle Power Plant in Marquette, Michigan. In that letter, you requested information on wildlife resources, including endangered and threatened species or critical habitat, in the project area to assist you in compliance with both Section 7 of the Endangered Species Act of 1973, as amended, (ESA) and provisions of the Fish and Wildlife Coordination Act (FWCA).

In your letter, you referenced a previous request to us for the same information that you had sent in a letter dated February 27, 2003. You indicated that you had not yet received a response from us. We apologize for any miscommunication that has occurred. Our Michigan-based field office in East Lansing did send a response to the February 27 letter on April 18, 2003, addressed to Richard E. Johnson, Principal Engineer Air Quality of We Energies. We have enclosed that response for your review (see Enclosure 1). As you can see from that letter, our East Lansing Field Office found that there are no listed or proposed species occurring within the proposed project area. Unless the project has changed locations or will impact a larger area than previously expected, there is no need for further action on this project under Section 7 of the ESA. If the project has changed locations or will impact a larger area than previously expected, please contact our East Lansing Field Office at (517) 351-2555. We appreciate your early contact with us to meet your Section 7 responsibilities under the ESA.

Regarding compliance with provisions of the FWCA, the letter dated February 27th (see Enclosure 2) did not request input from us on the potential impacts of the project to wildlife outside of what is required under the ESA for listed or proposed species and designated or proposed critical habitat. Our agency does have responsibilities under the FWCA to provide

comments to other Federal agencies on impacts their proposed actions could have on fish and wildlife and to provide suggestions to minimize or mitigate those impacts. Since this is a new request to us, we will gladly provide comments under the purview of the FWCA. The information you provided in your most recent letter to us, dated June 6, 2003, including the enclosure, has been forwarded to our East Lansing Field Office. You should receive a response from them in a timely manner. Please contact Mr. Craig Czarnecki, Field Supervisor, at our East Lansing Field Office at (517) 351-2555 with questions or technical assistance needs.

Sincerely,

TJ Miller
Program Manager
Endangered Species/Habitat Conservation

Enclosures 2

cc: Craig Czarnecki, ELFO

United States Department of the Interior

FISH AND WILDLIFE SERVICE
East Lansing Field Office (ES)
2651 Coolidge Road, Suite 101
East Lansing, Michigan 48823-6316

IN REPLY REFER TO:

April 18, 2003

Richard E. Johnson
Wc Energies
231 W. Michigan Street
Milwaukee, WI 53290-0001

Re: Endangered Species List Request, Proposed Multi-Pollutant Control System (TOXECON), 2701 N. Lakeshore Blvd., Marquette, Marquette County, Michigan

Dear Mr. Johnson:

Thank you for your request received on April 10, 2003 for information on endangered, threatened, proposed, or candidate species, and critical habitat which may be present within the proposed project area. Your request and this response are made pursuant to Section 7 of the Endangered Species Act of 1973 (the Act), as amended, (87 Stat. 884, 16 U.S.C. 1531 *et seq.*).

Based on information presently available, there are no listed or proposed species occurring within the proposed project area. This presently precludes the need for further action on this project as required under Section 7 of the Act.

We advise, however, that should a species become officially listed or proposed before completion of this project, the Federal action agency for the work would be required to reevaluate its responsibilities under the Act. Further, should new information become available that indicates listed or proposed species may be present and/or affected, consultation should be initiated with this office.

Since threatened and endangered species data is continually updated, new information pertaining to this project may become available which may modify these recommendations. Therefore, we recommend your agency annually request updates to this list.

We appreciate the opportunity to provide these comments. Please refer any questions directly to Tameka Dandridge of this office at (517) 351-8315 or the above address.

Sincerely,

for Craig A. Czarnecki
Field Supervisor

cc: Michigan Department of Natural Resources, Wildlife Division, Lansing, MI
(Attn: Lori Sargent)

we energies

231 W. Michigan St.
Milwaukee, WI 53290-0001
www.we-energies.com.

February 27, 2003

Chief, Ecological Services Operations
U.S. Fish and Wildlife Service
Bishop Henry Federal Building
One Federal Drive
Ft. Snelling, MN 55111-4056

Re: Informal Consultation for We Energies, Presque Isle Power Plant TOXECON Retrofit Project

Gentlemen:

We Energies propose to install on the Presque Isle Power Plant coal-fired Units 7, 8 & 9 a new multi-pollutant control system referred to as TOXECON. The primary pollutants to be controlled are mercury and particulate matter. Additional testing will be performed to demonstrate the ability to use a sorbent for the control of NOx and SO_2. The proposed multi-pollutant control system basically consists of a sorbent storage and injection system and the addition of one (1) new baghouse (particulate control device) for the three (3) units. This project will involve partial funding by the U. S. Department of Energy, Clean Coal Technology program. The purpose of this letter is to begin informal consultation with the review agencies.

The proposed project will be located at 2701 N. Lakeshore Boulevard, Marquette, MI 49855 (Marquette County). Figure 1 shows the general location of the Presque Isle Power Plant. The Project itself will be located in a portion of Section 2, Township 48 North Range 25 West as shown in Figure 2. The project will affect about 1.1 acres of the existing fully developed 65.5 acre plant site.

The area where the Presque Isle Power Plant is located has been developed for industrial use for nearly a century. The area where the proposed project will be located is adjacent to the exiting power-house building for Unit 9 and is currently a paved parking lot. The sorbent storage and injection equipment will also be located in the paved parking lot.

Prior studies, including, the U. S. Army Corps of Engineers, St. Paul, District, Minnesota, Environmental Assessment Presque Isle Station, Units 5 and 6, Upper Peninsula Generating Company, March 28, 1973 study have not shown any Federal or State threatened or endangered species to be present on the Presque Isle Power Plant Site.

We Energies request your comments on the proposed undertaking to assist We Energies in meeting its responsibilities under the Endangered Species Act.

If you have any questions please call me at 414 221-4234, or contact me by email at dick.johnson@we-energies.com .

Sincerely,

Richard E. Johnson

Richard E. Johnson
Principal Engineer Air Quality

attachments (2)

APPENDIX B

CONSULTATION LETTER UNDER SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT

U.S. Department of Energy

National Energy Technology Laboratory

June 6, 2003

Mr. Brian D. Conway
State Historic Preservation Officer
Michigan Historical Center
Box 30740
Lansing, Michigan 48909-8240

Dear Mr. Conway:

The United States Department of Energy (DOE) is considering participation, through a five year cooperative agreement with We Energies, in a project for Retrofit for Mercury and Multi-Pollutant Control on Three 90 MW Coal-Fired Boilers. Under the cooperative agreement, We Energies would design, install, operate, and evaluate the TOXECON process for integrated control of mercury, particulate matter, SO_2, and NO_x emissions at Wisconsin Electric Power Company's Presque Isle Power Plant in Marquette, Michigan.

A letter dated February 27, 2003, to the Historic Preservation Officer, Michigan State Historic Preservation Office from Richard E. Johnson, Principal Engineer Air Quality for We Energies, previously notified you of this proposed project. A response dated March 26, 2003, was received from Brian Grennell, Environmental Review Specialist, requesting additional information. That information is currently being compiled and will be forwarded to you as it comes available.

The TOXECON unit would be installed on the combined flue gas stream of Presque Isle Power Plant units 7, 8, and 9, which have a total capacity of 270 MWe. In the TOXECON process, sorbents that include powdered activated carbon for mercury and other air toxic emissions control would be injected into a new pulse-jet baghouse installed downstream of the existing particulate control device. The key objectives of the project would be to (1) achieve very high levels mercury removal, (2) increase collection efficiency of particulate matter, and (3) determine viability of sorbent injection for additional SO_2 and NO_x control, while maximizing the use of coal combustion by-products. A description of the proposed project including graphics depicting its location is provided as an Enclosure. The project location is clearly labeled as "Powerplant" on the topographical map enclosure.

As part of our coordination and consultation responsibilities, and to comply with provisions implementing Section 106 of the National Historic Preservation Act of 1966, we would appreciate receiving any information you have regarding historic or cultural properties in the project area. Your thoughts on the potential impacts associated with the proposed project would also be appreciated.

3610 Collins Ferry Road, P.O. Box 880, Morgantown, WV 26507-0880 ❖ 626 Cochrans Mill Road, P.O. Box 10940, Pittsburgh, PA 15236-0940
REPLY TO: Morgantown Office • ted.mcmahon@netl.doe.gov • Voice (304) 285-4865 • Fax (304) 285-4403 • www.netl.doe.gov

Based on the scope of the proposed project, DOE has initiated preparation of an Environmental Assessment (EA), in accordance with requirements of the National Environmental Policy Act, to analyze, document, and disseminate information on the potential environmental consequences of the proposed project. Information that you provide will be incorporated and appropriately addressed in the EA. If your initial review concludes that no historic or cultural properties are present in the project area, a written acknowledgement of that conclusion would be appreciated. In any case, the information that you provide will be considered in preparing the final EA. The draft EA will be available for review in June 2003. A copy of the EA will be sent to you.

Should you require additional information, please contact me by telephone at (304) 285-4865 or by e-mail at 'ted.mcmahon@netl.doe.gov.'

Sincerely,

Ted McMahon
Project Manager

Enclosures

cc: Richard Johnson, We Energies
Robert L. Miller, Oak Ridge National Laboratory

APPENDIX C

PUBLIC COMMENT LETTER AND RESPONSES

Comments on Draft Environmental Assessment (DOE/EA-1476)
TOXECON Retrofit for Mercury and Multi-Pollutant Control
Presque Isle Power Plant
Marquette, Michigan
By John C. Ulrich

Comment:

Section 2.1.2 on p. 2-7

With all three boilers running, what happens if one induced-draft (ID) fan fails? Suggest installing four ID fans to prevent any problems with a failed fan.

Response:

Each unit's ID fan would be a reliable, very expensive piece of equipment, similar to the forced-draft (FD) fan and other critical equipment. If the ID fan would trip off, the entire unit would go off line. Spares would be maintained of individual components that could fail but not of the entire fan. The degree of redundancy under the proposed configuration would be the same as under current plant operation. The reliability and redundancy of this equipment would be consistent with industry standards and with good engineering practice.

Comment:

What kind of vent is on the dry ash storage silo? What is to prevent the Hg laden activated carbon from flying into the air as the fly ash/carbon mixture is loaded into the silo?

Response:

A self-contained bag-type fabric filter (Flex Kleen or equivalent) would be mounted atop the dry ash storage silo. The dust collector would filter the air displaced by the fly ash/carbon mixture that would be loaded into the silo. A similar system would be installed on the silo used to store the activated carbon prior to injection.

Comment:

Section 2.1.4 on p. 2-9

WE Energies have talked about retiring the older units (1 through 6) in the future. If that is done, where will the extra 3 MWE come from?

Response:

The electricity generated by the Presque Isle Power Plant is fed into the Mid-America Interconnected Network (MAIN) electrical grid. The Midwest Independent System Operator is responsible for dispatching (bringing on-line) power plants based on demand, starting with the least expensive power available. The MAIN has a 24.7% reserve margin at peak summer generation, according to a North American Electric Reliability Council report dated May 2003 ("2003 Summer Assessment: Reliability of the Bulk Electricity Supply in North America," found at www.nerc.com under "Reliability

Assessments"). The Upper Peninsula of Michigan has access to electricity generated in Wisconsin and Michigan as part of this grid. Electricity would be provided by other generators on the grid if, for any reason, the power demand in the locality would exceed the supply available from the Presque Isle Power Plant (including accounting for the 3-MW loss to the electrical grid due to operation of the proposed project).

Comment:

Section 2.1.5.3 on p. 2-14

Approximately 748 tons annual injection of activated carbon is quoted. Wouldn't it be better to give a range such as 570 to 965 tons per year?

Response:

The actual injection rate and operating range would be determined by testing. A range between 450 and 780 tons per year would be expected. Table 2.1.1 and Section 2.1.5.3 have been revised to reflect this range.

Comment:

Section 2.1.6.1 on p. 2-14

If there is no fire protection system inside of the bag house, what would happen to all of the Hg which was captured in the carbon when it burns? Would it go into the air?

Response:

The baghouse would not include a fire protection system. In the event of a baghouse fire, the plantwide fire protection system and the city of Marquette Fire Department would be activated. Hg captured on the carbon could be released into the air, but quantities would not exceed current Hg emissions because current emissions are not captured by a baghouse prior to release to the atmosphere.

Comment:

Would it be wise to discuss the effects of one bag breaking through and releasing Hg laden activated carbon into the air?

Response:

Toxicity Characteristic Leaching Procedure (TCLP) testing would demonstrate that Hg, after being captured on the carbon, is quite stable because a substantial amount of Hg does not leach from the carbon. Because the baghouse would house approximately 8,000 fabric filters, failure of a few filters would have a very small effect on Hg emissions. Total Hg emissions would still be much less than without operation of the baghouse. Standard operating procedures would be implemented to detect any bag failure, allowing isolation of the compartment and repair of the bag.

Comment:

Should there be a discussion of the potential of acid rain due to lower plume height?

Response:

Acid rain, the popular name for acidic deposition, is a regional phenomenon that occurs when SO_2 and NO_x are chemically transformed and transported in the atmosphere and deposited on the earth's surface in the form of wet (rain, snow, fog) or dry (particle, gas) deposition. SO_2 and NO_x are readily oxidized in the atmosphere to form sulfates and nitrates. Subsequently, the sulfates and nitrates may form sulfuric acid and nitric acid when combined with water, unless neutralized by other chemicals present. SO_2 and NO_x can be transported by the wind for hundreds of miles from one region to another.

During the demonstration of the proposed project, SO_2 emissions from the Presque Isle Power Plant would decrease or stay the same, ranging from 14,704 to 18,326 tons per year compared with 18,326 tons per year currently. Similarly, NO_x emissions would decrease or stay the same, ranging from 11,212 to 12,117 tons per year compared with 12,117 tons per year currently. Consequently, acidic deposition resulting from the Presque Isle Power Plant would be expected to decrease slightly or exhibit no perceptible change upon operation of the proposed project. The lower plume height resulting from the proposed project could cause a slight, unquantifiable change in the geographical distribution of acid rain, but would have a negligible effect on acid rain formation overall.

Comment:

Section 2.1.6.2 on p. 2-15

Is there a fire protection system inside of the bag house in case the carbon on the filters catches fire? If so, how would the Hg laden activated carbon that would flow into the floor drain system be cleaned? Would it be prudent to construct a new floor drain system for the new filter system?

Response:

The baghouse would not include a fire protection system. Activated carbon has no auto ignition or flash point (i.e., it does not combust on its own in high oxygen environments). In the event that water would be used to fight a baghouse fire, the contained water would be processed by the plant's wastewater treatment system. TCLP testing would demonstrate that Hg, after being captured on the carbon, is quite stable because a substantial amount of Hg does not leach from the carbon (e.g., during immersion in water).

Comment:

Section 3.6.3 on p. 3-9 and Section 4.1.6.3 on p. 4-10

From recent articles in the newspaper, I believe the gray wolf has been remove [sic] from the endangered species list and has been included on the threatened species list.

Response:

As suggested in the comment, the gray wolf has been reclassified in midwestern U.S. states, including Michigan, from endangered to threatened status, effective April 1, 2003 (it is still listed as endangered in the southwestern United States). Section 3.6.3 has been revised to reflect this change in status. Because the gray wolf is dismissed as a concern in Section 3.6.3, it is not discussed in Section 4.1.6.3.

Comment:

Section 4.1.2.2 on p. 4-4

Would it be wise to place a new monitor near the 2.3 mile predicted range for maximum increases a re [sic] predicted for plume concentrations being higher?

Response:

Maximum ambient concentrations, which are the sum of existing concentrations and maximum increases in modeled concentrations resulting from the proposed project, are predicted to be no more than 25% of the National Ambient Air Quality Standards (NAAQS). Moreover, actual percentages would be less because of the conservative assumptions used in the analysis. Consequently, the maximum ambient concentrations would not approach the NAAQS, and a new monitor would not be necessary to assure compliance with the NAAQS.